Type equation here.Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS
MAXIMUM MARKS: 80
COURSE: BASIC ELECTRONICS

SEMESTER: III
PROGRAMME: ELECTRICAL ENGG.
SUBJECT CODE:120020

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any three of the following.** **(12)**

(a) Define terms: -
   (i) Atoms (ii) Intrinsic Semiconductor
   (ii) Extrinsic Semiconductor (iv) Doping

(b) List different types of diodes with an application of each.

(c) Draw the symbols of
1.Different types of MOSFETs OR
2.Forward & reverse bias characteristics of PN Junction diode

(d) With the help of transistor characteristic, explain the relation between drain current, V_{GS} and g_m.

(e) Define h parameters of transistor in CE configuration.

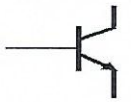
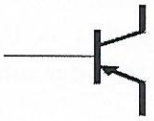
Q.2. **Attempt any two of the following.** **(12)**

(a) With a neat diagram explain the application of a transistors as Inverter.

(b) Justify that doping level improves/ decides conductivity of a semiconductor.

(c) Draw i/p and o/p characteristics of CB configuration of a transistor.

(d) Match the following

S NO.	Group A	Group B
1	NPN	Current controlled device
2	FET	
3	Intrinsic semiconductor	Voltage controlled devices
4	PNP	Amplifier
5	Active regain	Less conductivity
6	BJT	
7		Cut off

Q.3. Attempt any two of the following. **(16)**

(a) Explain the working of PNP transistor with a neat diagram.
(b) With a neat circuit diagram and waveform describe the operation of bridge full wave rectifier.
(c) List the types of JFET and explain the working of any one with its characteristics.

SECTION-II

Q.4 Answer any Three out of Five **(12)**

(a) Draw symbols and give names to the terminals.
  (i) TRAIAC (ii) UJT (iii) SCR
(b) Describe photo transistor.
(c) Draw and explain the characteristics of photo diode.
(d) Compare CLASS A with CLASS B amplifier.
(e) Describe phot multipliers in brief.

Q.5 Answer Any Two out of Four **(12)**

(a) Draw and explain two transistor analogy of SCR in detail.
(b) Draw a neat circuit diagram and explain Triac-Diac light dimmer in detail.
(c) Draw a neat and explain Boot strap circuit in detail.
(d) Draw V-I characteristics of
  (i) TRIAC (ii) UJT

Q.6 Answer Any Two out of Three **(16)**

(a) Draw a neat circuit and explain class AB amplifier.
(b) Draw neat circuit and explain SCR characteristics and also plot its V-I characteristics.
(c) Draw and explain effect of frequency on bandwidth w.r.t. single stage & two stage amplifier.

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SEAT NO. _____

TIME ALLOWED: 3 HOURS **SEMESTER: III**
MAXIMUM MARKS: 80 **PROGRAMME: ELECTRICAL ENGG.**
COURSE: GENERAL MECHANICAL ENGG **COURSE CODE:120027**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q1. Attempt **Any three** of the following: **(12)**

a) Draw neat labelled sketch of constant pressure open cycle gas turbine.
b) Differentiate between single acting and double acting steam engine.
c) Classify steam turbine.
d) Draw a neat sketch of Cochran boiler.
e) Compare fire tube and water tube boilers.

Q2. Attempt **any Two** of the following: **(12)**

a) Describe the compoundings of impulse turbine.
b) Describe types of condenser.
c) Describe La-Mont boiler.
d) Sketch and explain lever loaded safety valve.

Q3. Attempt **any Two** of the following: **(16)**

a) Explain with neat sketch, working principle of double acting steam engine.
b) Explain reheating and intercooling in gas turbine.
c) Describe with neat sketch, working of
(i) Impulse Turbine
(ii) Reaction Turbine

SECTION-II

Q.4 Attempt **Any Three** of the following: **(12)**

a) Classify Internal Combustion Engine.
b) Classify belt drive.
c) Describe working of 4 stroke petrol engine.
d) Explain flange coupling, Also state it`s application.
e) Draw a neat sketch of carburettor.

Q.5 Attempt **any Two** of the following: **(12)**

a) Explain with neat sketch, air refrigeration system.
b) Draw and explain valve timing diagram of 2 stroke diesel engine.
c) Differentiate single and multiplate clutch.
d) Classify brakes and state its application.

Q.6 Attempt **any Two** of the following: **(16)**

a) Explain vapour absorption refrigeration system with neat sketch.
b) Classify cam and followers.
c) i)Describe Oldham coupling with neat sketch,
ii) Define following
A. Absolute humidity
B. Relative humidity
C. Dew Point Temperature

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: VI**
MAXIMUM MARKS: 80 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: POWER ELECTRONICS | **SUB CODE: 120028**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 Attempt **ANY THREE** of the following. **(12)**

a) Discuss the condition for sustained Oscillations. What is Barkhousen criteria?
b) Give the constructional details of PUT. Sketch its schematic diagram and the Circuit symbol.
c) Define latching and holding currents as applicable to an SCR. Show these Currents on its static V-I characteristics.
d) Describe the significance of di/dt in SCRs.
e) Explain main features of firing circuit.

Q.2 Attempt **ANY TWO** of the following. **(12)**

a) Explain RC phase shift Oscillator with neat diagram and its frequency equation.
b) Explain construction details and V-I characteristics of DIAC.
c) Explain snubber circuit for overvoltage protection with neat diagram.
d) Explain firing circuit for TRIAC.

Q.3 Attempt **ANY TWO** of the following. **(16)**

a) What are the main features of firing circuit ?Explain RC firing circuit with neat circuit diagram and Waveform.
b) Describe IGBT in detail.
c) Described Hartley Oscillator with its circuit diagram & its frequency equation.

SECTION-II

Q.4 Solve **ANY THREE** of the following. **(12)**

a) Explain the principle of phase control.
b) Draw a neat block diagram of UPS.
c) Write a short note on freewheeling diodes.
d) State the various applications of SCR.
e) Write classification of chopper.

Q.5 Attempt **ANY TWO** of the following. **(12)**

a) Draw and write working principle of step up chopper with waveforms.
b) Sketch the diagram of single phase bridge inverter. Explain its operations.
c) Explain with neat diagram single phase semi converters and its load voltage Waveform.
d) Explain different frequency system for chopper with neat diagram.

Q.6 Attempt **ANY TWO** of the following. **(16)**

a) Draw a neat block diagram of SMPS. Explain each block.
b) What is class C commutation? State its working principle with circuit diagram.
c) Compare series inverter with parallel inverter with neat diagram.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: III**
MAXIMUM MARKS: 80 **PROGRAMME: ELECTRICAL ENGG.**
COURSE: ELECTRICAL ENGG. FUNDAMETAL **SUB CODE: 120302**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any Three out of Five.** **(12)**

(a) Explain Ohm's law with neat diagram.

(b) Draw the circuit for three resistances connected in series and have derive formula for total resistance.

(c) Define
(i)Magnetic flux (ii) Flux density (iii) Capacitance (iv) Inductance

(d) State Fleming's left hand and right hand rule.

(e) Explain mutual Inductance with neat diagram.

Q.2. **Attempt any Two out of Four.** **(12)**

(a) Explain with neat diagram KCL &KVL.

(b) Compare cork's screw rule with Fleming's right hand rule.

(c) Explain
(i) Faraday's Law of Induction (ii) Lenz's Law

(d) Derive the equation for relation between self and mutual Inductance of two coupled coil.

Q.3. **Attempt any Two out of Three.** **(16)**

(a) Explain –
(i) Dielectric strength (ii) Electric flux density
(iii) Electric field (iv) Voltage gradient

(b) (i) Explain capacitance in series connection circuit.

(ii) Two Identical coils A and B consisting of 1500 turns each lie in parallel planes such that 70% of flux produced by the current in coil A link the coil B. Current of 4 amp flowing in the coil A produces in it a flux of 0.04 mwb. Calculate
(1) Self-inductance of each coil (2) Mutual inductance between them.

(c) (i) Compare Electric circuit with magnetic circuit.

(ii) The resistance of the field winding of a dc machine at 0^0C is 120Ω. What will be its resistance at a working of 55^0C. Temperature Coefficient of resistance of copper is 0.0043 per ^{0}C at 0^0C.

SECTION-II

Q.4. Attempt any Three out of Five. **(12)**

(a) Define
(i) Average value (ii) Maximum value (iii) RMS value
(iv) Amplitude regarding alternating quantities.

(b) Explain the concept of lagging phasor with vector diagram.

(c) Write advantages and disadvantages of balanced star connected Circuit.

(d) Explain the concept of Admittance of Impedance.

(e) Derive-
(i)Resonance (ii) Resonance frequency (ii) quality factor
(iv) Selectivity.

Q.5 Attempt any Two out of Four. **(12)**

(a) Explain behaviour of pure capacitive circuit. Draw wave form of current, voltage and power

(b) Write comparison of series resonance & parallel resonance.

(c) Explain Millman's theorem for neutral shift.

(d) Draw vector diagram & expression for series combination of RL Circuit.

Q.6. Attempt any Two out of Three. **(16)**

(a) $V_1 = 60 \angle 40^0$ $V_2 = 6 \times Jg$. Calculate $V_1 + V_2$, $V_1 - V_2$, $V_1 * V_2$, $\frac{V_1}{V_2}$
In both forms.

(b) Derive relation between line voltage & phase voltage, line current & Phase current for star connection.

(c) (i) Draw admittance principle d& replay it various components.

(ii) Explain concept of balanced & unbalanced load.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | **SEMESTER: III**
MAXIMUM MARKS: 80 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: ELECTRICAL ENGG. MATERIALS | **COURSE CODE:120303**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q1. Attempt **Any three** of the following: **(12)**

a) State the various properties of electrical Engineering Materials.
b) State the thermal properties of materials and hence define temperature co-efficient of resistance.
c) State the application of aluminium.
d) Give the classification of magnetic materials & hence define permeability.
e) What is ferrites? Stat it's application.

Q2. Attempt **any Two** of the following: **(12)**

a) State various mechanical properties of materials & hence define
(i) Ductility (ii) Melteabilitay.
b) Explain B-H curve of a magnetic materials with neat sketch. State it's importance.
c) Enlist various law conductivity materials hence explain any two with application.
d) State and explain the properties of
(i) Iron (ii) Cobalt

Q3. Attempt **any Two** of the following: **(16)**

a) Give the detailed classification of electrical Engineering materials based on energy band theory.
b) State and explain the properties and uses of
(i) Copper (ii) Constantan
c) Compare between soft magnetic materials and hard manganic materials with examples.

SECTION-II

Q.4 Attempt **Any three** of the following: **(12)**

a) Compare between intrinsic and extrinsic semiconducting materials.

b) Explain the concept of 'polarisation' w.r.t dielectric materials with neat sketch.

c) State the desirable properties of good insulating materials.

d) State the properties of PET &PBT.

e) Give the detail classification of insulating materials.

Q.5 Attempt **any Two** of the following: **(12)**

a) Enlist different types of capacitors and explain any two in detail.

b) What is meant by doping? Explain the process of doping and its relevance.

c) Compare between thermoset and thermoplastic.

d) Explain with neat-sketch the concept of dielectric loss and loss angle with neat sketch.

Q.6 Attempt **any Two** of the following: **(16)**

a) Explain the properties and applications of polycarbonate and polystyrene.

b) Enlist various gaseous insulating materials and hence explain SF_6 with merits and demerits.

c) (i) Compare between polar and non-polar dielectric.
(ii) Explain P type and N type semiconductors with neat sketch.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: III**

MAXIMUM MARKS: 80 **PROGRAMME: ELECTRICAL ENGG.**

COURSE: POWER GENERATION **SUB CODE:120304**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt any three.** **(12)**

(a) List out four each name of Thermal and hydropower station with their capacities.
(b) State different types of coal and its effects on quality of power generation.
(c) Give the types of turbine and also mentions which types of turbine is used for low and high head hydropower station.
(d) Give the four application of diesel power station.
(e) Draw single line diagram of power system and mention voltage levels.

Q.2. **Attempt any Two.** **(12)**

(a) Explain two stroke cycle of IC engine.
(b) State the choice of a size selection for nuclear power station.
(c) What are the major components of diesel power plants.
(d) State the function of condenser and Economiser in thermal power station.

Q.3. **Attempt any Two** **(12)**

(a) Draw the layout of thermal power station and explain its working in detail.
(b) Enlist all the factors that decides the site selection for hydroelectric power station.
(c) State the function of following term with reference to nuclear power plant.
(i) Moderator (ii) Reflector (iii) Control Rod (iv) Coolant

SECTION-II

Q.4 **Attempt any Three out of Five.** (12)

(a) Write any two advantages and limitations of tidal power generation.
(b) Give advantages of biomass-based generation.
(c) Define firm power, cold reserve, hot reserve and spinning reserve.
(d) Write the effects of variable load on power station.
(e) Define base load and peak load.

Q.5. **Attempt any Two out of Four.** **(12)**

(a) Explain basic working principle of photovoltaic cell.
(b) Give significance of load curve.
(c) Explain the of interconnected power system.
(d) Discuss the significance of higher values of load factor and diversity factor.

Q.6. **Attempt any Two out of Three.** **(16)**

(a) Explain construction , working and applications of fuel cell with neat labelled diagram.
(b) Discuss the working of Wind Energy conversion system with neat block diagram.
(c) A generating station has the following daily load cycle:

Time(Hrs)	6-8	8-11	11-16	16-19	19-22	22-24	24-6
Load (MW)	20	40	50	35	70	40	20

Plot daily load curve and determine:

(i) Units generated per day
(ii) Average load
(iii) Load factor.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | SEMESTER: IV

MAXIMUM MARKS: 80 | PROGRAMME: ELECTRICAL ENGG.

COURSE: TRANSMISSION AND DISTRIBUTION | CODE: 120306

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Solve Any Three out of Five** (12)

(a) Write difference between DHVAC & EHVDC

(b) Explain skin effect in detail.

(c) Draw neat diagram for transmission and distribution of electrical power and explain it.

(d) Explain properties of conductor material used for transmission and distribution of electric power.

(e) Define string efficiency and explain its formula.

Q.2 **Solve Any Two out of Four** (12)

(a) Define Insulator & explain suspension type of insulator.

(b) Explain formulation of corona. Write advantages & disadvantages of corona.

(c) (i) Write difference between stranded and bundled conductors.
(ii) Explain limitations of EHVDC.

(d) Explain- losses and efficiency of transmission line.

Q.3 **Solve Any Two Out of Three** (16)

(a) Explain sag calculation when supports are connected at equal level.

(b) Explain performance of medium transmission line (π network) with neat vector diagram.

(c) (i) Explain effect of load power factor on performance of transmission line.
(ii) Explain need of A,B,C,D parameters for calculation of transmission line.

SECTION-II

Q.4 **Attempt any Three out of Five** (12)

(a) Classify substations.
(b) Explain the requirements of distribution system.
(c) Describe briefly the design considerations in distribution system.
(d) Differentiate between indoor & outdoor substation.
(e) Define & explain the terms feeder & distributors.

Q.5 **Solve Any Two out of Four** (12)

(a) With neat sketch explain construction of underground cable.
(b) Describe off load top changing method of voltage control. Also state its limitations.
(c) With a neat diagram, describe Murray Loop test for the location of earth fault in an underground cable.
(d) Explain primary & secondary distribution systems.

Q.6 **Solve Any Two out of Three** (16)

(a) Explain with neat diagram distributor fed from one end & both end & write its advantages.
(b) List the equipment's used in substation & explain their function.
(c) A 3 phase 4-wire system supplies power at 400 V and lighting at 230V. If the lamps used requires 70amp,84amp & 33amp in each of these three lines. Calculate the current through the neutral wire. If 3 phase motor is now started taking 200 Amp from the lines at a power factor of 0.2 lagging. Calculate the total current in each line & neutral wire. Also find the total power supplied to the lamps and the motor.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018
SEAT NO. _____

TIME ALLOWED: 3 HOURS
MAXIMUM MARKS: 80
COURSE: ELECTRICAL MEASUREMENTS
SEMESTER: IV
PROGRAMME: ELECTRICAL ENGG.
SUBJECT CODE: 120307

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. Attempt any Three of the following **(12)**

(a) State the base quantities and their units of SI system.

(b) Give applications of DC potentiometer and explain any one in detail.

(c) Write the errors occur in resistance measurement using the Wheatstone's bridge.

(d) Draw the circuit diagram of basic AC bridge network and derive general bridge equation.

(e) State the four categories of standards with an example.

Q.2. Attempt any Two of the following **(12)**

(a) Describe construction and working of Crompton potentiometer with neat labelled diagram.

(b) Explain the need and working of Kelvin bridge for measurement of low resistance.

(c) Discuss different adjustments in AC energy meter.

(d) Explain the calibration process of single phase energy meters.

Q.3. Attempt any Two of the following **(16)**

(a) Write the difficulties involved in high resistance measurement and explain any one method of measuring high resistance in detail.

(b) Describe the operation of Maxwell's inductance capacitance bridge and obtain an expression. Also write advantages and disadvantages of the same.

(c) Explain construction and working of single phase induction type energy meter with neat labelled diagram.

SECTION-II

Q.4. Answer any Three of the following. **(12)**

(a) Describe the pointers and scales in indicating instruments.

(b) Give one example of each of indicating, recording and integrating instrument.

(c) Describe the working of any one type frequency meter.

(d) Moving iron instruments can be used to measure DC as well as AC Explain.

(e) Why are electrodynamometer instruments called 'transfer instrument'?

(f) Explain reactive power measurement using neat sketch.

Q.5. Answer any Two of the following. **(12)**

(a) Describe the working of rectifier type of instruments.

(b) Define the following terms used for instrument transformers.
(i)Transformation Ratio ii) Nominal Ratio (iii) Burden

(c) Derive the torque equation for an electrodynamometer type of wattmeter.

(d) Describe the construction details of moving iron type of power factor meter.

Q.6. Answer any Two of the following. (16)

(a) Explain how power can be measured in balanced 3-phase circuit using two wattmeter method.

(b) What are the different methods of measurement of frequency in power frequency range? Explain the working of vibrating reed type of frequency meter.

(c) In a 2 wattmeter method of measurement of 3-phase power the readings of the wattmeter are 3KW and 1KW respectively. Calculate the power and power factor for a balanced circuit.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: IV**
MAXIMUM MARKS: 80 **PROGRAMME: ELECTRICAL ENGG**
COURSE: TRANSFORMER AND INDUCTION MOTORS **COURSE CODE: 120308**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. Attempt **ALL** questions
3. All questions are compulsory.
4. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
5. Illustrate your answer with neat sketches, wherever necessary.
6. Figure to the right indicate full marks.
7. Assume suitable additional data, if necessary.
8. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 Attempt any **Three** out of Five (12)

(a) Explain with neat sketch the working of transformer.
(b) Draw the vector diagram of transformer as Ideal transformer. State the characteristic of it.
(c) State the need of parallel operation of transformer.
(d) Enlist the applications of an auto transformers.
(e) Compare between single phase and three phase transformers.

Q.2 Attempt any **Two** out of Four (12)

(a) Classify transformers based on i) Voltage ii) Phase iii) construction and iv) applications. Hence Define transformation Ratio.
(b) Obtain the approximate equivalent circuit of transformer referred to primary and secondary side. Draw neat sketches.
(c) Define all day efficiency of transformer and also derive the Condition for maximum efficiency.
(d) State and explain the significance of tertiary winding and give it's use.

Q.3 Attempt any **Two** out of Three (16)

(a) Describe Scott connection of transformers with neat sketch. Give it's application.

(b) The open circuit and short circuit test on a 10KVA, 500/250V, 50Hz, Single phase transformer gave the following results.
Open circuit: 500V, 2A, 100W (H.T. side)
Short circuit: 25V, 20A, 90W (HT side)
Compute (i) Components of No-load current.
(ii) Approximate equivalent circuit referred to primary
(iii) Regulation & (iv) Efficiency of full load at 0.8 pf lagging.

(c) Derive an expression for copper saving in an auto transformer State its merits and demerits.

SECTION-II

Q.4 Attempt any **Three** out of Five (12)

(a) Define 'Slip' of an induction motor and also state its effect on frequency and rotor current under running condition.

(b) State and explain the need of starter for induction motor.

(c) Enlist the advantage and disadvantage of universal motor.

(d) Enlist various methods of speed control of 3 ϕ induction motors.

(e) Draw neat diagram of manual star- Delta starter and explain it's Working.

Q.5 Attempt any **Two** out of Four (12)

(a) Explain with neat sketch the working principle and construction Of 3 phase induction motors.

(b) Describe the procedure to plot the circle diagram step by step. State It's importance.

(c) Draw neat sketch of Direct on line starter and explain it's working using contractors.

(d) A- 3 phase induction motor having a synchronous speed of 1200 RPM, draws 80KW from 3-phase feeder. Copper losses and stator losses in the stator amount to 5KW. If the motor runs at 1152 rev/min. Calculate i) Active power transmitted to rotor
ii) Rotor copper losses
iii) Mechanical power developed
iv) Mechanical power developed at the shaft knowing that windage and frictional loss as 2 KW
v) Efficiency of motor.

Q.6 Attempt any **Two** out of Three (16)

(a) Explain with neat sketch the torque speed and torque slip Characteristics of 3 ϕ induction motor.

(b) Draw neat sketch of Automatic star delta starter and explain it's Operation.

(c) Justify why single phase induction motors are not self-starting. Hence explain the method to make it self starting with example.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: IV**
MAXIMUM MARKS: 80 | **PROGRAMME: ELECTRICAL ENGG.**

COURSE: CIRCUITS & NETWORKS | **SUB CODE: 120309**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

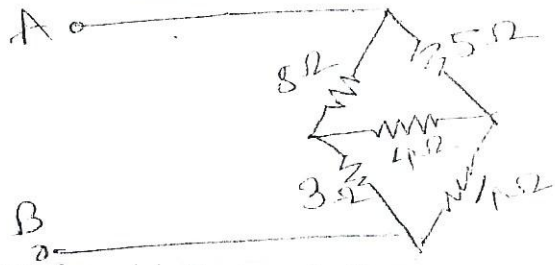
Q.1 **Solve any Three** **(12)**

(a) Define the following term.
i) Passive and active circuit element.

(b) Derive the energy store in capacitor.

(c) Write a type of harmonics & its cause & effect.

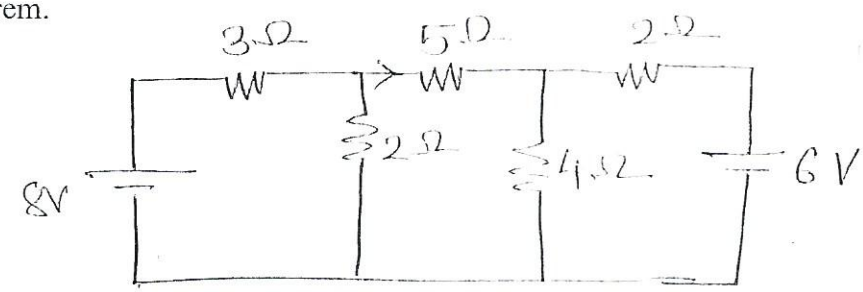
(d) Find the equipment resistance between A & B



(e) State & explain Reciprocity theorem.

Q.2 **Solve anyTwo** **(12)**

(a) Find the current flowing through 5 Ω resistance using superposition theorem.

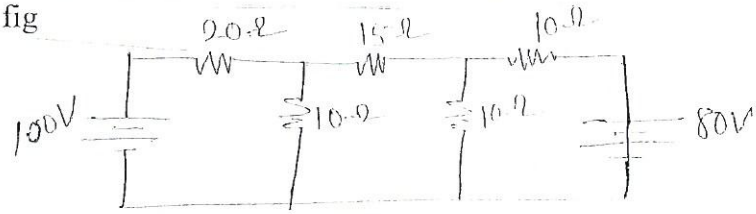


(b) Derive the expression for rise and decay of current in simple RL series circuit.

(c) Explain a Harmonics in single phase A.C. circuit.
(d) Write a type of sources & explain source transformation.

Q.3 **Solve any Two** **(16)**

(a) Using the nodal method, determine the current in individual resistance the circuit shown in fig



(b) Explain odd and even term harmonics with waveform.
(c) Derive expression for rise and decay of voltage in simple RC series circuit.

SECTION-II

Q.4 **Solve any Three** **(12)**

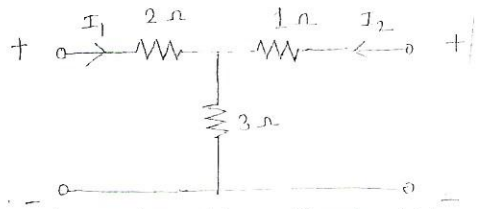
(a) Define i) Positive phase sequence component
ii) Negative phase sequence component
iii) Zero phase sequence component.
(b) Write standard equations for the following
i) Y parameters.
ii) h parameters.
(c) Define Ampere hour efficiency and watt hour efficiency.
(d) Give the difference between operator 'a' and operator 'j'.
(e) Obtain the condition of symmetry in case of Z parameters.

Q.5 **Solve any Two** **(12)**

(a) Explain symmetrical component method for analysis of 3 Ø unbalance System.
(b) Obtain h parameters in terms of Z parameters.
(c) Explain with construction Nickel alkaline battery.
(d) The Zero and positive sequence components of R phase are $E_{RO} = (0.5 - j\ 0.866)$ volt, $E_{R1} = 2\angle 0^0$ volt, If the phase voltage $E_R = 3\angle 0^0$ volt, find the negative sequence component of R phase.

Q.6 **Solve any Two** **(16)**

(a) Find h parameters for the following T network



(b) Explain construction and working of lead acid battery.
(c) Find out positive, negative and zero phase sequence component of the following set of the unbalance voltages.
$V_A = 10\angle 30^0$, $V_B = 30\angle -60^0$ & $V_C = 15\angle 145^0$,

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Shri Vile Parle Kelavani Mandal's
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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: VI**

MAXIMUM MARKS: 80 **PROGRAMME: ELECRICAL ENGG.**

COURSE: SYNCHRONOUS MACHINES **SUB CODE:120310**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1. **Solve any Three out of Five.** **(12)**

(a) State and explain in brief the working principle of an alternator.

(b) Classify alternators as per the application.

(c) Explain the term synchronous reactance.

(d) Explain the conditions to be satisfied for parallel operation of alternators.

(e) Calculate the speed and open circuit line and phase voltages of a 4-pole, 3 phase, 50Hz, star connected alternator with 36 slots and 30 conductors per slot. The flux per pole is 0.05 wb sinusoidally distributed.

Q.2. **Solve any Two of the Four.** **(12)**

(a) With neat sketch explain M.M.F. method of finding regulation of an alternator.

(b) Derive an expression for synchronising power of an alternator connected in parallel.

(c) A 3 phase,800KVA, 11KV, star connected alternator has resistance of 1.5Ω/phase and synchronous reactance of 25 Ω/ph. Find the percentage regulation for a load of 600KW at 0.8 leading power factor.

(d) Distinguish between salient pole type and non-salient type pole rotors with neat sketch.

Q.3. **Solve any Two out of Three.** **(16)**

(a) Explain two bright and one dark lamp method of synchronisation of alternators.

(b) State and explain the terms
(i) pitch factor (ii) Distribution factor. Also state its importance.

(c) State 'voltage regulation' and explain the synchronous impedance method with neat sketch.

SECTION-II

Q.4. Solve any Three out of Five. **(12)**

(a) State the advantages and disadvantage of synchronous motor.

(b) Explain why synchronous motor is called as synchronous condenser.

(c) State all facts about synchronous motor.

(d) Explain the principle of operation of synchronous motor.

(e) Define-
(i)starting torque (ii) Running torque (iii) Pull in torque (iv)pull out torque for synchronous motor.

Q.5. Solve any Two of the Four. **(12)**

(a) Explain V-curves and inverted V-curve of synchronous motor.

(b) State the methods of starting and explain any one method of starting a synchronous motor.

(c) Explain the use of synchronous motor as a drive for industrial application.

(d) Draw the power stages of synchronous motor and explains each stage in brief.

Q.6. Solve any Two out of Three. **(16)**

(a) Explain with phasor diagram effect of change of excitation with constant load for
(i)Unity p.f. (ii) Lagging pf (iii) leading p.f.

(b) A 1000KVa ,11000V, 3-phase star connected synchronous motor has an armature resistance and reactance per phase of 3.5Ω and 40 Ω respectively. Determine the induced emf and angular retardation of the rotor when fully loaded at (i) Unity pf (ii) 0.8 pf lagging.

(c) A 500V,1-phase synchronous motor gives a net output mechanical power of 7.47kw and operate at 0.9pf lagging. If effective reactance is 0.8 Ω. If the iron and friction losses are 500W and excitation losses are 800W, estimate the armature current, calculate the commercial efficiency.

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Type equation here.Shri Vile Parle Kelavani Mandal's
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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS
MAXIMUM MARKS: 80
COURSE: SWITCHGEAR & PROTECTION

SEMESTER: VI
PROGRAMME: ELECTRICAL ENGG.
SUBJECT CODE:120311

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any three of the following.** **(12)**

(a) Describe the main switchgear arrangement in generating station.
(b) State the sequence of operation of circuit breaker, isolator & earthing switch while opening & closing operation.
(c) Explain important characteristics of fuses.
(d) Enlist the advantages & disadvantages of H.R.C. fuse compared to rewireable fuse.
(e) State the terms – Restriking voltage & recovery voltage.

Q.2. **Attempt any two of the following.** **(12)**

(a) State the importance of ELCB. With the help of suitable sketch illustrate the operation of ELCB.
(b) State the various function of protective relaying in the power system.
(c) With the help of complete labelled diagram explain the construction & working principle of Buchholz's relay.
(d) Explain the advantages of static relay with respect to other types of relays.

Q.3. **Attempt any two of the following.** **(16)**

(a) State & explain the methods of arc extinction in a circuit breaker which is used in D.C. circuit & A.C. circuit.
(b) With the help of neat labelled diagram, explain principle of operation & working of induction type overcurrent relay.
(c) Enumerate the advantages & disadvantages of SF_6 circuit breaker.

SECTION-II

Q.4 **Solve any Three out of Five** **(12)**

(a) Explain need of current limiting reactor in power system and write its advantages.

(b) Explain primary and Back-up protection in power system also write various types of Back-up protection.

(c) Explain difficulties occur in differential protection.

(d) Describe operation of SCADA system.

(e) Explain definite distance Relay protection of feeder lines.

Q.5 **Solve Any Two out of Four** **(12)**

(a) Explain with neat diagram percentage differential protection of transformer.

(b) Describe with neat diagram sensitive earth fault protection of alternator.

(c) Explain with neat diagram Arcing ground phenomena.

(d) Describe with neat diagram overcurrent protection of induction motor.

Q.6 **Solve Any Two out of Three** **(16)**

(a) State various Earth fault protection of transformer and explain any two in detail.

(b) (i) State difference between surge absorber and lightening arrestor.
(ii) Explain with neat diagram Horn Gap type lightening Arrestor & state its advantages also.

(c) A 3 phase transmission line operating at 10KV and having a resistance of 2Ω and reactance of 5Ω is connected to the generating station bus-bars through 7 MVA step-up transformer having reactance of 7%. The bus-bars are supplied by 15MVA alternator having 12% reactance. Calculate the short-circuit KVA fed to symmetrical fault between phases if it occurs –

(i) At the load end of transmission.

(ii) At the H.T. side of transformer.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: VI**

MAXIMUM MARKS: 80 **PROGRAMME: ELECTRICAL ENGG**

COURSE: BASICS OF CONTROL SYSTEM **COURSE CODE: 120312**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. Attempt **ALL** questions
3. All questions are compulsory.
4. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
5. Illustrate your answer with neat sketches, wherever necessary.
6. Figure to the right indicate full marks.
7. Assume suitable additional data, if necessary.
8. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt any Three of the following.** **(12)**

(a) Define transfer function and state its advantage & disadvantage. (any two).

(b) State the classification of control systems and compare them.(any four point)

(c) Define steady state error and state different types of the system.

(d) Write down the Manson's gain formula.

(e) Draw the block diagram of feedback control system and state application of feedback control system.

Q.2 **Attempt any Two from the following.** **(12)**

(a) Consider following transfer function, give the answer.

$$\frac{C(S)}{R(S)} = \frac{(s+4)}{s^2(s+2)}$$

(i) Write the number of poles & zero.

(ii) Plot the pole-zero plot.

(iii) What is the type of system?

(b) Explain the construction of AC Servomotors and state its application.

(c) Find the transfer function of figure (1).

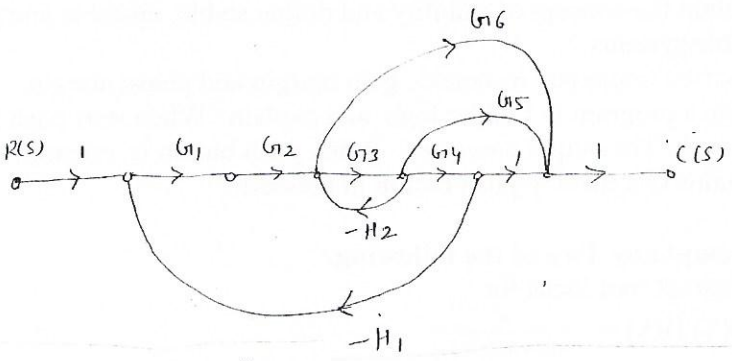


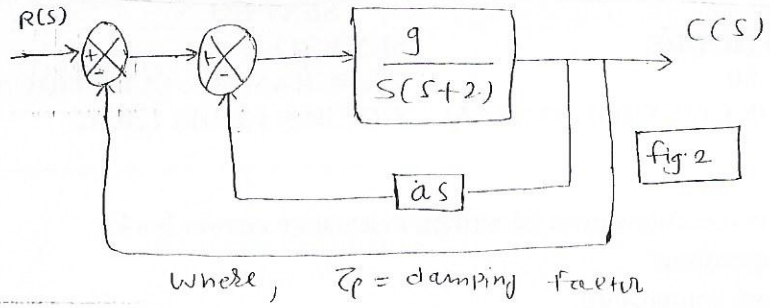
Figure (1).

(d) Express the terms mathematically in time domain & Laplace domain also plot graphically.

(i) Step input (ii) Ramp input (iii) Parabolic input

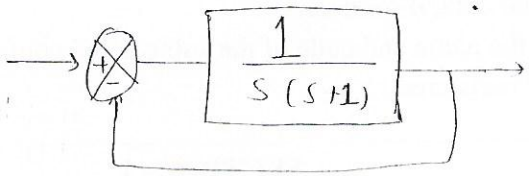
Q.3 **Attempt any Two of the following.** **(16)**

(a) Obtain the equivalent transfer function of the following block Diagram also find ξ & W_n.



(b) Explain working principle and characteristics of stepper motor with neat diagram. Also state the applications of stepper motor.

(c) Find the following time domain specification of the system shown below.



(i)Rise time (ii) Peak time (iii) Settling time
(iv) Maximum overshoot in percentage.

SECTION-II

Q.4 **Attempt any Three of the following.** **(12)**

(a) Give two conditions that must be satisfied for a point to lie on the root locus.

(b) Define Asymptote and Centroid in root locus. Also write formula for the same.

(c) State Gain crossover and phase-crossover frequencies.

(d) Define programmable logic controller. State its applications.

(e) Describe any two instruction used in Ladder diagram in detail.

Q.5 **Attempt any Two of the following.** **(12)**

(a) Find range of values of 'K' for which the system with following transfer function will be stable.

$$G(S)\,H(S) = \frac{K}{S(S+2)(S+4)(S+8)}$$

(b) Explain the concept of stability and define stable, unstable and marginally stable systems.

(c) Describe frequency response , gain margin and phase margin.

(d) Write a program in Ladder logic and explain "When start push Button is pressed. The output energises. When push button is released output still remains ON till stop push button in pressed".

Q.6 **Attempt any Two of the following.** **(16)**

(a) Construct root locus for

$$KG(S)\,H(S) = \frac{K}{S(S+3)(S+6))}$$

Comment about stability of the same.

(b) Draw a bode plot for,

$$G(S)\,H(S) = \frac{3200}{S(S+8)(S+40)}$$

Find gain margin and phase margin and examine stability.

(c) Draw block diagram of PLC and explain e ach component in detail

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: VI**
MAXIMUM MARKS: 80 | **PROGRAMME: Electrical Engg**
COURSE: Traction and Drives | **COURSE CODE: 120314**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt any Three out of Five.** **(12)**

a) Give advantages and disadvantages of electric traction.
b) State the requirements of braking system.
c) List the factors affecting specific energy consumption.
d) Compare current collection by OHE and that by Third rail.
e) Draw speed-time curve and simplified speed time curve and explain it in brief.

Q.2 **Attempt any TWO out Of FOUR.** **(12)**

a) List the desirable characteristic of traction motor.
b) Describe regenerative braking. How Three Phase induction motor can be used for regenerative braking? Explain.
c) What is regulated OHE and unregulated OHE? What is automatic tension Device?
d) Draw typical line diagram of 25KV AC-TSS.

Q.3 **Attempt any Two out of Three.** **(16)**

a) Discuss the precautions to be taken for working on electrified section.
b) State and explain different equipment in Traction Power Circuit.
c) Draw and explain the construction, operation and application of Metadyne and Amplidyne.

SECTION-II

Q.4 **Attempt Any Three Out of Five.** **(12)**

a) State the advantages and disadvantages of multi motor drive.

b) Define duty cycle. Draw the duty cycle for:
i) short time loading
ii) intermittent loading

c) State the advantages and disadvantages of D.O.L. Starter.

d) Draw the block diagram sugar mill.

e) State the properties of D.C. series motor.

Q.5 **Attempt any Two out Of Four.** **(12)**

a) Define load equalization. Explain its need and method to equalize the load.

b) Draw power and control diagram of star-delta starter.

c) State the different types of loads with its characteristics and examples.

d) Explain electrical drives needed for paper mill.

Q.6 **Attempt any Two out of Three.** **(16)**

a) Derive an equation for heating curve and hence draw the heating curve.

b) Explain the factors to be considered before selection of an electric motor for a application.

c) With the help of neat sketch explain:
i) Float switch
ii) pressure switch
Also state their applications.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 80

SEMESTER: VII
PROGRAMME: ELECTRICAL ENGG.

COURSE: INSTRUMENTATION

SUB CODE: 120317

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Solve any Three out of Five** (12)

(a) Differentiate both accuracy & precision.

(b) Define the following term
i) Sensitivity ii) Repeatability iii) Reproducibility iv)Speed of response

(c) Explain active and passive transducers.

(d) Define i) Instrumentation Amplifier
ii) Differential Amplifier

(e) Describe necessity of data processing in instrumentation.

Q.2 **Solve Three out of Five** (12)

(a) Explain the following in brief
i) Primary & secondary transducers.
ii) Electrical & mechanical transducers.

(b) Explain operational Amplifiers with neat sketch. Explain its working & operation.

(c) Give advantages & disadvantages of digital data transmission over analog transmission.

(d) Explain Block diagram of AC & DC signal conditioning also explain its working.

Q.3 **Solve any Two out of Three** (16)

(a) Draw with neat sketch construction & explain the working principle Of LVDT.

(b) Write a short note on
i) Piezoelectric transducer.
ii) V to I converter.

(c) Explain with neat sketch, block diagram of data transmission system.

SECTION-II

Q.4 **Solve any Three out of Five** (12)

(a) Describe construction and working of Bimetallic Thermometer.

(b) Describe the construction of pH electrode.

(c) Explain the principle of Piezoelectric transducer.

(d) Describe construction and working of U – tube monometer.

(e) Show the relationship between Absolute and Gauge pressure and list various sensors used for pressure measurement.

Q.5 **Solve any Two out of Four** (12)

(a) Draw the diagram of optical pyrometer and discuss.

(b) Draw the diagram of light Beam Oscillograph and discuss.

(c) Explain measurement of flow using Venturi Tube.

(d) Describe Pirani Gauge.

Q.6 **Solve any Two out of Three** (16)

(a) Draw the block diagram of CRO and explain function of each block.

(b) Draw the block diagram of Magnetic Recorder Tape and explain its working.

(c) With the help of neat diagram discuss Electro-magnetic flow meter.

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | **SEMESTER: VII**
MAXIMUM MARKS: 80 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: TESTING AND MAINTENANCE | **SUBJECT CODE:120318**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q1. Solve any Three out of Five. **(12)**

a) State the causes of Electrical accident.

b) Define maintenance. Also state the objectives of testing of electrical machines.

c) Draw the connection diagram and vector diagram for the phase group Yy6.

d) Draw the connection diagram for testing insulation resistance of the complete installation to earth in case of LT Installation.

e) Explain need of testing of machines & state various test on dc machine.

Q2. Solve any Two out of Four. **(12)**

a) Explain with neat sketch Brake test on D.C machine.

b) List out the tests to be conducted before commissioning of a transformer as per ISS 2026-1962.

c) Explain with neat sketch earth resistance test.

d) Explain any one method for determining temperature rise in case of transformer.

Q3. Solve any Two out of Three. **(16)**

a) Two shunt motor loaded for the Hopkinson's test takes 15A at 200V from the supply, the motor current is 100A and the shunt current are 3A and 2.5A. If the resistance of each armature is 0.05Ω. Calculate the efficiency of each machine for its particular conditions of loading.

b) Explain with neat diagram back to back test for transformer.

c) Two single phase transformers A and B of equal voltage ratio are running in parallel and supplying a load requiring 500A at 0.8 pf lagging at a terminal voltage of 400volt. The equivalent impedance of the transformer, as referred to secondary winging are (2+j3) & (2.5+j5) Ω. Calculate the current supplied by each transformer.

SECTION-II

Q.4 **Solve any Three out of Five.** **(12)**

a) Explain the conditions required for parallel operation of synchronous machines.

b) Describe the maintenance schedule provided for synchronous machines as per ISS 4889-1968.

c) Explain the causes of failures of induction motor.

d) Explain the phenomenon of noise production in induction motor.

e) Classify insulation of electrical equipment as per ISS1271-1958.

Q.5 **Solve any Two out of Four.** **(12)**

a) Explain necessity of parallel operation of three phase alternators. Also state the process of load sharing between the parallel connected alternators.

b) Explain the procedure of providing routine maintenance for induction motor as per ISS 900-1965.

c) Describe type & routine test for single phase Induction Motor as per ISS 996-1964.

d) Explain care to be taken when electrical equipment are not used for any activity.

Q.6 **Solve any Two out of Three.** **(16)**

a) State the different methods of synchronization. Explain any one method in detail with the help of suitable diagram.

b) (i) Define insulation resistance. List the factors affecting the useful life of electrical insulation.
(ii) Explain with neat Sketch-Revarnishing of electrical insulation.

c) With the help of experimental setup. Explain the open circuit & locked rotor test to be performed on 3 phase Induction Motor. Also state its significance.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | **SEMESTER: VII**
MAXIMUM MARKS: 80 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: UTILIZATION OF ELECTRICAL ENERGY | **COURSE CODE: 120319**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any Three.** **(12)**

(a) Define Luminous flux, luminous intensity, utilization factor & solid angle.
(b) Give the classification of electrical heating along with applications.
(c) Explain the principle of resistance welding.
(d) Compare carbon & graphite electrodes on the basis of current capacity & applications.
(e) With neat sketch, explain working of seam welding machine.

Q.2. **Attempt any Two.** **(12)**

(a) Explain the law's of illumination.
(b) Explain any two modes of transfer of heating.
(c) Explain construction & working of Ajax Wyatt furnace.
(d) Give comparison between DC Arc welding & AC Arc welding.

Q.3. **Attempt any Two.**

(a) With suitable diagram, explain construction & working of sodium vapour lamp. Also state its applications. **(16)**
(b) (i) Explain the factors to be considered while designing the lighting scheme.
(ii) Compare LED lamps with CFL lamps.
(c) Explain working of direct resistance heating & indirect resistance heating.

SECTION-II

Q.4. **Attempt any Three out of Five.** **(12)**

(a) State the requirements of ideal traction system.

(b) Define the term Electric Drive and also draw the basic block diagram of Drive.

(c) Give the classification of elevator machines.

(d) Define-
(i) Fixed charge (ii) Semi fixed charge
(iii) Running charge.

(e) State the causes of low power factor.

Q.5. **Attempt any Two out of Four.** **(12)**

(a) Explain the suitability of series motor for electric traction.

(b) Explain the advantages and disadvantages of electric drive.

(c) Explain the different motors used in the elevator.

(d) A consumer has annual consumption of 3,40,500 units. The tariff is Rs 230/Kw of M.D. per year plus 17 paise per unit, L.F = 40%. Find average cost per unit.

Q.6. **Attempt any Two out of Three.** **(16)**

(a) A train has scheduled speed of 30 Kmph over level track between the stations 1Km apart. Station stopping time is 20 seconds. Assuming braking retardation of 3 kmphps and maximum speed 25% greater than an average speed. Calculate the acceleration.

(b) Explain the factors to be considered before selection of electric motors for a particular application.

(c) Explain any two methods of power factor improvement.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: VII**
MAXIMUM MARKS: 80 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: ENERGY AUDIT & CONSERVATAION | **SUB CODE: 120321**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1. **Attempt any ~~Two~~ Three of the following.** **(12)**

(a) Explain the global warming effects.
(b) State the basic concept of preliminary energy audit.
(c) Explain need for energy audit and write its various types.
(d) Explain about simple payback period.
(e) Explain in detail about ozone layer depletion process and its various effects.

Q.2. **Attempt any Two of the following.** **(12)**

(a) Explain Energy pricing in India.
(b) Discuss different renewable source of energy.
(c) Explain about detailed energy audit methodology.
(d) Explain in detail Acid rain & its effects.

Q.3. **Attempt any Two of the following.** **(16)**

(a) Explain: i) Role of Energy Manager ii) Types of Audit.
(b) Compare:
(i) Primary and secondary energy with appropriate example
(ii) Commercial and non-commercial energy with appropriate example.
(c) Explain the implementation plan for Top management.

SECTION-II

Q.4. **Attempt any Three of following.** **(12)**

(a) State the merits of electronic ballast compared to conventional magnetic Ballast.

(b) Enlist the factors which affect the energy efficiency of a motor.

(c) Draw the schematic diagram of maximum demand controller. State its Function.

(d) List various losses taking place in transmission & distribution system.

(e) A consumer require $50x10^6$ kwh per annum. The tariff is Rs 100 per KW of Maximum demand per year plus 25 paise per unit. Calculate the annual cost Of supply at load factor of 60%. Also estimate the saving in annual cost if the load factor is improved to 100%.

Q.5. **Attempt any Two of the following.** **(12)**

(a) Suggest suitable measures to improve energy conservation in refrigeration And air conditioning system.

(b) Explain the characteristics of energy efficient transformers compared to Ordinary transformers.

(c) State the causes of reactive power and hence explain any one method to Compensate reactive power.

(d) Explain 'energy efficient lighting' in brief.

Q.6. **Attempt any Two of the following.** **(16)**

(a) State and explain the salient features of Energy conservation act 2001.

(b) Describe the measure to incorporate energy efficiency in electric motors.

(c) Draw the neat sketch of VFD and explain its operation with advantages.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018
SEAT NO._____

TIME ALLOWED: 3 HOURS | **SEMESTER : I**
MAXIMUM MARKS: 100 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: ELECTRICAL ENGINEERING MATERIALS | **COURSE CODE: 160301**

INSTRUCTIONS:

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt Any Six of the following:** (18)

(a) Define the following terms
(i) Conductivity (ii) Resistivity (iii) Surface & volume resistivity.
(b) Write difference between ferrous & non-ferrous materials.
(c) Write in detail general classification of materials.
(d) Explain ACSR conductor.
(e) Write the properties of silver soldiers & copper solders.
(f) Explain the properties of high resistivity material & give two examples.
(g) Define – Magnetic flux, magnetic flux density, magnetic flux intensity.
(h) Explain absolute permeability & relative permeability.

Q.2 **Attempt Any Four of the following:** (16)

(a) Describe the concept of magnetism.
(b) Write classification of magnetic materials & explain it.
(c) Explain Electrical properties of materials.
(d) Write properties & application of tungsten.
(e) Explain- Thermal conductivity, Chemical resistance, Heat resistance, Hygroscopic nature of materials.
(f) Explain any four Mechanical properties of materials.

Q.3 **Attempt Any Two of the following:** (16)

(a) Describe manufacturing process of Electrical carbon materials. Also write its properties and application.
(b) Explain properties of any two contact materials and write the factors affecting it.
(c) Explain with neat diagram B-H curve & Hysteresis loop.

SECTION-II

Q.4 **Attempt Any Six of the following:** (18)

(a) State the impurities added to form p type and N type semiconductors.

(b) Differentiate between p type & n type semiconductors. (any three points)

(c) Name the materials used as dielectric medium.

(d) Define loss angle. Give its importance.

(e) Classify insulating materials.

(f) Give any six examples of insulating materials.

(g) State the applications of polystyrene and PVC.

(h) What are polymers? What are the special characteristics of it?

Q.5 **Attempt Any Four of the following:** **(16)**

(a) Write the advantages and limitations of thermosets.

(b) State the important properties of epoxy resins.

(c) Explain the function of insulating materials.

(d) State the uses of Mica porcelain, Wood & varnish in Electrical machines.

(e) Explain doping process.

(f) Differentiate between intrinsic & extrinsic semiconductors. (any four points)

Q.6 **Attempt Any Two of the following:** **(16)**

(a) Explain different methods of polarization.

(b) Explain the term-insulation resistance and Dielectric loss.

(c) Differentiate between important properties of thermoplast and thermosets.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: I**
MAXIMUM MARKS: 100 **PROGRAMME: ELECTRICAL ENGG.**
COURSE: ELECTRICAL POWER GENERATION **COURSE CODE: 160302**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q1. **Attempt any Six of the following.** **(18)**

a) Define Electrical and write its unit.
b) State Fleming's Right hand rule with the help of neat diagram.
c) Draw single line diagram of a power system.
d) List various source of electric power and classify them on the basis of conventional and nonconventional sources.
e) Write a list of thermal power stations in the state with their capacities.
f) Name the various types of coal available in nature.
g) Name the factors to be considered for the selection of coal for thermal power plant.
h) Give classification of combustion engines.

Q2. **Attempt any four of the following.** **(16)**

a) State the importance of Electrical power in day to day life.
b) Describe Thermal pollution.
c) State the factors to be considered for the selection of site for Thermal power station.
d) Explain the function of cooling tower with neat labelled diagram.
e) Discuss the working of Electrical dust collectors with neat labelled diagram.
f) Write the applications of Diesel Power Station.

Q3. **Attempt any Two of the following.** **(16)**

a) Suggest the power plant which shall be suitable for the following situations with Proper justification.
(i) To meet the power demand of an industry which is situated in central part of India and has Load factor near unity.
(i) To meet the varying consumer demand in the rural area having high average rainfall where large land is available at cheaper rate.
(iii) To build a power plant in the area hiving low average rainfall, away from coal Mines and lies in low risk seismic zone.
(iv) To provide power for back up and emergency conditions which can also be used to serve peak load in order to avoid high peak load charges.
b) Explain the working of Thermal power plant in detail.
c) Draw block diagram of Diesel power plant and name its various components.

SECTION-II

Q4. Attempt any Six of the following. **(18)**

a) Classify hydropower plant on the basis of pondage.
b) State the difference between load curve and load duration curve.
c) State the importance of high load factor.
d) State the significance of having moderator in nuclear power plant.
e) State the three demerits of nuclear power station.
f) How the various devices protect the Penstock?
g) State the term firm power and cold reserve.
h) State the need of nuclear energy.

Q5. Attempt any Four of the following. **(16)**

a) How will you dispose solid, liquid and gaseous nuclear waste? Explain in brief.
b) 'Surge tank is compulsory in in case of high head hydropower plant' Give reason. Also state its location in hydropower plants.
c) State the term connected load and hot reserve.
d) Explain nuclear fission process with neat diagram.
e) Give advantages of hydro power plants.
f) State the factor to be considered for site selection of Nuclear power plant.

Q6. Attempt any Two of the following. **(16)**

a) Draw block diagram of nuclear reactor & explain tis working.
b) Draw layout of hydropower plant and state the function of spill way and forebay.
c) (i) What are the different difficulties involves whiles selecting size (rating) and Number of generating units. (set)
(ii) State the term diversity factor and plant capacity factor.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: II**

MAXIMUM MARKS: 100 **PROGRAMME: ELECTRICAL ENGG.**

COURSE: ELECTRICAL ENGINEERING FUNDAMENTALS **SUB CODE**: 160303

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Answer Any Six out of Eight** **(18)**

(a) State and explain ohm`s law.
(b) Explain the different factors affecting resistance.
(c) State properties of lines of force.
(d) Explain Faraday`s laws of Electromagnetic Induction
(e) Define the following terms with their unit:
(i) Charge (ii) Electric field (iii) Elastic flux
(f) Explain Lenz`s Law.
(g) Explain with neat diagram statically induced emf.
(h) Explain self inductance of the coil and write its formula

Q.2 **Answer Any Four out of Six** **(16)**

(a) Explain KVL with neat sketch.
(b) A coil has resistance of 18 Ω when its temperature is 20°C and 21 Ω when its temperature is 65° C. Find its temperature when resistance is 20 Ω.
(c) Explain B-H curve with neat diagram. Also state the applications of B-H curve.
(d) Explain Eddy current loss with its empirical formula stating meaning of each term.
(e) Derive an equation of equivalent or resultant capacitance when three capacitors are connected in parallel
(f) Write comparison between electric circuit and magnetic circuit.

Q.3 **Answer Any Two out of Three** **(16)**

(a) Derive on equation of equivalent resistances when three resistances are connected in (i) Series (ii) Parallel
(b) Derive suitable relation of reluctance and total MMF for series magnetic circuit considering three different parts of circular cross section.

Q.3 (a) Define the following terms with unit

(i) Potential Gradient (iii) Absolute Permittivity

(ii) Permittivity of the medium (iv) Relative Permittivity

SECTION-II

Q.4 Attempt Any Six out of Eight **(18)**

(a) State the term
   (i) Frequency
   (ii) Time Period and
   (iii) Amplitude

(b) Define
   (i) Active Power
   (ii) Reactive power and
   (iii) Apparent Power along with units.

(c) What is meant by ` Neutral Shift` explain.

(d) State and explain the concept of lagging and leading of phasor`s with neat sketch.

(e) Define " Root Mean Square Value of Sine wave". State its importance.

(f) Compare between single phase and three phase circuits (any three points)

(g) Compute the following :
   (i) $(20 + j\ 70) \div 30/\underline{50}$
   (ii) $40/\underline{30} + 20/\underline{30}$

(h) Define the terms : (i) Impedance (ii) Power factor and (iii) Quality factor

Q.5 Attempt Any Four out of Six **(16)**

(a) A sine wave has a peak value of 12V. Determine
(i) RMS Value (ii) Average Value (iii) Peak factor (iv) Form factor

(b) Derive an expression for power in a purely resistive circuit.

(c) Compare between star and delta circuits.

(d) Explain term:
(i) Inductive Reactance and (ii) Capacitive Reactance state its units.

(e) Define average value of sine wave and hence derive the formula for the same.

(f) With neat sketch explain how 3 phase AC is generated. State the equations for each phase.

Q.6 Attempt Any Two out of Three **(16)**

(a) Prove that purely inductive circuit does not consume any power. Draw neat sketches.

(b) A balanced star connected load of $(4 + j\ 3)\ \Omega$ per phase is connected to a balanced 3 phase 400V supply. The phase current is 12A. Find
   (i) Power Factor
   (ii) Total Active Power
   (iii) Total Reactive Power and
   (iv) Total Apparent Power

(c) Distinguish between ` series` and ' parallel resonance`

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Shri Vile Parle Kelavani Mandal's

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS **SEMESTER: II**

MAXIMUM MARKS: 100 **PROGRAMME: ELECTRICAL ENGG.**

COURSE: RENEWABLE ENERGY SOURCES **COURSE CODE:160304**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any Six out of the following.** **(18)**

- **(a)** Name all renewable energy sources.
- **(b)** State the application of Solar energy.
- **(c)** List Solar power plants in India along with their capacities.
- **(d)** Define Intrinsic & Extrinsic semiconductors.
- **(e)** Describe n-type and p-type semi-conductors
- **(f)** Name the types of Geothermal power plants.
- **(g)** Describe current energy from Ocean.
- **(h)** State advantages of current and wave Ocean energy.

Q.2. **Attempt any Four out of the following.** **(16)**

- **(a)** State Kyoto protocol.
- **(b)** Describe Acid rain and Smog.
- **(c)** Compare Solar and biomass energy on the basis of cleanliness, running cost, reliability and environmental impact.
- **(d)** Write a short note on Flat plate collector.
- **(e)** Define photovoltaic effect.
- **(f)** State geothermal reservoir and methods to identify the same.

Q.3. **Attempt any Two out of the following.** **(16)**

- **(a)** Explain the process of formation of potential barrier in p-n junction.
- **(b)** Write a short note on construction and working of solar cell along with neat labelled diagram.
- **(c)** Write the limitations of Ocean Thermal energy.

SECTION-II

Q.4. **Attempt any Six out of the following.** **(18)**

(a) Name the factors which determine the electrical output.
(b) Give advantages and limitation of wind power generation.
(c) Write a chemical reaction of photosynthesis.
(d) Write a composition of biogas.
(e) Name the Fuels used in Fuel cell.
(f) Define cogeneration .
(g) Define base load and peak load.
(h) Draw diagram of interconnected grid system in India.

Q.5. **Attempt any Four out of the following.** **(16)**

(a) Explain Yaw control and pitch control.
(b) Describe energy plantation.
(c) Give applications of fuel cells.
(d) List down the properties of Hydrogen.
(e) Write the safely precautions to be taken in case of Hydrogen usage as a fuel.
(f) Explain the advantages of interconnected grid system.

Q.6. **Attempt any Two out of the following.** **(16)**

(a) Explain wind energy conversion system with neat labelled diagram.
(b) Explain benefits of distributed generation.
(c) Discuss the benefits of combined operation of power plants.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS **SEMESTER: III**
MAXIMUM MARKS: 100 **PROGRAMME: ELECTRICAL ENGG.**
COURSE: ELECTRICAL CIRCUIT &NETWORK **COURSE CODE: 160306**

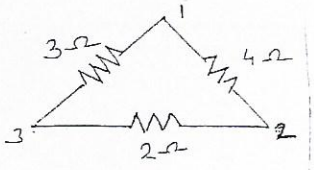
Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

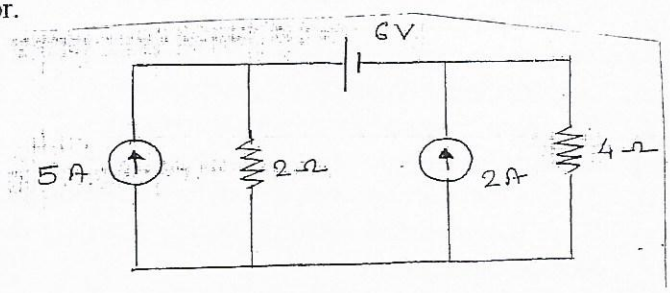
Q.1 **Attempt Any Six of The following:** **(18)**

(a) Define the terms-
  i) Lumped elements (ii) Distributed element (iii) Active elements
(b) State reciprocity theorem.
(c) Define time constant during rise and decay of current in simple R-L series circuit.
(d) Define Mutual & self-inductance.
(e) State maximum power transfer theorem.
(f) Draw the graph of instantaneous voltage, charge and current during charging and discharging process of the capacitor.
(g) Define driving point impedance and Transfer impedance.
(h) Obtain equivalent resistances in star for the following delta connected resistances.



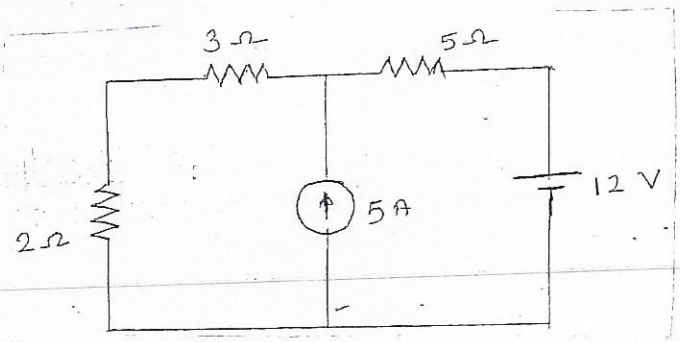
Q.2 **Attempt Any four of the following:** **(16)**

(a) Explain in detail ideal and practical voltage source.
(b) Derive an equation of energy stored by a capacitor.
(c) Draw an equivalent circuit of transformer impedance matching.
(d) Using source conversion technique, find current flowing through 4Ω resistor.



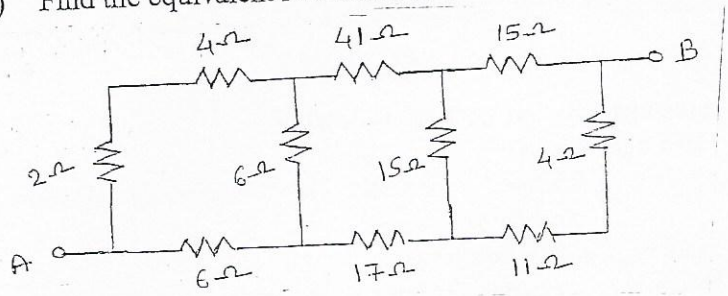
(e) A 2μF capacitor is charged to 100V and a 3 μF capacitor to 200V. After disconnecting the supply, capacitor terminals of similar polarity are connected together. Calculate the p.d. between the terminals of the combination.

(f) Using superposition theorem, find current flowing through 5Ω resistor.



Q.3 **Attempt Any Two of the following:** (16)

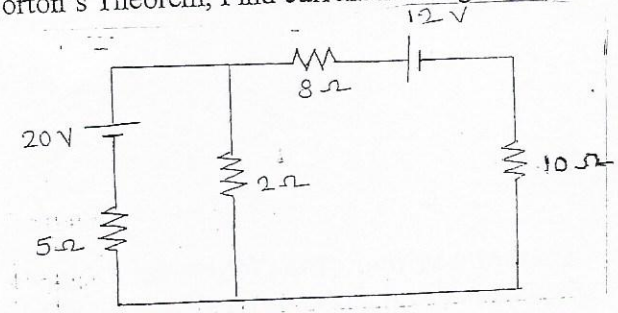
(a) Find the equivalent resistance between the terminals A and B



(b) A 75 μF capacitor series with a 1500Ω resistor is suddenly connected across a 200V d. c supply. Find-

(i) Initial current (ii)Time constant (iii) Initial rate of rise of p.d across capacitor (iv) Value of current when the time is equal to the time constant (v) Charge on capacitor after 0.125 second. (vi)Voltage across resistor after 0.125 second. (vii) Charging current after 0.125 second.

(c) Using Norton's Theorem, Find current flowing through 10Ω resistor.



SECTION-II

Q.4 **Attempt Any Six of The following:** (18)

(a) What is operator 'a'?
(b) State the condition for symmetry used in Z,Y, T & h network.
(c) State different types of storage batteries.
(d) Compare balanced & unbalanced system.
(e) State different type of unsymmetrical faults.
(f) Define two-part network and write its advantages.
(g) State the chemical equation during charging & discharging process of storage batteries.
(h) State different two part networks.

Q.5 **Attempt Any four of the following:** **(16)**

(a) The current in a 3-phase unbalanced system are:

$\vec{I}_R = (12+j6)$ A ; $\vec{I}_Y = (12-j12)$ A

$\vec{I}_B = (-15+j10)$ A

The phase sequence in RYB. Calculate zero, positive & negative sequence components of current.

(b) Derive the condition for symmetry in Z-parameter.

(c) Explain –

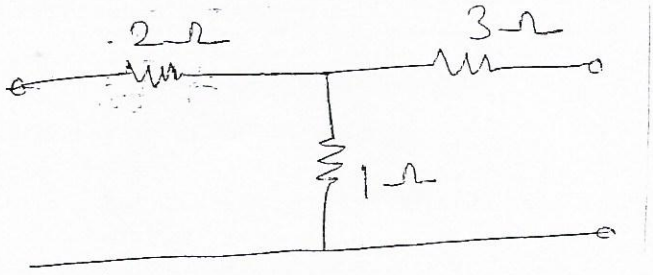
(i) Ampere hour rating

(ii) Ampere hour efficiency.

(d) Explain symmetrical component method for analysis of 3-phase unbalanced system.

(e) Derive ABCD parameters in term of Z-parameters.

(f) Find Y- parameter for given T network.



Q.6 **Attempt Any Two of the following:** **(16)**

(a) Derive the ABCD parameter for π network.

(b) Explain construction & working principle of Nickel alkaline cells.

(c) A balanced star connected load takes 90A from a balanced 3-phase, 4 wire supply. If the fuse in the Y & B phases are removed. Find the symmetrical components of the line current.

(i) Before the fuses are removed.

(ii) After the fuses are removed.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 03 HRS | **SEMESTER: III**
MAXIMUM MARKS: 100 | **PROGRAMME: - Electrical Engg.**
COURSE: Basic Electronics | **OURSE CODE: 160307**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **ATTEMPT ANY SIX** (18)

a) Define and state the relation between them
   i. Intrinsic Semiconductor
   ii. Extrinsic Semiconductor

b) Enlist the methods of transistor biasing.

c) List the types of transistor as per their use /applications.

d) Define: - i) Transconductance ratio
   ii)Pinch off voltage
   iii) I_{DSS}

e) Compare EMOSFET and DMOSFET.

f) With diagram discuss various configurations of BJT.

g) State the relation between doping level and conductivity in semiconductor.

h) List the application of
   i. Zener diode
   ii. FET
   iii. BJT

Q.2 **ATTEMPT ANY FOUR** (16)

a) Compare BJT and FET.

b) With the help of characteristics of BJT define their different region of operations.

c) Explain the construction of JFET.

d) Sketch h'parameter equivalent circuit diagram of CB configuration and list the parameters.

e) Draw full wave centre tap rectifier with it's waveform.

f) With a VI characteristic of PN junction diode define following terms.
   i) PIV ii) Knee point

Q.3 **ATTEMPT ANY TWO** (16)

a) With a neat diagram explain in detail any one of biasing method of transistor.

b) Compare different types of rectifiers.

c) Explain the operation of Depletion mode MOSFET with a neat diagram & it's output characteristics.

SECTION-II

Q.4 **Answer ANY SIX out of EIGHT** (18)

a) Compare LED and LCD.

b) Draw symbol of phototransistor and list its applications.

c) Draw symbol of i) SCR ii) DIAC iii) TRIAC

d) List applications of SCR.

e) Compare DIAC and TRIAC (3 points).

f) List types of Amplifier. List applications of Amplifier.

g) Draw circuit diagram of Bootstrap Amplifier.

h) List different feedback techniques. State where it is used (Give two circuits)

Q.5 **Answer ANY FOUR out of SIX** (16)

a) Explain construction and characteristics of LED.

b) Draw characteristics of SCR. Define latching current and Holding current.

c) Draw Symbol, construction and characteristics of photomultiplier.

d) Compare SCR & TRIAC.

e) Explain basic concept of Amplifier.

f) Compute the gain of two stage amplifier.

Q.6 **Answer ANY TWO out of THREE** (16)

a) Explain construction and working of SCR with neat sketches. Draw two transistor analogy of SCR.

b) i) Compare LED & General purpose P.N. Junctions Diode.
ii) Compare class A and Class B power amplifier

c) Draw neat circuit diagram of CE Amplifier and explain its working with waveform.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: III**
MAXIMUM MARKS: 100 | **PROGRAMME: Electrical Engineering**
COURSE: Electrical Transmission and Distribution | **COURSE CODE: 160308**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 Attempt **any Six** out of Eight **(18)**

a) State the classification of different transmission system on the basis of voltage level.
b) State function of any four components used in transmission line.
c) State the advantages of ACSR conductors.
d) Write any four required properties of line support.
e) State the requirement of Extra high voltage transmission system.
f) Define transmission system and Give Classification Of transmission line according to its length.
g) State the effect of load factor power factor on transmission efficiency.
h) Explain the losses taking place in transmission line.

Q.2 Attempt **any Four** out of Six. **(16)**

a) Define corona and explain various factors affecting corona.
b) Define string efficiency. Explain the methods to improve string efficiency.
c) State various advantages of suspension type Insulator.
d) State skin effect and proximity effect related to transmission lines.
e) Draw nominal TI network for medium transmission line. Draw its vector diagram and state the equation for the sending end voltage.
f) State the advantages and limitations of HVDC transmission system.

Q.3 Attempt **any Two** out of Three. (16)

a) Each line of a 3phase system is sespended by a string of 3 similar insulators. If the voltage across the line unit is 17.5 kv, calculate the line to neutral voltage. Assume that the shunt capacitance between each insulator and earth is $1/8^{th}$ of the capacitance of insulator itself. Also calculated the string efficiency.

b) Explain formation of sag in transmission line and hence Derive equation for sag when supports are at equal height.

c) A 3phase line delivers 3600kw at a p.f. of 0.8 lagging to a load. If the sending end voltage is 33kv, determine i) receiving end voltage ii) line current iii) line losses and iv) transmission efficiency. The resistance and reactance of each conductor are 5.31 Ω and 5.54 Ω respectively.

SECTION-II

Q.4 Attempt **any Six** out of Eight (18)

a) State the importance of Armouring and Lead sheathing in case of underground cables.

b) State function of Voltage Regulator and give classification.

c) State the factors to be considered for selection and location of site of substations.

d) Define distribution system and give its classification

e) Give the comparison between indoor and outdoor substations.

f) Give the design considerations in distribution system

g) Explain in short open circuit fault, short circuit fault and Earth fault of cable.

h) Define substation and give classification of substation according to its service requirement.

Q.5 Attempt **any Four** out of Six (16)

a) Explain with neat Diagram singly fed distributor.

b) Explain Murray loop test for locating short circuit fault of underground cable.

c) Compare overload Transmission line with Underground cable.

d) Draw single bus bar system and state disadvantages.

e) A single phase A-C distributer AB 300mtrs. Long is fed from end A and is loaded as under:

i) 100 A at 0.707 p.f. lagging 200mtr. from point A.

ii) 200A at 0.8 p.f. lagging 300mtr. From point A.

The load resistance and reactance of the distributor is 0.2 Ω and 0.1 Ω per kilometre. Calculate the total voltage drop in the distributor.

f) Explain with neat diagram booster transformer for voltage control.

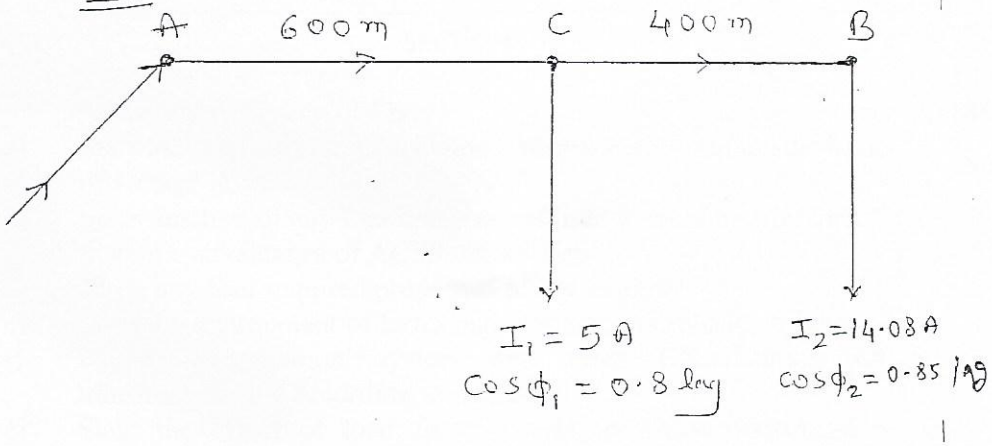
Q.6 Attempt **any Two** out of Three **(16)**

a) A 3Ø 400v distributors AB is loaded as shown in the figure. The 3Ø load at point C takes 5A per phase at a p.f. of 0.8 lagging. At point B, a 3Ø 400V induction motor is connected which has an output of 10H.P. with an efficiency of 90% and p.f. 0.85 lagging. If the voltages at point B is to be maintained at 400v, What should be the voltage at point A? The resistance and Reactance of the line are 1Ω and 0.5Ω per phase per kilometre respectively.

b) Explain the function of following elements in the substation
   1) Transformers
   2) C.T
   3) P.T.
   4) Isolators

c) Explain with neat diagram operation of ON load tap changing transformer. also state its advantages.

Q6.(a) fig.



Q6. a) fig.

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: III**
MAXIMUM MARKS: 100 **PROGRAMME: ELECTRICAL ENGG.**
COURSE: TRANSFORMER & INDUCTION MOTORS **COURSE CODE: 160309**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6.
7. Assume suitable additional data, if necessary.
8. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 Attempt **any Six out of Eight** **(18)**

a) Define transformation ratio. State its importance.
b) Justify why the rating of a transformer is given in KVA.
c) State the applications of an auto transformers.
d) State the function of 'Tertiary winging' with neat sketch.
e) Define
(i)Per unit impedance (ii) Per unit reactance (iii) per unit resistance
f) State the condition to be fulfilled for parallel operation of transformers.
g) Draw vector diagram of transformer at no-load.
h) Define 'all day deficiency' of transformer. State its importance.

Q.2 Attempt **any Four out of Six.** **(16)**

a) Discuss the concept of ideal transformer with its vector diagram.
b) Define 'voltage regulation' of a transformer, explain Direct loading method to estimate IE.
c) Derive the condition for maximum efficiency of a transformer.
d) State the function of-
(i)Conservator (ii) Breather with neat sketch.
e) With neat sketch explain the working principle of 3-phase transformer along with its advantages and disadvantages.
f) Describe various losses of transformers and suggest the remedy to minimise the same.

Q.3 Attempt **any Two out of Three.** **(16)**

a) Parameter of a 2300/230, 50Hz transformer are
$R_1 = 4\Omega$, $R_2 = 0.04\Omega$
$X_1 = 12\Omega$ $X_2 = 0.12\Omega$
KVA = 23KVA Transformer is operating at 75% of its rated load.
If the power factor of the load is 0.866 leading, determine the efficiency of the transformer. Make suitable assumptions.

Q.3 b) Discuss the 'Scott' connection' of transformer with neat sketch. Draw necessary vector diagrams. State its use.

c) State and explain the importance of open circuit and short circuit test. State its procedure with neat sketch.

SECTION-II

Q.4 Attempt **any Six out of Eight.** **(18)**

a) Compare squirrel cage induction motor with slip ring induction motor (any three points)

b) Why 3 phase induction motor never runs at synchronous speed?

c) Why starter is required for induction motor?

d) State the uses of universal motor.

e) Why single phase induction motor is not self-starting? Give reason.

f) Draw the approximate equivalent circuit diagram of an induction motor. State the meaning of each terms.

g) Draw the power flow diagram of 3Ø induction motor.

h) If the emf in the stator of a 4 pole, 3Ø induction motor has a frequency of 50Hz and that in the rotor is 1.5 Hz at what speed is the motor running and at what slip. Calculate percentage slip.

Q.5 Attempt **any Four out of Six.** **(16)**

a) Derive the condition for maximum torque for a 3 phase induction motor.

b) Draw neat sketch of D.O.L starter for 3 Ø induction motor. Explain its working.

c) Explain the operation of capacitor start capacitor run with the help of neat diagram.

d) Explain speed control of three phase induction motor by Roter resistance control.

e) A 3 Ø induction motor is wound for 4 poles & is supplied from 50Hz supply. Calculate
(i)The synchronous speed (ii) Speed of rotor at 4% slip
(iii) The rotor frequency when rotor runs at 1000 rpm.

f) List any four type of 1Ø induction motor. Write down any one application for each

.

Q.6 Attempt **any Two out of Three.** **(16)**

a) State the significance of circle diagram. Explain the procedure to plot the circle diagram with neat sketch.

b) Describe the working and advantages, disadvantages and applications of shaded pole induction motor with neat sketch.

c) A 12 pole, 50 Hz, 3 phase induction motor has rotor resistance of 0.15Ω and standstill reactance of 0.25Ω per phase. On full load it is running at a speed of 480 rpm. The rotor induced emf peer phase at standstill is observed to be 32V. Calculate:

(i) Starting torque (ii) F.L. Torque (iii) Maximum torque (iv) Speed at maximum torque.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 03 HRS | **SEMESTER: IV**
MAXIMUM MARKS: 100 | **PROGRAMME: - ELECTRICAL ENGG.**
COURSE: ELECTRICAL & ELECTRONICS MEASUREMENTS | **COURSE CODE: 160313**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Answer any Six out of the following.** **(18)**

(a) Distinguish between international standards, primary standards, secondary standards and working standards.
(b) Explain the term standardisation of a potentiometer.
(c) Explain 'loss of charge' method of measuring high resistance.
(d) What are the different problems associated with measurement of low resistance.
(e) Explain lag compensation in energy meter.
(f) Explain the method of measuring resistance by using Wheatstone bridge.
(g) Explain various sources and detectors used in a.c. bridges.
(h) What do you mean by guard terminal? Explain its significance with neat diagram.

Q.2. **Answer any Four of the following.** (16)

(a) Explain how d.c. potentiometer can be used to calibrate voltmeter, ammeter and wattmeter.
(b) Explain the working of Meggar with neat sketch.
(c) Explain high voltage Schering bridge with suitable diagrams and equations.
(d) Explain the construction and working principle of electronic energy meter.
(e) Explain method of calibration of energy meter with various types of loads.
(f) Draw neat sketch Wheatstone bridge and explain it's working. State it's limitations.

Q.3. **Answer any Two out of the following.** (16)

(a) Derive the equations of balance for Anderson's bridge. Draw the phasor diagram for conditions under balance. Discuss the advantages and disadvantages of the bridge.

(b) Derive the expression for deflecting torque in single phase induction type energymeters.

(c) Explain how the following adjustments are made in a single phase energy meter
(i) Overload compensation (ii) Friction compensation
(iii) Temperature compensation (iv) Phase error compensation.

SECTION-II

Q.4. **Attempt any Six out of Eight.** (18)

(a) Write types of Instrument transformer. Also state their functions.

(b) Define 'Burden' on instrument transformer.

(c) Draw equivalent circuit of transformer.

(d) State and define performance characteristics of an instrument.

(e) Give classification of Electrical measuring instruments based on their functions.

(f) Draw Damping curve and indicate three types of damping.

(g) Name the torque/forces which are required to be overcome by deflecting torque in indicating instruments.

(h) Draw basic block diagram of Electronic Instrument system.

Q.5. **Attempt any Four out of Six.** (16)

(a) Explain the effects produced by current or voltage to produce deflecting torque in indicating instruments.

(b) Compare current transformer and Potential transformer (any four points)

(c) Explain the reason of short- circuiting secondary winding of the current transformer.

(d) Discuss the need of wattmeter over ammeter-voltmeter measurement of AC power.

(e) Write advantages of two-wattmeter method.

(f) Discuss the function of Digital Multimeter and draw the basic block diagram.

Q.6. **Attempt any Two out of Three.** (16)

(a) Explain construction and working of permanent Magnet moving coil instruments with neat labelled diagram.

(b) Discuss construction and working of Electrodynamometer type wattmeter.

(c) Compare electronic meters and conventional analog meters.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO. _____

TIME ALLOWED: 03 HOURS | **SEMESTER: IV**
MAXIMUM MARKS: 100 | **PROGRAMME: Electrical Engg.**
COURSE: DC & Synchronous machines | **SUB CODE: 160314**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 Attempt **ANY SIX** out of EIGHT **(18)**

a) State the function of i) Yoke ii) Commutator and iii) Carbon brush in dc generator
b) Define i) Critical speed ii) Critical field resistance and iii) Armature Reaction with respect to dc machines.
c) Compare between armature lap and wave windings.
d) State and explain the working principle of dc motor.
e) Enlist various losses of DC machines. Explain Eddy current loss in brief.
f) List various methods of speed control of dc shunt and series motors.
g) Draw open circuit characteristics and load characteristic for DC series generator and hence comment on it.
h) State the principle of Electric motor. Also give the classification of D.C. motors.

Q.2 Attempt **ANY FOUR** out of SIX (16)

a) Derive an emf equation of dc generator.
b) Explain with neat sketch the voltage built up process of dc generator. State the conditions.
c) Explain with neat sketch construction and working of Brushless DC Motors'.
d) Define efficiency of dc machines and hence derive the condition for maximum efficiency.
e) A – 4 pole, lap wound DC shunt generator has a useful flux/pole of 0.08 Wb. The armature winding consist of 260 turns each of 0.006Ω resistance. Determine the terminal voltage when running at 1000 rpm. If the armature current is 55A.
f) Draw and explain with neat sketch
i) Speed – Torque
ii) Torque – Armature Current characteristics of DC series motors.

Q.3 Attempt **ANY TWO** out of THREE (16)

a) A – 4 pole, 220V, wave connected shunt motor gives 11.19 KW when running at 1000 rpm and drawing armature and filed current of 50A and 1.0A respectively. If has 540 conductors. It's resistance is 0.1Ω. Assuming a drop of 1 volt per brush. Find.
i) Total Torque ii) Useful Torque iii) Useful flux/pole
iv) Rotational losses & v) Efficiency of dc shunt motor

b) Draw with neat sketch DC -3 point starter and explain it's operation. State the need of starter also.

c) Explain with neat sketch i) O.C.C. ii) External and iii) Internal characteristics of DC shunt motor and compound motor.

SECTION-II

Q.4 Attempt **ANY SIX** of the following. (18)

a) Define synchronous speed & write it's unit.
b) State the application of synchronous generator & synchronous motor.
c) What is the need of parallel operation of alternators?
d) Why damper winding is used in synchronous motor.
e) Define pitch factor and distribution factor.
f) What do you mean by the voltage regulation of an alternator?
g) Compare alternator and synchronous motor. (ANY 3 Point)
h) What is synchronous condenser?

Q.5 Attempt **ANY FOUR** of the following. (16)

a) Draw and explain the V-curve of synchronous motor.
b) State the different starting methods of synchronous motor and explain any one method.
c) What are the conditions for the proper synchronisation in parallel operation of alternators.
d) Explain the operation of synchronous motor.
e) A 3Ø , 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03 Wb sinusoidally distributed and the speed is 375 rpm. Find the frequency and phase emf assuming full pitched coil.
f) Explain synchronous impedance method related to the regulation of alternator.

Q.6 Attempt **ANY TWO** of the following. (16)

a) Explain with neat diagram the methods used for synchronisation of three Phase alternators.
b) What is the effect of load on synchronous machine also explain the behaviour of synchronous motor with variable excitation.
c) Explain with neat diagram the effect of armature reaction on the synchronous generator for different power factor.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018
SEAT NO._____

TIME ALLOWED: 3 PROGRAMME: ELECTRICAL ENGG.

MAXIMUM MARKS: 100 SEMESTER: IV

SUBJECT: UTILIZATION OF ELECTRICAL ENERGY SUBJECT CODE: 160315

INSTRUCTIONS: -

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q 1. Answer any **Six** out of Eight. **(18)**

a. Define the following terms w.r.t illumination
   i) Luminous flux
   ii) MHCP
   iii) Reduction Factor
b. State Inverse square Law.
c. State the advantage of electrical heating.
d. State the requirements of good heating material.
e. State the advantages of Arc welding.
f. State the classification of electrodes for Arc welding with examples of each.
g. State the functions of Bureau of energy efficiency.
h. State the importance of energy conservation.

Q 2. Answer any **Four** out of Six. **(16)**

a. Discuss the role of renewable energy in energy conservation.
b. Distinguish between D.C. welding and A.C. welding.
c. With the help of neat diagram explain spot welding
d. With the help of neat diagram explain indirect resistance heating system.
e. Discuss the methods used for heat transfer in case of electrical heating system.
f. State the factors to be considered while designing the lighting scheme.

Q 3. Answer any **Two out of** Three. **(16)**

a. With the help of neat illustration explain the construction, working and application of compact fluorescent lamp.

b. A 15 KW, 220 V, single phase resistance oven employs nickel-chrome wire for its heating elements. If the wire temperature is not to exceed 1000 ^{0}c and the temperature of charge is 600 ^{0}c, calculate the diameter and length of wire. Assume radiating efficiency to be 0.65 and emissivity as 0.92, for nickel chrome resistivity is 1.016×10^6 Ωm.

c. Distinguish between resistance welding and Arc welding.

SECTION – II

Q 4. Answer any **Six** out of Eight. **(18)**

a. Draw energy flow diagram and state its significance

b. Name any three equipment used in energy audit and state their functions.

c. Give three advantages of ABC analysis.

d. Draw power flow diagram of Induction Motor

e. State the concept of energy conservation by operating two transformers in parallel.

f. State various power quality issues.

g. Name the technique followed to control maximum demand.

h. Draw the basic block diagram of variable speed / Frequency Drive (VSD / VFD)

Q 5. Answer any **Four** out of Six. **(16)**

a. Write the steps followed in Audit phase of detailed energy audit process.

b. Explain simple payback period.

c. Write comparison between energy efficient motor and conventional induction motor.

d. Explain energy conservation method in lighting system by installing separate transformer and servo stabilizer.

e. Describe the need of reactive power compensation in transmission and distribution system.

f. Compare soft starter with Direct- Online starter and Star-delta starter.

Q 6. Answer any **Two out of** Three. **(16)**

a. Explain energy conservation technique in HVAC system.

b. Write various technical and commercial losses in transmission and distribution system. Also state their remedies.

c. Explain working of :

1) Maximum Demand controller
2) Automatic Power Factor Controller.

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Shri Vile Parle Kelavani Mandal's

SHRI BHAGUBHAI MAFATLAL POLYTECHNIC

AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 03 HRS	SEMESTER: IV
MAXIMUM MARKS: 100	PROGRAMME: ELECTRICAL ENGG.
COURSE ELECTRICAL ESTIMATION & COSTING	COURSE CODE: 160317

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. Attempt any Six of the following. (18)

(a) Draw symbols for following.
(i) Buzzer (ii) Relay (iii) Exhaust Fan

(b) Write the difference between earth wire & neutral wire.

(c) State various components of service connection.

(d) Write down the features of service connection.

(e) State the need of earthing.

(f) Explain the importance of sub-circuit.

(g) Draw multiline wiring diagram for two lights and one fan with regulator controlled by three individual switches by using looping in system method.

(h) Why it is necessary to conduct various tests on electrical installations.

Q.2. Attempt any Four of the following. (16)

(a) What is estimation & costing? State the need of it.

(b) State any 4 IE rules related to electrical Installation & testing.

(c) Write the difference between overhead & underground service connection.

(d) What is service connection? Draw the diagram for overhead service connection.

(e) State the general guidelines for wiring of residential electrical installation.

(f) Write short not on polarity test.

Q.3. **Attempt any Two of the following.** (16)

(a) A room of 5m x 4m is to be wired with 2 lamps, one fan and one 5A socket with the necessary assumptions;
   (i) Decide the no. of sub-circuits required.
   (ii) Calculate load & size of cable for each sub-circuit.
   (iii) Draw multiline wiring connection diagram.
   (iv) Calculate the length of neutral wire & phase wire required. (refer table attached)

(b) List down the methods of earthing. Explain any one method in detail with neat sketch.

(c) Explain Insulation Resistance Test for wiring installation.

SECTION-II

Q.4. **Attempt any Six of the following.** (18)

(a) State the different types of industrial loads.
(b) What is the necessity of earthing in industrial installation.
(c) State the general conditions of contracts.
(d List any three commercial installation.
(e) State any three important rules used for motor wiring in industrial electrification.

(f) Define space to height ratio and give its importance.
(g) List the contingencies in the motor installation.
(h) List any three requirements must for preparing bill of any executed work.

Q.5. **Attempt any Four of the following.** (16)

(a) Estimate the material & total cost for installing 2 HP 3Ø induction motor in (10m x5m) workshop.

(b) Differentiate between electrification of residential and commercial installation.

(c) What is contract and state it's types.

(d) State the special requirements of chemical and petrochemical industry lighting.

(e) State different types of commercial loads (any fours)

(f) What is tender and tender notice.

Q.6. **Attempt any Two of the following.** (16)

(a) Draw a single line diagram for 3 Ø induction motor connected to supply with star delta starter, also explain design procedure for industrial installation.

(b) Explain the general conditions and necessary documents required for preparation tender.

(c) Calculate the ratings of cable, switches conduit and prepare an estimate for a proposed workshop of (12m x 8m) equipped with three machines.

(i) 3 Ø, 440 V, 5 HP Induction motor with efficiency of 0.85 and 0.8 power factor.

(ii) 3 Ø, 440V, 3 HP Induction motor with efficiency of 0.8 & 0.8 power factor.

(iii) 1 Ø, 230V 0.75 HP induction motor with efficiency of 0.8 & power factor of 0.75 located equidistant from each other, also draw its single line diagram.

TABLE 4.1: Current ratings of copper conductor single core cables (VIR, PVC or polythene insulated including tough rubber, PVC or lead sheathed)

Size of conductor		Two cables d.c. or single-phase a.c		Three or Four cables balanced three-phase a.c	
Nominal area (mm^2)	Number and dia of wire (mm)	Current rating (amps.)	Approximate length of run for one volt drop (m)	Current ratings (amps.)	Approximate length of run for one volt drop (m)
1.0	1/1.12	5	4.9	5	5.8
1.5	7/.737	10	3.0	10	3.7
2.5	3/1.06	15	3.4	13	4.3
4.0	7/737	20	3.7	15	5.8
6.0	7/1.06	28	4.0	25	5.2
8.0	7/1.12	36	4.9	32	6.1
10.0	7/1.40	43	5.5	39	7.0
15.0	7/1.63	52	7.0	48	8.8
20.0	19/1.12	62	7.6	56	9.8
25.0	19/1.40	74	8.8	67	11.3
25.0	19/1.63	97	10.0	88	12.8
50.0	19/1.80	160	19.4	155	13.4

TABLE 4.2: Current ratings of aluminium conductor, single core cables. (VIR, PVC or polythene insulated including tough rubber, PVC or lead sheathed).

Size of conductor		Two cables d.c. or single-phase a.c.		Three or Four cables balanced three-phase a.c		Four cables d.c orsingle-phase a.c.	
Nominal area (mm^2)	Number and dia of wire (mm)	Current rating (amps)	Approximate run for on volt drop (m)	Current rating (amps.)	Approximate run for on volt drop (m)	Current rating (amps.)	Approximate run for one volt drop (m)
1.5	1/1.4	10	2.3	9	2.9	9	2.5
2.5	1/1.80	15	2.5	12	3.6	11	3.4
4	1/2.24	20	2.9	17	3.9	15	4.1
6	1/2.28	27	3.4	24	4.3	21	4.3
10	1/3.55	34	4.3	31	5.4	27	5.4
16	7/1.70	43	5.4	38	7.0	35	6.8
25	7/2.24	59	6.8	54	8.5	48	8.5
35	7/2.50	69	7.2	62	9.8	55	9.0
50	7/3.00	91	7.9	82	10.1	69	10.0
	19/1.80						
70	19/2.24	134	8.0	131	9.5	–	–
95	19/2.50	153	8.8	152	10.0	–	–

TABLE 4.3: Current ratings of copper conductor twin, three core and four core cables. (VIR, PVC or Polythene insulated and sheathed with tough rubber, PVC or lead).

Size of conductor		One twin core cable d.c. or single phase a.c.		One-three-core or four-core cable balanced three-phase.	
Nominal area (mm^2)	Number and dia of wire (mm)	Current rating (amps.)	Approximate run for one volt drop (m)	Current rating (amps.)	Approximate run for one volt drop (m)
1.0	1/1.12	5	4.6	5	5.5
1.5	3/.737	10	3.0	8	5.3
2.5	3/1.06	15	3.0	10	5.5
4.0	7/.737	20	3.4	15	5.5
6.0	7/1.06	28	4.0	20	6.4
8.0	9/1.12	36	4.6	25	7.6
10.0	7/1.40	43	5.2	30	8.8
15.0	7/1.63	53	6.4	37	11.0
20.0	19/1.12	62	7.0	43	11.9
25.0	19/1.40	74	8.2	52	13.7
35.0	19/1.63	97	9.8	68	15.8
50.0	19/1.80	140	11.3	88	18.3

TABLE 4.4: Current ratings of aluminium conductor twin, three core or four core cables. (VIR, PVC or Polythene insulated and sheathed with tough rubber, PVC or lead)

Size of conductor		One twin core cable d.c. or single phase a.c		One three-core of four core cable balanced three-phase	
Nominal area (mm^2)	Number and dia of wire (mm)	Current rating (amps.)	Approximate length of run for one volt drop (m)	Current rating (amps).	Approximate lenght of run for one volt drop (m)
1.5	1/1.40	10	2.3	7	3.7
2.5	1/1.80	15	2.5	11	3.9
4.0	1/2.24	20	2.9	14	4.8
6.0	1/2.80	27	3.4	19	5.5
10.0	1/3.55	34	4.2	24	6.8
16.0	7/1.70	43	5.3	30	8.7
25.0	7/2.24	59	6.6	42	10.8
35.0	7/2.50	69	7.1	48	11.7
50.0	7/3.00	91	7.7	62	13.1
	19/1.80				
70.0	19/2.24	118	9.0	82	14.7
95.0	19/2.50	135	9.8	94	15.7

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 03 HRS **SEMESTER: V**
MAXIMUM MARKS: 100 **PROGRAMME: - ELECTRICAL ENGG.**
COURSE: TESTING AND MAINTANANCE **OURSE CODE: 160318**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any Six out Eight** (18)

(a) State the safety practices to be followed in general.

(b) Define:

(i) Routine test (ii) Type test (iii) Special test in case of D. C. machine

(c) Give the advantages of connecting transformers in parallel.

(d) State the different factors affecting earth resistance.

(e) Classify the different type of tests to be carried out on transformer, after manufacturing it.

(f) State the objective of testing.

(g) List the causes of failure of electrical machines.

(h) State the use and principle of phase sequence indicator.

Q.2. **Attempt any Four out of Six** (16)

(a) Explain the operation of Fire Extinguisher.

(b) In a swinburn's test on a d.c. machine the armature current was 4A at a terminal voltage 250V, the field circuit resistance being 250 ohms. Calculate the efficiency of the machine when it is delivering 50A. Assume armature resistance 0.2 ohm.

(c) Explain with neat sketch 'polarity test' on single phase transformer.

(d) Explain with neat diagram testing of insulation resistance between conductors (between phase & Neutral) in L T installation.

(e) Two 1 phase transformers A & B of equal voltage ratio are running in parallel and supply a load of 1000A at 0.8 p.f lag. The equivalent impedance of the two transformers are (2+j3) and(2.5+j5) ohms respectively. Calculate the current supplied by each transformer.

(f) State the advantages and disadvantages of Brake test and Hopkinson's test.

Q.3. Attempt any **Two out of Three** (16)

(a) With neat sketch explain calibrated machine test. Also give its advantages and disadvantages.

(b) Explain the tests to be conducted before commissioning of transformer as per ISS2026-1962, ISS 1886-1967.

(c) Explain with neat sketch 'Earth Tester' for measuring earth resistance.

SECTION-II

Q.4. Attempt any Six. **(18)**

(a) Define the term –
(i)synchronous current (ii) Synchronous power (iii) Synchronous torque

(b) State the causes of failure of induction motors.

(c) Define insulation resistance. State effect of temperature on insulation.

(d) Give the classification of insulating materials with an example and temperature withstand capacity.

(e) State routine and type test of single phase induction motor.

(f) Explain the quiet running test and moisture proofness test on single phase induction motor.

(g) Explain the maintenance of induction motor as per schedule prescribed vide ISS 900-1965.

(h) Explain the hot dip method of varnishing of insulation.

Q.5. Attempt any Four. **(16)**

(a) Explain with neat diagram "no load test" of three phase induction motor.

(b) Explain with neat diagram galvanometer method for measurement of slip of three phase induction motor.

(c) Explain the high voltage test of three phase induction motor and state the importance of the test.

(d) Explain with neat diagram two bright lamp method of synchroning of three phase alternators.

(e) Prepare the maintenance schedule of synchronous machines as pear ISS 4889-1968.

(f) Explain with neat diagram vacuum impregnating plant for revarnishing of insulation.

Q.6. Attempt any Two. **(16)**

(a) A 3000 KVA, 3300 volts, 6 poles alternator runs in parallel with other machines. Its synchronous reactance is 25%. Find synchronizing per unit mechanical angle of phase displacement. Also synchronizing torque.

(b) Explain with neat sketch-
(i)D.C. resistance measurement test
(ii) Slip measurement test
on 3-phase induction motor. State It's importance.

(c) State the need of parallel operation of alternators. Explain the conditions to be satisfied before connecting alternators in parallel.

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Shri Vile Parle Kelavani Mandal's
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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: V**

MAXIMUM MARKS: 100 **PROGRAMME: ELECTRICAL ENGG.**

COURSE: INDUSTRIAL INSTRUMENTATION **SUB CODE: 160319**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Answer Any Six out of Eight** **(18)**

(a) Define Accuracy, Sensitivity, Precision.
(b) Explain various types of Drifts in Instruments.
(c) Define Transducer and give its classification in detail.
(d) State difference between Primary Transducer and Secondary Transducer.
(e) Explain need of Filters in signal conditioning and state its various types.
(f) Draw pin diagram and circuit diagram of OP- amp 741.
(g) Explain with neat diagram characteristics of Low Pass Filters.
(h) State objectives of DAS.

Q.2 **Answer Any Four out of Six** **(16)**

(a) State difference between Active and Passive Transducer.
(b) Describe diaphragm with neat diagram.
(c) State advantages and disadvantages of potentiometer.
(d) Draw Block diagram of Data Transmission and Telemetry System and explain its various blocks.
(e) State advantages of Digital Data Transmission System.
(f) Describe position telemetry system with neat diagram.

Q.3 **Answer Any Two out of Three** **(16)**

(a) Describe with neat diagram operation of
    (i) Integrator (ii) Differentiator
(b) Explain with neat diagram construction, working and characteristics of LVDT.
(c) Explain block diagram of Instrumentation System by giving example of Bourden Tube.

SECTION-II

Q.4 **Attempt Any Six out of Eight** **(18)**

(a) Write down the errors while measuring temperature and remedies of it.
(b) Describe Mercury Thermometer in brief.
(c) With the help of neat diagram explain the functions of galvanometer.
(d) State different metal diaphragms and Bellows.
(e) Write down the application of pneumatic transducer and piezo electric transducer.
(f) State the principle of P-H meters.
(g) Enlist types of mechanical transducer.
(h) Draw the diagram of magnetic tape recorder and write it`s application.

Q.5 **Attempt Any Four out of Six** **(16)**

(a) Explain the construction and working of bi-metallic strip.
(b) Explain piezo electrical transducer.
(c) Write down need of temperature measurement and explain it`s various scale.
(d) Describe Analog indicators oscillographs in detail.
(e) Describe with neat diagram U – tube manometer.
(f) Draw and explain elbow flow meter.

Q.6 **Attempt Any Two out of Three** **(16)**

(a) Explain filled system thermometer for measurement of Temperature and explain with neat diagram any one type of thermometer in detail.
(b) Explain with neat sketch construction and working of pirani gauge pressure transducer with it`s advantages and disadvantages.
(c) Describe with neat diagram construction and working of P.H. meter.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018

SEAT NO._____

TIME ALLOWED: 3 PROGRAMME: ELECTRICAL ENGG.

MAXIMUM MARKS: 100 SEMESTER: V

SUBJECT: POWER ELECTRONICS SUBJECT CODE: 160320

INSTRUCTIONS: -

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q 1. Answer any **Six** out of Eight **18**

a) State principle of oscillator.
b) What are condition of sustained oscillation?
c) Draw symbol of
   i. PUT
   ii. SUS
   iii. Light activated thyristor.
d) Draw V-I characteristic of DIAC.
e) Draw snubber circuit for protection of IGBT.
f) Draw protection circuit for Gate of SCR.
g) Draw UJT based firing circuit for SCR.
h) What is commutation technique? Classify it.

Q 2. Answer any **Four** out of Six. **16**

a) Draw circuit diagram for crystal oscillator and explain it in brief.
b) Explain two transistor analogy of thyristor with appropriate diagram.
c) Explain working of IGBT with neat diagram.
d) State and explain triac rating.
e) Draw over voltage protection circuit and explain.
f) Explain pulse transformer in firing circuit with circuit diagram.

Q 3. Answer any **Two out of** Three. **16**

a) Explain RC firing circuit with diagram and waveform.
b) State turn ON and turn OFF method of triac and explain any one method of turn On And Turn Off in Detail.
c) Explain phase shift oscillator with diagram, waveform and state formula for frequency of oscillator.

SECTION – II

Q 4. Answer any **Six** out of Eight **(18)**

a) Draw block diagram of SMPS.
b) Explain principle of chopper with its block diagram.
c) What is principle of Inverter? List application of Inverter.
d) Explain importance of freewheeling diode.
e) List application of BLDC Motor Drive.
f) Distinguish between controlled and uncontrolled rectifier(3 points each).
g) Explain pulse width modulation with constant frequency in choppers.
h) Draw circuit diagram of type A Chopper.

Q 5. Answer any **Four** out of Six. **(16)**

a) Explain single phase half wave rectifier with Resistive load using neat circuit diagram and respective waveforms.
b) Write short note on BLDC motor drive.
c) Compare- series Inverter with parallel inverter(four points).
d) Explain step down chopper with output voltage expression.
e) Draw circuit diagram of basic series Inverter. Describe its Operating principle.
f) Explain type E chopper with circuit diagram and waveform.

Q 6. Answer any **Two** out of Three. **(16)**

a) Explain single phase Mid-point controlled rectifier with free-wheeling diode using neat circuit diagram and respective waveform.
b) Explain type D chopper operating in all four modes with circuit diagram and respective waveform.
c) Draw block diagram of On-Line UPS and Off-Line UPS. Explain Working of both.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: V**
MAXIMUM MARKS: 100 | **PROGRAMME: ELECTRICAL ENGG.**
COURSE: Traction and Drives | **SUB CODE: 160322**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of pocket calculators (non-programmable) and electronic data sheet is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q1. **Attempt any Six out of Eight** **(18)**

a) Enlist the types of systems of track electrification in traction systems.

b) Draw the speed time curve for urban, suburban and main line service

c) Define: 1) crest speed 2) Average Speed 3) Scheduled Speed

d) State the advantages of pantograph collector.

e) List down the requirements of electric breaking system.

f) State the factors affecting schedule speed.

g) Draw the connection diagram to achieve shunt transition in traction System.

h) Write down the importance of series parallel starting.

Q.2 **Attempt any Four out of Six** **(16)**

a) State the advantages and disadvantages of electric traction

b) Draw the speed Vs torque and speed- current characteristics of DC Series motor with the help of equations.

c) State the suitability of series motor for traction duty.

d) Write down the major equipments used in electric traction

e) List down the constructional Features of amplidyne with neat sketch.

f) State the advantages and disadvantages of electrical braking over mechanical braking.

Q.3 **Attempt any Two out of Three.** **(16)**

a) An electric train weighing 200 tonne has 8 motors geared to driving Wheels. Each wheel is 90cm diameter. Determine the torque developed By each motor to accelerate the train to a speed of 48kmph in 30sec. up A gradient of 1 in 200. The tractive resistance is of 50N/ tonne, the effect of rotational inertia is 10% of train weight, gear ratio is 4 and gearing efficiency is 80%.

b) Explain the calculations of traction system by using trapezoidal speed time curve.

c) Explain plugging of 3-d Induction motor.

SECTION – II

Q4. **Attempt any Six out of Eight** **(18)**

a) Classify electric drives.

b) State the important mechanical features of electric drives

c) Enlist the applications of D.C. motor as a drive.

d) State the classes of duty cycles.

e) Give the significance of control switches in electric drives.

f) Write the application of different types of starters used for induction motor as a drive.

g) Draw basic block diagram of electric drive

h) Mention the types of drives used in any three machine tools.

Q5. **Attempt any Four out of Six.** **(16)**

a) Briefly describe the multi quadrant operation of electrical Drives.

b) State the step by step procedure of determining the motor rating for different drives applications.

c) Describe the term load equalization in electrical drives.

d) State the different types of limit switches. Explain any one type in detail.

e) Describe the characteristics D.C. motors used as electrical drive in paper mills.

f) State the essential requirements of textile mill drive and sugar mill drive.

Q6. **Attempt any Two out of Three.** **(16)**

a) With the help of labelled characteristics, describe the different the types of loads handled by electrical drives.

b) With the help of graphical representation, describe heating time curve and cooling time curve.

c) 1) Explain with neat diagram pressure switch and float switch.
2) Draw DOL starter and star delta starter scheme using contactors.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: I**
MAXIMUM MARKS: 80 | **PROGRAMME: All [CE/ME/EE/IE/DE/CH/PL]**
COURSE: BASIC MATHS | **COURSE CODE: 120003**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Answer the following (ANY THREE)** **(12)**

(a) Resolve into partial fractions:

$$\frac{x^2+23x}{(x+3)(x^2+1)}$$

(b) Find X, if $\begin{vmatrix} 1 & 2x & 4x^2 \\ 1 & 4 & 16 \\ 1 & 1 & 1 \end{vmatrix} = 0$

(c) If $A = \begin{bmatrix} 1 & -5 \\ 6 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$
Find the matrix AB – 2I.

(d) Find the term independent of μ in the expansion of $\left(\frac{2x^3}{a} - \frac{b}{x}\right)^{16}$

(e) Compute adjoint of the matrix: $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{bmatrix}$

Q.2 **Answer the following (ANY TWO)** **(12)**

(a) Solve the following equations using Cramer's rule.
$4x + 3y + 5z = 10$
$3x + 2y + z = 0$
$5x + 6y + 7z = 0$

(b) The term independent of x in the expansion of $\left(x^3 + \frac{m}{x^8}\right)^{11}$ is 1320. Find m.

(c) Resolve into partial fraction: $\frac{x^2+x+5}{(x^2+1)^2}$

(d) Find the inverse of the matrix $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$

Q.3 **Answer the following (ANY TWO)** **(16)**

(a) By using inverse of a matrix, solve the equations:
$2x + y = 3$, $2y + 3z = 4$, $2x + 2z = 8$

(b) Find the coefficient of $\frac{1}{y^3}$ in the expansion of $\left(y + \frac{1}{y}\right)^9$

(c) Find the approximate value of $\frac{1}{\sqrt{99}}$ using Binomial Theorem.

SECTION-II

Q.4 **Answer the following (ANY THREE)** **(12)**

a) Using allied angle property find the value
$\text{Sin}(150^0) + \text{Cos}(300^0)$

(b) Prove that
$\text{Sin}(20^0).\ \text{Sin}(40^0).\text{Sin}(80^0) = \frac{\sqrt{3}}{8}$

c) Find equation of the circle with centre (2, 3) and passing through (3, -2)

d) Find $\perp$ distance between parallel lines
$5x - 12y + 1 = 0$; $10x = 24y + 1$

e) Prove that
$\frac{Sin\,(4\theta)+Sin\,(2\theta)}{1+Cos\,(2\theta)+Cos\,(4\theta)} = \tan(2\theta)$

Q.5 **Answer the following (ANY TWO)** **(12)**

a) Prove that $a^3 \text{Sin}(B-C) + b^3 \text{Sin}(C-A) + c^3 \text{Sin}(A-B) = 0$

(b) Prove that $2\,\text{Cot}^{-1}(2) + \text{Sec}^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$

c) Find the equation of the line if Y intercept is more than X intercept by 4 and it passes through the point (1,3)

d) Find the equation if the line passing through the point of intersection of lines $2x + 3y = 13$ and $5x - y = 7$ and perpendicular to $3x - y + 7 = 0$

Q.6 **Answer the following (ANY TWO)** **(16)**

a) Find the equation of the circle which passes through the point (1 ,-2) and (4,3) and which has its centre on the line $3x + 4y = 7$

b) Find the equations of the tangents to the circle
$x^2 + y^2 + 6x - 6y - 7 = 0$ at the points where the circle cuts the Y axis.

c) Solve the ΔABC if $a = 4$, $b = 5$ and $m\angle B = 30^0$

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 80
COURSE: CHEMISTRY-I

SEMESTER: I
PROGRAMME: ALL
COURSE CODE: 120004

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1. **Answer any Three of the following.** **(12)**

(a) State any four Assumptions of Bohrs'theory.

(b) Distinguish between atomic number and atomic mass number.

(c) Explain Faradays First law of electrolysis.

(d) Calculate the binding energy per nucleon of Ca_{20}^{40}, which has atomic mass 39.975 a.m.u. The mass of hydrogen atom is 1.0078 a.m.u. and that of neutron is 1.0086 a.m.u. (1 a.m.u. = 931 Mev)

(e) Define the terms :
(i) Hardness (ii) Toughness (iii) Ductility (iv) Malleability

Q.2. **Answer any Two of the following.** **(12)**

(a) (i) Write the electronic configuration- (i) $_{12}Mg^{24}$ (ii)$_{18}\,Ar^{40}$
(ii) Explain Hand's Rule with an example.
(iii) Write two differences between orbit and orbital.

(b) (i) Write Faraday's second law of electrolysis.
(ii) Give two application of electroplating.
(iii) What is the difference between electrolyte and nonelectrolyte?

(c) (i) What are metalloids? Give one example.
(ii) Give two properties and two uses of copper.
(iii)Name two properties of aluminium due to which it is widely used in Aircrafts.

(d) (i) An element in having atomic number 11 and atomic mass number 23. Write the number of protons, electrons and neutrons in it.
(ii) Why is an atom electrically neutral?
(iii) Give two differences between electrovalent compounds and covalent compounds.

Q.3. **Answer any Two of the following:** **(16)**

(a) (i) Differentiate between electrons, protons and neutrons on the basis of symbol, nature, location in atom and relative charge.
(ii) Name the four quantum numbers. What does each quantum number Describe?

(b) (i) Explain electrolysis of copper sulphate solution by using copper Electrodes.
(ii) Define degree of ionization. Explain any Three factors affecting degree Of ionization.

(c) (i) State four postulates of Arrhenius theory.
(ii) Explain the formation of water molecule and name the type of bonding.

SECTION-II

Q.4. **Answer any Three of the following:** **(12)**

(a) Explain the following.
(i) Atmospheric (ii) Immersed corrosion.

(b) Name the method used for protection of metals from corrosion. Describe Any two method.

(c) Describe the disadvantage of using hard water in paper & textile industries.

(d) (i) What is hardness of water? State its type.
(ii) What is priming & foaming in boilers?

(e) (i) Calculate the pH value of a solution having H^+ ion concentration $1x10^{-5}$ gm./ion per litre.
(ii) Calculate pH of a solution whose hydrogen ion concentration is $5.5x\ 10^{-5}$ gm. ions per litre.

Q.5. **Answer any Two of the following:** **(12)**

(a) (i) A 50% has pH = 6.495. Find out hydroxyl ion concentration.
(ii)Calculate the pH & pOH of a solution which contain 1.54×10^{-2} mol/ litre of strong acid.

(b) (i) Name chemical substance imparting hardness in water.
(ii) State units expressing hardness of water.
(iii) How to remove temporary hardness of water? Explain using chemical reaction.

(c) Give reasons-
(i) Impure metal corrodes faster than pure metal.
(ii) Galvanised containers are not used for storing food struts.
(ii)Underground piping are connected to magnesium bars.

(d) Explain sherardizing process with neat diagram.

Q.6. **Answer any Two of the following:** **(16)**

(a) (i) Explain estimation of hardness of water by EDTA method.
(ii) Explain mechanism of corrosion of oxygen conglomeration cell.

(b) (i) Calculate the temporary hardness in some sample of water, if total hardness is 310 mg/litre & permanent hardness is 133 mg/litre.
(ii) Name & explain the thin film formed during corrosion.

(c) (i) Explain disadvantage of using hard water in boilers?
(ii) Explain scale & sludge formation in boiler.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018

SEAT NO._____

TIME ALLOWED: 03 Hrs. **SEMESTER: I/II**

MAXIMUM MARKS: 80 **PROGRAMME: ALL**

COURSE: COMMUNICATION SKILLS **COURSE CODE: 120005**

INSTRUCTIONS: -

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Answer the following Any Three** **(12)**

(a) Explain the need and importance of communication.
(b) Explain the advantages and disadvantages of written communication.
(c) What is diagonal communication ? Give one example.
(d) Explain the vertical communication and state it types with suitable example.
(e) State the importance of feedback.

Q.2 **Answer the following Any Two** **(12)**

(a) What are the types of communication ?
(b) Explain the Mechanical and psychological Barriers to communication.
(c) Explain the following terms :
  (i) Kinesics
  (ii) Body Language
(d) State the difference between Upward and Downward communication.

Q.3 **(A)** **Do as Directed-**

(a) Madhavi wrote me a letter yesterday (Change into Past Perfect Tense) **(10)**
(b) Write the phonetic transcription- (i) College (ii) Journey
(c) Gokhale was one of the greatest of Indian Politicians (Change the degree)
(d) Delhi is the Capital of India (Identify the parts of speech)
(e) The Manager granted me the permission (Change the Voice)

(B) **Answer the following (Any One)** **(06)**

(a) State any four principles of Effective Communication in detail.
(b) What are language barriers ?

SECTION-II

Q.4 **Answer the following (Any Three)** **(12)**

(a) How to overcome the psychological barriers ? Explain in details.
(b) Explain the use of video conferring for addressing diploma students.
(c) What Netiquettes must be followed during online communication ?
(d) What are the 7 (seven) C's of Good Writing.

Q.5 **Answer the following (Any Two)** **(12)**

(a) Write a letter of application to Crompton Greaves Private India Ltd. Mumbai-03 for the post of Junior Diploma Engineer, with resume.
(b) Write a complaint letter to Municipal Commissioner, B.M.C. to complain against illegal hawkers in your area causing inconvenience to people.
(c) As a Librarian of your college library place an order to Tata McGraw Hill, Mumbai, for the books on communication Skill and spoken English cassettes.
(d) Write an Enquiry letter to the registrar of M.S.B.T.E. Mumbai-28 inquiring about the kind of courses they offer after Diploma and requesting a copy of their prospectus.

Q.6 (a) One of the students received burn injuries while performing a welding job in the Workshop. Draft an accident report as the Workshop In-Charge to the Head of the Institute. **(08)**

OR

Develop into well – organised paragraph

(i) Effect of De-Monitization on day-today life.
(ii) Importance of Goal setting.

(b) Read the following passage carefully and answer the question below. **(08)**

Many thoughtful people are now worried about Scientific inventions, because they have become so dangerous to man that may burn up our whole civilization. They suggest that we should call a halt to scientific research.

But it is impossible to carry out their suggestion. Science must investigate all material changes in man's world. The aim of scientist is to study how nature may be controlled and used for the benefit of man. Progress of one kind or another cannot be hold to stand still. Nothing can stop it, and as time goes on scientific progress is likely to proceed an even faster rate. The problem as to how the discoveries of scientist are to be applied to the ordinary issues of everyday life is not really a scientific problem. It is for the politician and the people at large to decide whether or not an atom bomb or a hydrogen bomb should be dropped on a foreign country.

Questions-

(i) Why are many thoughtful people worried about scientific inventions? **(02)**
(ii) What is the aim of scientific investigation? **(02)**
(iii) Who are the people to decide the application of scientific discoveries? **(02)**
(iv) Explain the meaning of the following **(02)**
(i) Call a halt (ii) to stand still

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | **SEMESTER: I**
MAXIMUM MARKS: 80 | **PROGRAMME: C/M/E/IE/PL/CH/**
COURSE: PHYSICS-I | **SUBJECT CODE: 120008**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Attempt any Three of the following.** **(12)**

(a) Define the terms-
(i) Angle of contact (ii) surface tension
(iii)Adhesive force (iv) Elastic limit

(b) Water rises to 1.5 cm in capillary tube of diameter 0.4 mm. How far will it rise in capillary tube of radius 0.3 mm.

(c) Define the terms-
(i) Stress (ii) Strain (iii) Factor of safety (iv) Breaking stress

(d) Draw neat diagram of Searle's apparatus to find thermal conductivity of good conductor.

(e) Define-
Cp, Cv, Enthalpy, Cp in terms of enthalpy.

Q.2. **Attempt any Two of the following.** **(12)**

(a) Define Reynold number.
(i) Derive formula for R
(ii) Differentiate between laminar flow & turbulent flow.

(b) (i) State stoke's law write equation for viscous drag on spherical object.
(ii) Draw stress strain diagram for metal write & show elastic limit, yield point.

(c) (i) Gases have two specific heat capacities, Explain why?
(ii) A glass window $50m^2$ area & 0.34 cm thick has temperature 40^0C on outer side & 25^0C on inner side. Calculate coefficient of thermal conductivity if 650 kcal of heat is conducted in 60 sec.

(d) (i)Define young's modulus, Bulk modulus, & modulus of rigidity.
(ii) State hook's law of elasticity write equation for young's modulus.

Q.3. **Attempt any Two of the following.** **(16)**

(a) (i) Define the term surface Energy, and capillarity.
(ii) Derive formula for surface tension T for liquid by capillary rise method.
(ii) Draw neat diagram of capillary rise method for determination of T.

(b) (i) Define the terms velocity gradient, streamline flow.
(ii) State poiseuille's Equation.
(iii)Draw neat diagram of Poiseuille's apparatus

(c) (i) What are three different modes of heat transfer. Give example of each.
(ii) Convert 1cal/gm/c^0/s into W/m/K.
(iii) Explain why Cp is erector than Cu for gases with relation.

SECTION-II

Q.4. **Attempt any Three of the following.** **(12)**

(a) State first law of thermodynamics. Convert 20 calories into Joule.

(b) In case of resonance tube closed at one end, a tuning fork of frequency 512Hz gives an observed resonating length of 15.9 cm. Inner dimeter of resonance tube is 3.65 cm. Calculate velocity of sound in air.

(c) With a neat diagram, explain working of optical pyrometer.

(d) Define-
Reverberation, Reverberation time, absorption coefficient, echo.

(e) Define: Reversible process, Irreversible process, cycle, Entropy.

Q.5. **Attempt any Two of the following.** **(12)**

(a) Draw neat diagram of 'Graphical representation of displacement of particle performing S.H. M. and starting from mean position'. A particle performing S.H.M. has acceleration of 45cm/s^2 when it is 8 cm from the mean position. Calculate its period.

(b) Describe: Measurement of loudness of sound, velocity of sound by resonance tube experiment.

(c) Define: Node, Antinode With neat diagram, describe ' Frequency of A.C. supply by sonometer'.

(d) List conditions for good acoustics. With neat diagram, explain 'formation of stationary wave'.

Q.6. **Attempt any Two of the following.** **(16)**

(a) Define: Linear S.H.M., Amplitude of S.H.M. frequency of S.H.M., velocity of wave, wavelength of wave, state any three characteristics of wave motion.

(b) State and with neat diagram illustrate "Zeroth law of thermodynamics" State- see back effect, Peltier effect.
Define- Temperature of inversion, Neutral temperature.

(c) With neat diagram, explain isothermal process and adiabatic process. List any two examples of reversible process and irrevressible process.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS
MAXIMUM MARKS: 80
COURSE: CHEMISTRY-II

SEMESTER: II
PROGRAMME: C/M/E/IE/PL/CH/DE
COURSE CODE: 120010

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1. **Answer the following (any three).** **(12)**

(a) Explain the process of gravity separation for the concentration of ore.
(b) What is heat treatment? Write three purpose of heat treatment.
(c) Give the composition and two uses of brass and duralumin.
(d) What are the factors affecting the thermal conductivity of insulators?
(e) Distinguish between calcination and roasting of ore.

Q.2. **Answer the following (any Two).** **(12)**

(a) (i)Name two ferrous alloys.
(ii)Which reducing agent is used in smelting?
(iii)Why is glass wool used to filter acids?
(b) (i) Name the ores of iron.
(ii) Define metallurgy and ore.
(iii) What are thermal insulators?
(c) (i) What is the effect of carbon on steel?
(ii) Give two characteristics of a good thermal insulator.
(iii) Define alloys.
(d) (i) Why cast iron cannot be beaten into sheets?
(ii) What are the products of blast furnace?
(iii) Define flux and gangue.

Q.3. **Answer the following(any Two).** **(16)**

(a) (i)Draw a neat and labelled diagram of blast furnace.
(ii) Write four applications of asbestos.
(b) (i) Describe fusion method for the preparation of alloys.
(ii) Distinguish between annealing and normalizing.
(c) Explain why-
(i) Amalgams are prepared.
(ii) Wood's metal is used to prepare electric fuse.
(iii) Copper is added to gold while making jewellery.
(iv) Ni and Cr are added to stainless steel.

SECTION-II

Q.4. **Answer any Three of the following.** **(12)**

(a) Explain fluid film lubrication with the help of figure.

(b) Define lubricant. Give the classification of lubricants with examples.

(c) Write four differences between paints and varnishes.

(d) Define the terms-
(i)Viscosity (ii) Viscosity index (iii)Flash point (iv) Fire point

(e) Give four applications of rubber based on its properties.

Q.5. **Answer any Two of the following.** **(12)**

(a) (i) Define acid value of lubricating oil.
(ii) What are plastics?
(iii)Name two method for reducing air pollution due to I.C. engine.

(b) (i) What is greenhouse effect?
(ii) Give two drawbacks of natural rubber.
(iii)Define pollution. Name tow air pollutants.

(c) (i) What is vulcanisation of rubber.
(ii) Write two purposes of applying paints.
(iii)Write two causes of pollution.

(d) (i) Give two characteristics of varnish.
(ii) Name two methods of applying paint.
(iii)Write two sources of noise pollution.

Q.6. **Answer any Two of the following.** **(16)**

(a) (i) Name the constituents of paint. Give the function of any one.
(ii) What is water pollution. Explain three sources of water pollution.

(b) (i) Write four characteristics of a good paint.
(ii)What is biochemical waste? Give two techniques for its disposal.

(c) (i) State four function of lubricant.
(ii) Write four differences between thermosoftening plastics and thermosetting.

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Shri Vile Parle Kelavani Mandal's
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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: II**
MAXIMUM MARKS: 80 **PROGRAMME: ALL**

COURSE: ENGINEERING MATHEMATICS **COURSE CODE: 120012**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt any Three** **(12)**

(a) If $f(x) = \frac{x+2}{4x-3}$ and $t = \frac{2+3x}{4x-1}$ show that $f(t) = x$

(b) Evaluate $\lim_{x \to 3} \frac{x^3 - 27}{\sqrt{x^2+7}-4}$

(c) If $y = tan^{-1}\left(\frac{\cos x}{1+sinx}\right)$, Find $\frac{dy}{dx}$

(d) Find $\frac{dy}{dx}$, $ax^2 + 2hxy + by^2 = 0$

(e) Differentiate w.r.t. x
$x\sin(2x) + 10^x + K^K + \tan^3(x^2)$

Q.2 **Attempt any TWO** **(12)**

(a) If $y = (x)^{\sin x} + (\cos x)^x$, Find $\frac{dy}{dx}$

(b) Evaluate $\lim_{x \to 0} \frac{e^x + e^{-x} - 2}{1 - \cos(2x)}$

(c) Evaluate $\lim_{x \to 0} \left(\frac{2x+1}{1-2x}\right)^{\frac{1}{x}}$

(d) Differentiate sin (log x) w.r.t. x.

Q.3 **Attempt any TWO** **(16)**

(a) If $y = \cos(m \sin^{-1} x)$, show that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} + m^2y = 0$

(b) If $y = e^{\theta}(\cos\theta + \sin\theta)$ and $x = e^{\theta}(\cos\theta - \sin\theta)$, Find $\frac{dy}{dx}$

(c) If $x^p \cdot y^q = (x+y)^{p+q}$, show that $\frac{dy}{dx} = \frac{y}{x}$

SECTION – II

Q.4 **Attempt any THREE of the following.** **(12)**

(a) Three forces $2\hat{\imath} + \hat{\jmath} + \hat{k}$; $-\hat{\imath} - \hat{\jmath} - \hat{k}$ and $3\hat{\imath} - 2\hat{\jmath} + 2\hat{k}$ are acting at the point (-2, 1, 2). Find the moment of force about the point (1, 1, 1).

(b) Find area of the triangle having vertices (1, 3, 2) : (2, -1, 1) and (-1, 2,3)

(c) If $\vec{a} = 2\hat{\imath} + \hat{\jmath} + \hat{k}$
$\vec{b} = \hat{\imath} - \hat{\jmath} - \hat{k}$
$\vec{c} = 2\hat{\imath} - 2\hat{\jmath} + \hat{k}$
Find $\vec{a} \cdot (\vec{b} \times \vec{c})$

(d) Find the angle between the vectors $\hat{\imath} + 2\hat{\jmath} + 2\hat{k}$ and $\hat{\imath} - 2\hat{\jmath} + 2\hat{k}$

(e) If $\vec{a} + \vec{b} + \vec{c} = 0$, Prove that $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a}$.

Q.5 **Attempt any Two of the following.** **(12)**

(a) Using Euler's formula prove that $\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$

(b) Solve using De Moivre's theorem $x^4 + 1 = 0$

(c) Find K if $(\sqrt{3} + i)^{14} + (\sqrt{3} - i)^{14} = K$

(d) Find the value of $z^3 + z^2 - z + 22$, if $z = \frac{5}{1-2i}$

Q. 6 **Attempt any Two of the following.** **(16)**

(a) The slope of the curve $2y^3 = ax^2 + b$ at (1, -1) is same as the slope of $x + y = 0$ Find a, b.

(b) Find the equations of tangents to the curve $y = x^2 - 2x - 3$, where it meets the x – axis.

(c) Particle is moving according to the law, $s = t^3 - 6t^2 + 9t + 5$, Find
i) When its acceleration is zero
ii) Velocity and distance at that time.

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | **SEMESTER: II**
MAXIMUM MARKS: 80 | **PROGRAMME: C/M/E/IE/PL/CH/DE**
COURSE: PHYSICS -II | **COURSE CODE: 120013**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt Any Three of the following** **(12)**

(a) Define : Threshold Wavelength , Work Function, Stopping Potential, Threshold Frequency.

(b) Derive the relation for effective resistance, if three resistors R_1, R_2 and R_3 are connected in series.

(c) List four conditions for steady interference pattern.

(d) Calculate resultant capacitance, if three condensers of capacities $1\ \mu F, 3\mu F\ and\ 5\mu F$ are connected in parallel.

(e) Define : Diffraction of light, polarization of light, Right handed substance, left handed substance.

Q.2 **Attempt Any Two of the following** **(12)**

(a) State Planck's hypothesis, list four applications of photoelectric effect.

(b) List four properties of line of force, state Coulomb`s law, Define potential gradient.

(c) Define : Ohm`s law, specific resistance, calculate specific resistance in S.I. unit of wire of length 110 cm and of resistance 30 ohm and radius 0.011 cm.

(d) Draw neat diagram of comparison of e.m.f. of cell by single cell method and sum and difference method respectively, convert $1\ \frac{V}{cm}$ into $\frac{V}{m}$.

Q.3 **Attempt Any Two of the following** **(16)**

(a) With neat diagram, explain constructive and destructive interference respectively, covert 3eV into Joule. [1 eV $= 1.6 \times 10^{-9}\ Joule$]

(b) With the help of neat diagram, describe Newton's rings set up. calculate energy of photon if frequency of incident radiation is $7.981 \times 10^{14}\ Hz$. [$h = 6.625 \times 10^{-34}\ J.S.$]

(c) List four applications of photoelectric effect and applications of interference of light respectively.

SECTION-II

Q.4 **Attempt Any Three of the following** **(12)**

(a) With neat diagram, explain dia and para magnetism respectively.

(b) State Bohr`s third postulate, calculate energy and radius of Bohr`s second orbit respectively.

(c) Define: Packing density, Miller Indices, draw (112) and (122) planes in cubic crystal respectively.

(d) With neat diagram, describe construction of optical fibre.

(e) List four applications of Nanotechnology.

Q.5 **Attempt Any Two of the following** **(12)**

(a) List dia, para and ferro magnetic material each, Define : Critical temperature, Critical magnetic field, Superconductivity.

(b) List name of two impurity material .With neat diagram, explain formation of P-type semiconductor.

(c) List name of four nanomaterial and one example of one dimensional and two dimensional Nano material respectively.

(d) List four properties of Laser, draw neat diagram of He-Ne Laser.

Q.6 **Attempt Any Two of the following** **(16)**

(a) With neat diagram, explain spontaneous and stimulated emission, with neat diagram describe energy level diagram of hydrogen atom.

(b) State first and second postulates of Bohr`s theory respectively, Define : Unit cell, number of atoms per unit cell, co-ordination number, draw neat diagram of unit cell of S.C. , B.C.C., F. C.C. respectively.

(c) On the basis of Band theory of solids, classify material into insulator, conductor and semiconductor respectively, list two popular method of NDT and applications of ultrasonic respectively.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS **SEMESTER: III/IV**

MAXIMUM MARKS: 80 **PROGRAMME: PLASTICS/CHEMICAL/MECH**

COURSE: ELECTRICAL TECHNOLOGY **COURSE CODE: 120017**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt Any Three** **(12)**

(a) State and explain Ohm`s Law.

(b) Explain working principle of DC Motor with neat sketch.

(c) Explain working principle of transformer with neat sketch.

(d) Explain concept of autotransformer and 3 Ø transformer.

(e) State two applications of each of following DC motor.

(i) DC Series Motor

(ii) DC Shunt Motor

Q.2 **Attempt Any Two** **(12)**

(a) State and explain Kirchhoff`s Laws.

(b) Draw characteristics between

(i) T_a and I_a (ii) N & I_a for DC shunt motor.

(c) Explain the core construction of transformer.

(d) State the EMF equation of transformer and give meaning of each term in the equation.

Q.3 **Attempt Any Two** **(16)**

(a) (i) State and explain Faraday's Laws of Electromagnetic Induction.
(ii)State the term power factor and reactive power.

(b) Classify types of DC Motor on basis of connection between armature winding and field winding and draw circuit diagram of each.

(c) Define transformer and compare core type transformer with Shell type transformer.

SECTION-II

Q.4 Attempt Any Three. **(12)**

(a) State the principle of Three phase induction motor.

(b) State any four factors to be considered for selection of drive.

(c) Give the applications of resistance heating (Any Four)

(d) Draw the circuit diagram of resistance split phase 1 Ø induction motor.

(e) State any four disadvantages of direct core type induction furnace.

Q.5 Attempt Any Two. **(12)**

(a) Why single phase induction motor is not self-starting?

(b) Define Electrical Drive. Also explain it with the help of block diagram.

(c) Explain di-electric heating with its principle and working.

(d) Give the applications of the following motors

(i) 3 Ø squirrel cage induction motor.
(ii) 3 Ø slip ring induction motor.
(iii) 1Ø permanent capacitor split phase induction motor.

Q.6 Attempt Any Two. **(16)**

(a) Explain the construction of 3 Ø squirrel cage induction motor.

(b) Give the advantages and disadvantages of
(i) Coupling
(ii) Rope Drive
(iii) Chain Drive
(iv) Gear Drive

(c) Explain with the help of a neat sketch direct and indirect induction furnace.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER. 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS
MAXIMUM MARKS: 80
COURSE: STRENGTH OF MATREIALS

SEMESTER: III
PROGRAMME: PLASTIC / CHEMICAL
SUBJECT CODE: 120018

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt any Three out of Five.** **(12)**

a) Define Poisson's ration and state the relation between three elastic constants E, G and k.

b) A steel road 800mm long and 60mm X 20mm in cross-section is subjected to an axial push of 89KN. If the modules of elasticity is 2.1×10^5 N/mm^2, Calculate the stress, strain and reduction in length of the rod.

c) Define strain energy and modules of resilience.

d) A bar is subjected to a tensile stress of 100 N/mm^2. Determine the normal and tangential stresses on a plane making an angle of 60^0 with the axis of tensile stress.

e) Define principal planes and principal stresses.

Q.2 **Attempt any TWO out of FOUR** **(12)**

a) The principle stresses at a point in the section of a boiler shell are 120MPa, and 30MPa both tensile. Find the normal, tangential and resultant stresses across a plane through the point inclined at 50^0 to the plane carrying 120MPa stress.

b) A steel bar 4m long and 50mm diameter hangs vertically which is securely fixed on a collar at its lower end. If a weight of 20KN falls on the collar from a height of 10mm. determine the stress developed in the bar. Also calculate the strain energy stored in the bar Take E=210GPa.

c) A brass rod of 250mm length and 20mm diameter is fixed inside a steel tube of 40mm external diameter and 20mm internal diameter and of same length. The composite bas is subjected to an axial pull of 150KN. Find the stress in each metal.
Take E_{steel} = 200GPa and E_{brass}= 110GPa

d) For a round bar of 50mm diameter and 2.5m long a certain material has young's modules of 1.10×10^5 N/mm^2 and modulus of rigidity is 0.45×10^5 N/mm^2 Find the bulk modulus and the lateral contraction of the bar when stretched by 3mm.

Q.3 Attempt any Two out of Three (16)

a) A circular bar of 500mm length has a cross-section as given below: First 100mm as a diameter 12mm, second 200mm has a diameter of 20mm. and the last 200mm has a diameter of 30mm. Determine the maximum axial pull which the bar may be subjected if the maximum stress is limited to 100N/mm^2 . find the total elongation. Take E = 2 X 10^5 N/mm^2.

b) A steel cube of 50mm side is subjected to a force of 6KN (tensile) 8KN (compressive) and 4KN (tensile) along X, Y and Z directions respectively. Determine the changes in volume of the block. Take E=200GPa and μ=0.3

c) A channel section has the following dimensions,
Flanges: 50mm X 10mm
Overall depth: 200mm
Thickness of web: 10mm
Find Ixx and Iyy.

SECTIONS-II

Q.4 Attempt any Three out of five (12)

a) Define hoop stress, longitudinal stress, maximum shear stress and volumetric strain for thin cylinders.

b) Write the torsional formula for shaft and explain the meaning of each term.

c) What is core of section? Obtain core of section for a rectangular section

d) What are the assumptions in theory of simple bending

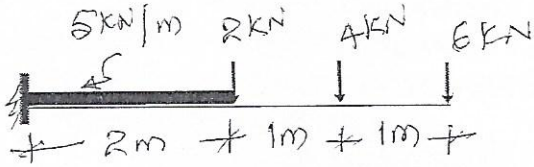
e) Draw shear force and bending moment diagram for cantilever of length 'l' carries point load 'W' at free end.

Q.5 Attempt any two out of four (12)

a) A rectangular beam section 300mm wide and 500m deep is simply supported over a span of 4m. it carries UDL of 10KN/m over entire span. Find maximum bending stress and draw bending stress distribution diagram.

b) A short column 200x 200mm is subjected to an eccentric load of 95 KN at an eccentricity of 65mm. find maximum and minimum stresses at the base section.

c) Draw SF and BM Diagram for cantilever beam as show in figure. 1



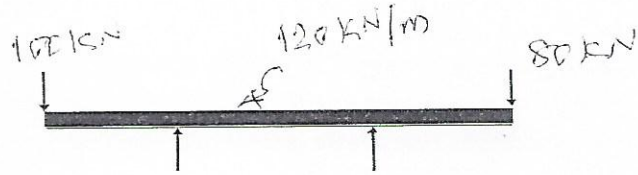
Q.5.b fig-1

d) A timber beam 200mm wide and 400mm deep is simply supported over a span of 5m. find the UDL load it can carry over full span, if the maximum bending stress is 7.2 MPa.

Q.6 **Attempt any Two out of Three** **(16)**

a) A cylindrical shell 4m long and 900mm internal diameter. It is subjected to internal pressure of 1.5MPa. If the thickness of shell is 10mm. find hoop stress, longitudinal stress, change in length and change in volume. Take E= 210GPa and μ=0.25

b) Draw SF and BM diagram for beam as show in figure. 2



Q.6.b fig-2

c) Determine safe diameter of solid shaft which transmits 500Kw at a speed 100rpm. The values of shear stress and angle of twist are restricted to 100mpa and 1.2^0 in 1.8m length respectively. The shaft is likely to have maximum torque 40% more than mean torque. take G=8.4 X 10^4 MPa.

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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018

SEAT NO._____

TIME ALLOWED: 03 Hrs. **SEMESTER: III**

MAXIMUM MARKS: 80 **PROGRAMME: IE/DE/EE**

COURSE: APPLIED MATHEMATICS **COURSE CODE: 120022**

INSTRUCTIONS: -

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt Any Three** **(12)**

(a) Evaluate $\int \frac{2}{x^2(2+x)}\, dx$

(b) Evaluate $\int Sin^5x.cos^3x\, dx$

(c) Evaluate $\int \frac{1}{(15+4x-4x^2)}\, dx$

(d) Evaluate $\int_0^{\pi/2} \log(\tan x)dx$

(e) Evaluate $\int_0^{\pi/2} \frac{dx}{5+3\cos x}$

Q.2 **Attempt Any Two** **(12)**

(a) Find the area of region bounded by the parabola $y = 4x-x^2$ and x−axis

(b) Find the volume of the solid obtained by the complete revolution of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about the major axis (x - axis)

(c) Find the moment of inertia of a uniform circular disc about its diameter.

(d) Find the R.M.S. value, if I = 3 sin(2t) from t = 0 to t = π

Q.3 **Attempt Any Two.** **(16)**

(a) For the following data representing the distribution of the daily wages of hundred workers in a Company. Calculate the mean deviation from mode

Salary (in Rs.)	300-400	400-500	500-600	600-700	700-800	800-900
No.of workers	12	16	32	18	13	9

(b) The following are the runs scored by two batsmen A and B in 10 test matches. Use coefficient of variation and decide who should be selected for the coming England Tour

Runs by Batsman A	32	28	47	63	71	39	10	60	96	14
Runs by Batsman B	19	31	48	53	67	90	10	62	40	80

(c) For a group containing 100 observations, the arithmetic mean and standard deviations are 8 and $\sqrt{10.5}$ respectively. For 50 observations selected from these 100 observations, the mean and standard deviations are 10 and 2 respectively. Calculate the mean and standard deviation for the other half.

SECTION-II

Q.4 **Attempt Any Three** **(12)**

(a) Find $L^{-1}\left\{\frac{35-7}{s^2+9}\right\}$

(b) Find L $\{e^{2t} + \cos 3t + \sin 2t\}$

(c) Find L $\{t \sin 2t\}$

(d) Solve given differential equation $(1+x^3)\,dy - x^2y\,dx = 0$

(e) Form the differential equations by eliminating the arbitrary constant from the equation $Y^2 = 4ax$

Q.5 **Attempt Any Two** **(12)**

(a) Solve the following differential equation using Laplace Transform $\frac{dy}{dt} + 3y = 1 + e^t$ given that y(0) = 1

(b) Solve $(D^2 + 8D + 16)\,y = e^{-3x}$

(c) Two six faced unbiased dice are thrown. Find the probability that the sum of numbers shown is 7 or product is 12.

(d) If A and B are two events such that
P (A) $= \frac{1}{2}$, $P(B) = \frac{1}{3}$, $P(A \cap B) = \frac{7}{12}$, $Find\ P(\bar{A} \cap \overline{B})$

Q.6 **Attempt Any Two** **(16)**

(a) Find Inverse Laplace Transform $\frac{1}{(s^2+1)(S+3)}$

(b) Check whether following equation is an exact D.E.? If it is exact D.E. then solve the D.E.
$(2x^2 + 6xy - y^2)\,dx + (3x^2 - 2xy + y^2)\,dy = 0$

(c) Solve $\frac{d^2y}{dt^2} - 2\frac{dy}{dt} + 2y = 0$ using Laplace transform. Given that y'(o) =1 and y (o) =1

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: VI / VII**

MAXIMUM MARKS: 80 **PROGRAMME: ME / CH / EE / IE / DE**

COURSE: INDUSTRIAL MANAGEMENT **COURSE CODE: 120024**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt Any Three** **(12)**

(a) Classify industry.

(b) Explain partnership deed.

(c) Enlist qualities of supervisor.

(d) Differentiate between management and administration.

(e) Write short note on industrial safety.

Q.2 **Attempt Any Two** **(12)**

(a) Explain roles and responsibilities of supervisor.

(b) Explain recruitment procedure.

(c) Explain Co-operative enterprises.

(d) On what criteria location of industries are selected. Write advantages of location.

Q.3 **Attempt Any Two** **(16)**

(a) Differentiate between public limited company and private limited company & State functions of human resource management.

(b) Explain principles of management.

(c) Explain industrial training.

SECTION-II

Q.4 **Attempt Any Three** **(12)**

(a) What is industrial disputes? What are its causes?

(b) List out the duties of storekeeper.

(c) Differentiate between sales and marketing.

(d) What are various sources of finance?

(e) Explain budget and budgetary control.

Q.5 **Attempt Any Two** **(12)**

(a) Explain methods and machinery for resolving industrial disputes.

(b) Explain in brief purchase procedure

(c) What are various channels of distribution? State their importance.

(d) What is Break Even Analysis? Draw Break Even Chart and show all important parameters.

Q.6 **Attempt Any Two** **(16)**

(a) What is depreciation? What are its causes? What are methods to calculate depreciation?

(b) Differentiate between working capital and fixed capital and state the importance of marketing.

(c) What are various financial ratio and objectives of cost calculation.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO. _____

TIME ALLOWED: 3 HOURS | **SEMESTER: I**
MAXIMUM MARKS: 100 | **PROGRAMME: CE/ME/PL/CH**
COURSE: APPLIED MECHANICS | **COURSE CODE: 160001**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Answer any Six out of Eight.** (18)

(a) Define Mechanics and give classification for the same.
(b) Give classification of force system.
(c) State and explain "Law of Parallelogram".
(d) Explain condition of equilibrium.
(e) Explain in detail different types of Beams.
(f) Define force and state various characteristics of force.
(g) State and explain Varignon's theorem.
(h) Explain the concept of Free Body Diagram (F.B.D.) and use of same in statics.

Q.2 **Answer any Four out Six.** (16)

(a) Find the resultant of the given force system by law of parallelogram

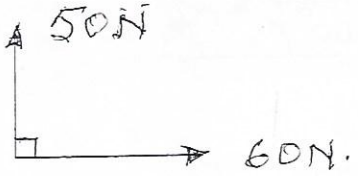

Fig-1 Q 2.a

(b) Resolve the given force into horizontal and vertical components.

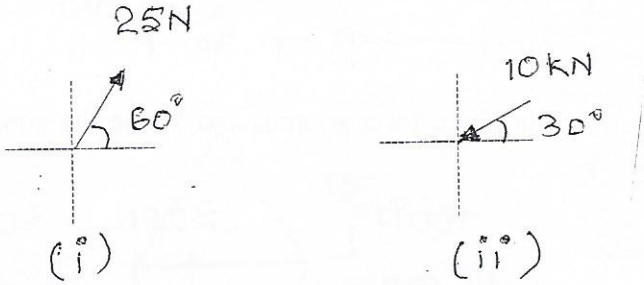

Fig-2 Q 2.b.

(c) Determine the tension in cords AB and BC for equilibrium of 200N block shown in the given figure.

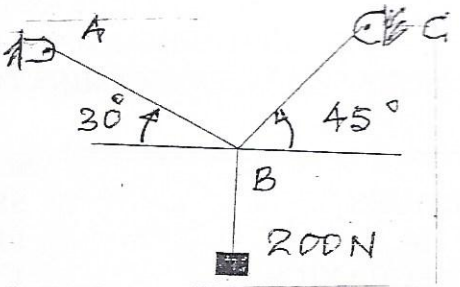

Fig 3. Q.2.C

(d) Find the magnitude and direction of resultant for the given force system. Also locate the position of resultant.

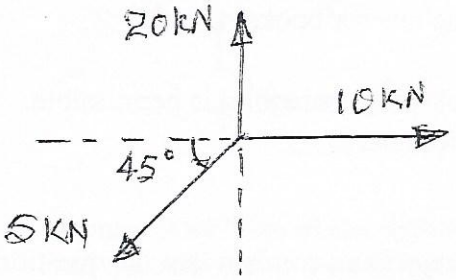

Fig 4 Q.2.d.

(e) A simply supported beam of span 6m as shown in fig carries a load of 3KN and 5KN at a distance of 2m and 4m from 'A' respectively. Find the reactions at the supports.

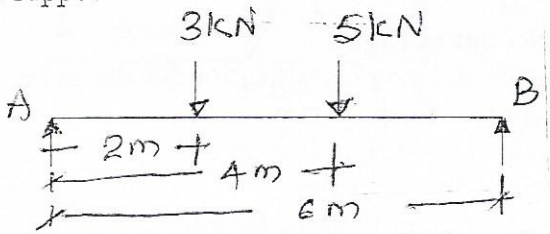

Fig 5
Q.2E.

(f) Figure below shown a cylinder resting in a smooth channel. The weight of cylinder is 600N. Determine the reactions offered by the channel surface.

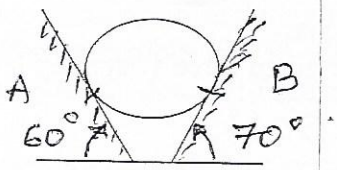

Fig 6.
Q.2.f.

Q.3 Answer any Two out of Three. (16)

(a) Figure below shown a simply supported beam AB. Calculate reactions at the supports.

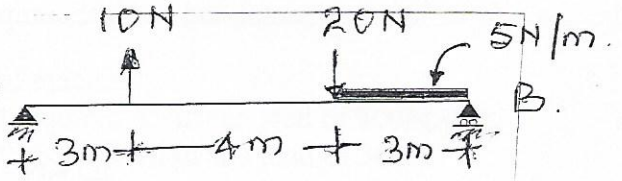

Fig-7
Q.3a

(b) Find the resultant for the given force system and locate the position of same from point 'A'.

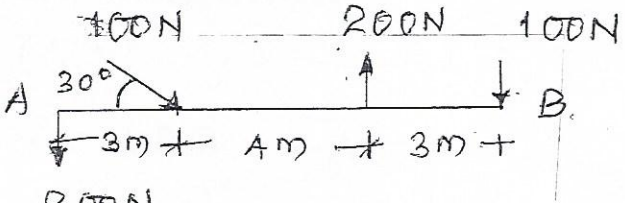

Fig-8
Q.3.b.

(c) A string A, B, C, D is fixed at A and B to the ceiling and carries two loads of 150 N and 100N as shown in fig below. Find the tension in the string.

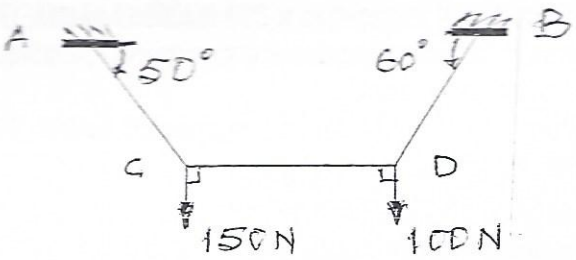

Fig-9
Q.3.a

SECTION-II

Q.4 Attempt Any Six of following. (18)

(a) Define angle of repose a staring its relation with co-efficient of friction.
(b) State three laws of static friction.
(c) State the position of centre of gravity of solid cone and cylinder with sketch.
(d) Locate the centre of gravity of equilateral tringle of side 300m.
(e) Define Mechanical advantages its velocity ratio.
(f) What is reversible machine? State the conditions of reversibility of machine.
(g) Define space diagram & vector diagram.
(h) Define centroid and centre of gravity.

Q.5 Attempt Any Four of the following. (16)

(a) Locate the centroid of the following lamina

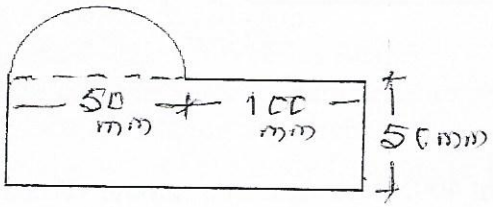

Fig. 10
Q5.a

(b) Find the resultant & angel of resultant graphically.

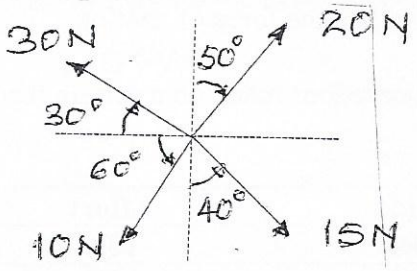

Fig-10
Q5.b

(c) In a machine an effort of 25N can lift a load of 500N. Find the law of machine and also find the effort required to lift a load of 1000N.
(d) Find the C.G of the solid given in fig.

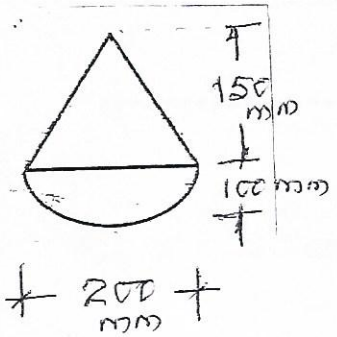

Fig-11
Q5.d

(e) A block of 500N is kept on a 20^0 inclined plane. The co-efficient of friction is 0.30 calculate the force required parallel to the plane to pull the block up the plane.

(f) Following fig. shown a simply supported beam. Calculate the support reactions by graphical method.

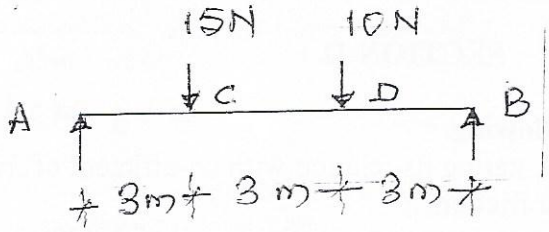

Fig-12
Q5.f.

Q.6 Attempt Any Two of the following. (16)

(a) Find the centroid of the laming as shown in fig.

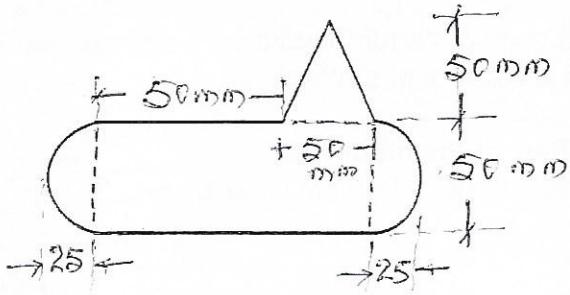

Fig-13
Q-6.a.

(b) A uniform ladder of weight 400N rests against a smooth vertical wall and a rough horizontal floor making an angle 60^0 with the horizontal. If the co-efficient of friction at the floor is 0.30. Find the reactions at the wall and floor and calculate the force of friction.

(c) The following are the observations made on a certain machine which has VR =20.

Load	Effort
100N	10N
200N	15N

Find –

(i) Law of machine
(ii) Effort required to lift the load of 300N.
(iii) Effort lost in friction at a load of 300N.
(iv) Efficiency of the machine at a load of 300N.

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301 A

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018

SEAT NO._____

TIME ALLOWED: 3 **PROGRAMME: ALL.**

MAXIMUM MARKS: 100 **SEMESTER: I**

COURSE: BASIC MATHEMATICS. **COURSE CODE: 160002**

INSTRUCTIONS: -

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt any Six** **(18)**

(a) Evaluate $\begin{vmatrix} 2 & -1 & -3 \\ 4 & 1 & 0 \\ 5 & -2 & 1 \end{vmatrix}$

(b) Solve $\begin{vmatrix} 2 & 3 & 1 \\ 6 & x & 2 \\ 4 & x & -2 \end{vmatrix} = 0$

(c) Solve $\log_x 9 = -$

(d) Show that $\log_5 3 . \log_7 5 . \log_3 7 = 1$

(e) Show that $\frac{1}{log_a ab} + \frac{1}{log_b ab} = 1$

(f) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 \\ 4 & 6 \end{bmatrix}$, Find 4A-3B+2I.

(g) Find values of x and y, if $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} x & 5 & -3 \\ 2 & y & 5 \end{bmatrix} = \begin{bmatrix} 5 & -3 & 7 \\ 7 & 7 & 1 \end{bmatrix}$

(h) Expand $(2x - \frac{1}{x})^4$ using binomial theorem.

Q.2 **Attempt any Two** **(16)**

(a) Show that $\begin{vmatrix} x^3+1 & x^2 & x \\ y^3+1 & y^2 & y \\ z^3+1 & z^2 & z \end{vmatrix} = (xyz+1) \begin{vmatrix} x^2 & x & 1 \\ y^2 & y & 1 \\ z^2 & z & 1 \end{vmatrix}$

(b) Solve $\log_{10}(x+3)^2 + \log_{10} x^2 = 2$.

(c) Show that $\frac{1}{log_a abc+1} + \frac{1}{log_b ac+1} + \frac{1}{log_c ab+1} = 1$

(d) If $A = \begin{vmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{vmatrix}$, show that $A^2 = A$.

(e) Find middle terms if $\left(x^3 - \frac{4}{x^2}\right)^8$

(f) Find $(\sqrt{2}+1)^5 + (\sqrt{2}-1)^5$.

Q.3 Attempt any Two **(16)**

(a) Solve using crmers rule.
$3x + 5y - 4z = 22,\ 2x - 3y + z = 3,\ 4y - x + 6z = 19.$

(b) Find A^{-1}, if $A = \begin{bmatrix} -1 & 3 & 4 \\ -1 & -1 & 3 \\ -2 & -3 & -1 \end{bmatrix}$

(c) If the constant term of $(x + \frac{3}{x^8})^{11}$ is 1320.

SECTION-II

Q.4 Attempt any Six out of Eight **(18)**

(a) Find the acute angle between the lines $y = 5x + 6$ and $y = x$.

(b) Find the length of perpendicular from (-3, -4) on the line $4(x + 2) = 3(y-4)$

(c) If $A = 30^0$, verify that $\text{Cos}2A = \frac{1-tan^2 A}{1+tan^2 A}$

(d) Without using calculator, find the value of $\text{Sin } 75^0$.

(e) If $A + B = 45^0$, prove that $\tan A + \tan B + \tan A . \tan B = 1$

(f) If one end of a diameter of a circle whose centre is (4,3) is (2,1). Find the other end of the diameter.

(g) Find the area of triangle whose vertices are (3,1), (-1.3) and (-3, -2).

(h) Find equation of line passing through (-4, 6) and (8, -3).

Q.5 Attempt any Four out of Six **(16)**

(a) Show that the point (-1, 4), (4,6) and (-4, 10) are the vertices of right angled triangle.

(b) Find equation of the circle with centre (4,-6) and passing through the point (3,4).

(c) Find the equation of circle passing through the point (2,3) and concentric with the circle $x^2 + y^2 + 6x - 4y - 12 = 0$

(d) Prove that: $\frac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta} = \tan\frac{\theta}{2}$

(e) Prove that: $\text{Sin}^{-1}(-) + \text{Sin}^{-1}\left(\frac{8}{17}\right) = \text{Sin}^{-1}\left(\frac{77}{85}\right)$

(f) Find 'P' if the lines $3x + 4py + 8 = 0$ and $3py - 9x + 10 = 0$, are perpendicular to each other.

Q.6 Attempt any Two out of Three **(16)**

(a) Find the equation of the line through the point of intersection of $x - 2y - 5 = 0$ and $x + 3y - 10 = 0$ and (a) parallel (b) perpendicular to $3x + 4y = 0$.

(b) Prove that $\frac{Sin\ A + Sin\ 3A + Sin\ 5A + Sin\ 7A}{Cos\ A + Cos\ 3A + Cos\ 5A + Cos\ 7\ A} = \tan 4A$

(c) Find the equation of the tangent and the normal to the circle $x^2 + y^2 + 3x - 4y = 0$ at (1,2) .

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS | **SEMESTER: I & II**
MAXIMUM MARKS: 100 | **PROGRAMME: ALL COURSES**
COURSE: COMMUNICATION SKILLS | **COURSE CODE: 160003**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Answer the following (Any Six)** (18)

(a) Explain grapevine communication.
(b) Explain role of sender and receiver.
(c) ` Feedback ` is final link of communication. Explain.
(d) Give two definitions of communication.
(e) What is extempore? Explain its importance.
(f) No other athelet is as fast as Usain Bolt in the World. (change the voice)
(g) Write phonetic transcription of (a) Coverage (ii) Book
(h) Give two examples of blending.

Q.2 **Answer the following (Any Four)** (16)

(a) Explain any two types of reading in detail.
(b) State any four techniques for improving speaking.
(c) Differentiate between vertical and horizontal communication.
(d) Explain the nature of language.
(e) What is LSRW? How do these four skills are interrelated?

Q.3 **Answer the following (Any Two)** (16)

(a) Enlist and explain any six characteristics of language.
(b) Explain the characteristics of communication.
(c) What is listening? Explain any six types of listening.

SECTION-II

Q.4 **Attempt Any Six from the following** (18)

(a) What is the importance of `Rhythm ` in spoken English?
(b) Give phonetic transcription of the following words –
(i) Company (ii) Psychology (iii) Industrialization
(c) Write in brief about any four C`s of effective letter writing.
(d) Why importance is given to the letters in the word of business?
(e) Give two example of Clipping, Blending, Compounding.

(f) What are types of essays?
(g) Explain 'You attitude' in letter writing.
(h) Give two examples of noun ending with '-Sion' as suffix.

Q.5 Attempt Any Four of the following (16)

(a) Respond to the following advertisement – "M/s. Jupiter Engineering Company, Powai requires fresh Diploma Engineers for the Post of Trainee Engineers to work in various parts of Maharashtra. Willing to work in night shifts and having excellent communication skills. Send job applications to - The HR Manager.

(b) Gyan- Mandir High School is in search of a firm who could establish a computer lab with 20 computers in their school. As the Principal of the School, write a letter to "Lingua Com", seeking information of their software and its price-list.

(c) What is a report? Write any four qualities of a good report?

(d) For certain unforeseen reasons, you are unable to deliver by the stipulated date, the ordered office furniture to your customer. Write a suitable letter to your customer requesting him for extension of time and promising of executing the order within short time.

(e) Explain various layouts /format of letter writing.

(f) Write a complaint letter to Municipal authority complaining about stray dogs in your area and increased incidents of dog bites.

Q.6 Attempt Any Two of the following report:- (16)

(a) (i) As the HR Manager of Superfine Nylon and Cotton Ltd. Calcutta you have been asked to investigate the accident and fire caused by some electrical fault in your industry. Write a report outlining the cause and extent of damage. Also suggest some preventive measures.
(ii) It was observed by the Head of your Institute that first year students did not participate in any of the cultural activities throughout the year. As the Cultural Secretary, submit a report giving the reasons for their lack of participation and suggest some ideas to encourage their participation in the future.

(b) Write an essay on (any one) of the following topic:
(i) Social Medias Effect on young people
(ii) Trend of Plastic Surgery in Hollywood as well as Bollywood.
(iiii) Modi wave in India

(c) Read the following passage carefully and answer the questions given below:-

Cholesterol- a word that gets a lot of bad press, not all of it deserved. As in the typical Indian film, there is a good guy or HDL and the bad guy or LDL. Of course, there is a host of other characters too like VLDL and triglycerides.

High LDL cholesterol and low HDL cholesterol- described as abnormal cholesterol levels- are a major described as abnormal cholesterol levels- are a major risk factor for heart disease and stroke. The bad news is that Indians are genetically vulnerable, being born with narrower arteries. Indian have a two-three times higher incidence of coronary disease than North Americans or Western Europeans. Worse, in Indians, heart disease tends to occur a decade earlier and the incidence is also more severe.

Bad cholesterol is harmful on its own and for other reasons too, says D.Srikanth Sola, Consultant Cardiologist, Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore, and formerly Staff Cardiologist, Cleveland Clinic, US. 'Bad cholesterol is like bad company- undesirable in itself and leading to other problems.'

It causes atherosclerosis or blockages in arteries. When blockages build up gradually, it can cause angina (chest pain on exertion or emotional stress) or improper blood flow to legs and abdominal organs. Sometimes, a piece of these blocks break off suddenly and occlude the entire artery causing a heart attack or stroke'

A major factor in high bad- cholesterol is genes but others include being overweight, a sedentary lifestyle stress and foods loaded in saturated fat.

Dr.Anil Mishra, Medical Director and Senior Consultant interventional Cardiologist, B.M.Bira Heart Research Centre, Kolkatta, explains, Despite a low- cholesterol diet, you can high LDL because the body is genetically programmes to produce more especially if you have a family history. Occasionally, high LDL can be caused by a disease like hypothyroidism.

If all preventive measures fail, people with high cholesterol counts- especially diabetics and post heart-attack /stroke patients-are prescribed medication.

However, increasing good cholesterol is a tougher job. As Dr. Mishra says, 'There is effective medicine to reduce bad cholesterol but the same cannot be said of medicines to increase good cholesterol. I advise regular exercise, no smoking and eating nuts such as almonds, walnuts, and chestnuts. Walking three four km a day and good diet are, perhaps, the best measures'

So, taking medication alone is not enough; it must be accompanied by lifestyle changes.

Source: Aruna Chandaraju, 'Healthwatch: The Good, the Bad, the Ugly,' The Hindu: Sunday Magazine, 6 June 2010, p.6.

(i) Why Indians are more prone to abnormal cholesterol according to the given passage?
(ii) How does the bad cholesterol leads to heart attack?
(iii) What can be the best preventive measure according to Dr.Anil Mishra?
(iv) What can be inferred from Dr.Srikanth Sola`s statement cited in the given passage?

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Attempt Any Two (16)

(a) Separate into real and imaginary parts : cosh (x +iy)

(b) Find the equation of the tangent to the curve $y = x^2 - 2x - 3$, where it meets the x- axis.

(c) (i) Find the unit vector which is perpendicular to the vectors $2i - j + k$ and $3i + 4j - k$

(ii) Find the projection of vector $\bar{b} = 4i - 4j + 7k$

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: II**
MAXIMUM MARKS: 100 **PROGRAMME: CE/ME/EE/IE/PL/CH/DE**
COURSE: ENGINEERING MATHEMATICS **COURSE CODE: 160008**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 Attempt Any Six (18)

(a) If $f(x) = x^3 - 5x^2 - 4x + 20$ show that $f(0) = -2.\ f(3)$

(b) Find f (t) if $f(x) = \frac{2x+5}{3x-4}$ and $t = \frac{5+4x}{3x-2}$

(c) Evaluate $\lim_{x \to 3} \frac{x^2+2x-15}{x^2-9}$

(d) $\lim_{x \to 0} \frac{1-cos^3 x}{sin^2 x}$

(e) If $y = x^4 . \sin(3x)$, find $\frac{dy}{dx}$

(f) Find $\frac{dy}{dx}$ if $y = \frac{2x+3}{5x-4}$

(g) Differentiate w.r.t x, $\tan^{-1}\left(\frac{2x}{1+35x^2}\right)$

(h) Differentiate w.r.t x, $(x)^{\cos x}$

Q.2 **Attempt Any Four** (16)

(a) Evaluate $\lim_{x\to 2} \frac{x^5-32}{x^7-128}$

(b) Evaluate $\lim_{x\to 0} \left(\frac{4+x}{4-x}\right)^{\frac{1}{x}}$

(c) If f (x) $= \frac{3x+4}{5x-7}$ and g (x) $= \frac{7x+4}{5x-3}$ show that (fog) (x) = x

(d) Find $\frac{dy}{dx}$ if x = a {2 cos(θ) + cos(2θ)}, y = a {2sin(θ) + sin(2θ)

(e) If y = A e^{2x} + B. e^{-2x} show that $\frac{d2y}{dx^2} - 4y = 0$

(f) Find $\frac{dy}{dx}$ if $x^3 + y^3 = 3a\,x\,y$

Q.3 **Attempt Any Two** (16)

(a) If y $= a\,e^{-3x} + b.e^{-4x}$ prove that $\frac{d2y}{dx^2} + 7.\frac{dy}{dx} + 12y = 0$

(b) Evaluate (i) $\lim_{x\to 0} \frac{4^{3x}-3^{2x}}{x}$ (ii) $\lim_{x\to 1} \frac{\sin(\pi x)}{x-1}$

(c) Differentiate x^x w.r.t log ^{x}

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SECTION-II

Q.4 **Attempt Any Six** (18)

(a) Find the point on the curve y = $x^2 - 6x + 8$ where the slope of the tangent is 4

(b) The law of motion of a particle is given by S = $t^3 - 3t^2 + 6t + 1$ where S is the displacement of the particle in time t. Find the velocity at t =1

(c) Find the radius of curvature of the curve y = log(sin x) at = $\frac{\pi}{2}$

(d) Express in the form x + 2y : $\frac{2-3i}{1+2i}$

(e) Find the modulus and amplitude of : $-1 + \sqrt[i]{3}$

(f) If $(a - 2bi) + (b - 3ai)$ = 5+ 2i , find a and b

(g) Find the volume of the parallelepiped with sides
$6i - 2j$, $j + 2k$, and $i + j + k$

(h) Find the moment of a force $\bar{F} = 3i + 2j - 4k$ passing through the point
(1, −1, 2) about the point (2, 0, 2)

Q.5 **Attempt Any Four**

(a) A bullet fired into a block of wood penetrates according to the law
S = $18t - \frac{t^3}{6}$. How for does it penetrate?

(b) Find the maximum and minimum values of
y =$2x^3 - 3x^2 - 12x + 12$

(c) Simplify using Dc Moivre`s Theorem :

$$\frac{(\cos 3\theta + i\,\sin 3\theta)^4.(\cos 4\theta + i\,\sin 4\theta)^2}{(\cos 4\theta - i\,\sin 4\theta)^3.(\cos 5\theta + i\,\sin 5\theta)^{-4}}$$

(d) Using Euler`s formula prove that : $\sin 2\theta = 2\sin\theta.\cos\theta$

(e) Find the area of the parallelogram having diagonals
$\bar{a} = 3i + j - 2k$ and $\bar{b} = i - 3j + 4k$

(f) A force $\bar{F} = 5i + 10j + 15k$ acts on a particle and displaces it from the point A (3, −1, −6) to the point B (1,0,3). Find the work done by the force.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: III**
MAXIMUM MARKS: 100 **PROGRAMME: EE/IE/DE**
COURSE: APPLIED MATHEMATICS **COURSE CODE: 160011**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt Any Six out of Eight** **(18)**

(a) Evaluate $\int \frac{\cos(\log x)}{x}$

(b) Evaluate $\int \frac{dx}{5+4x-x^2}$

(c) Evaluate $\int \sin\sqrt{x}\ dx$

(d) Evaluate $\int \frac{dx}{e^x+1}$

(e) Evaluate $\int_1^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{3-x}} dx$

(f) Find the area under the curve $Y = x^3$ from $x = -1$ to $x = 1$

(g) Find the volume obtained by revolving the area under the curve $9x^2 - 4y^2 = 36$ in the interval from $x = 2$ to $x = 4$ about X-axis.

(h) Evaluate $\int_0^5 \frac{\sqrt{9-x}}{\sqrt{9-x}+\sqrt{x+4}} dx$

Q.2 **Attempt Any four out of Six** **(16)**

(a) Evaluate $\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}} dx$

(b) Evaluate $\int_{-1}^1 \frac{x+x^2}{1+x^2} dx$

(c) Evaluate $\int \frac{e^x}{(e^x-1)\,((e^x+1)} \, dx$

(d) Evaluate $\int \frac{dx}{4+5\,\sin 2x}$

(e) Find the area bounded by $y^2 = 4x$ and $2x - y = 4$

(f) Calculate the centre of Gravity of the area in the first quadrant bounded by the parabola $y^2 = 16x$ and the Ordinate $x = 2$

Q.3 **Attempt Any Two out of Three** **(16)**

(a) Solve the following
(i) Find area of the region included between the parabola $Y = x^2 + 1$ and line $Y = 2x + 1$

(ii) Evaluate $\int \frac{dx}{(x^2+4)\,(x+1)}$

(b) Find the centre of the gravity of the area of circle $x^2 + y^2 = a^2$ in first quadrant.

(c) (i) Evaluate $\int \frac{\log x.dx}{x(2+\log x)\,(3+\log x)}$

(ii) Evaluate $\int x^2.\tan^{-1} x \, dx$

SECTION-II

Q.4 **Attempt Any Six of the following** **(18)**

(a) Find L $\{Sin^2 t\}$

(b) Find L $\{\cos 2t.\cos 4t\}$

(c) Find Laplace Transform of the function L $\left\{\frac{\sin t}{t}\right\}$

(d) Find $L^{-1}\left\{\frac{S}{s^2+2}\right\}$

(e) Form the differential equations eliminating the arbitrary constants from the equation: $xy = Ae^x + Be^{-x} + x^2$

(f) Solve $(1 + x^2)dy - x^2y\,dx = 0$

(g) Verify that $Y = e^{-x} + Ax + B$ is a solution of the differential equation $e^x\left(\frac{d^2y}{dx^2}\right) = 1$

(h) Solve $\frac{dy}{dx} = \cos(x + y)$

Q.5 **Attempt Any Four of the following** **(16)**

(a) Find $L^{-1}\left\{\frac{S+3}{s^2+4s+13}\right\}$

(b) Find L $\{e^{2t}.\cos 3t\}$

(c) Find inverse Laplace transform of $\frac{1}{(s+1)(S+2)(S-3)}$

(d) Solve $\frac{dy}{dx} = \sin(x+y) + \cos(x+y)$

(e) Verify that Y = sin(log x) is a solution of the differential equation
$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

(f) Solve $\frac{dy}{dx} = \frac{x-2y+3}{2x-4y+5}$

Q.6 **Attempt Any Two of the following** **(16)**

(a) A voltage E = $E_\theta.e^{-at}$, where E_θ and **a** are constant, is applied at time t = 0 to an LR electric circuit of inductance L and resistance R. Find the current at any time t.

(b) Solve $\frac{dy}{dx} + \frac{y}{x} = y^3$

(c) Show that the following differential equation is exact and solve

$$(e^x + 2xy^2 + y^3)dx + (a^y + 2x^2y + 3xy^2)dy = 0$$

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Shri Vile Parle Kelavani Mandal's
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AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018
SEAT NO._____

TIME ALLOWED: 3 HOURS **SEMESTER : IV/III/VI**
MAXIMUM MARKS: 100 **PROGRAMME: MECH/CHEM ENGG./IE/DE/EE**
COURSE : INDUSTRIAL MANAGEMENT **COURSE CODE: 160012**

INSTRUCTIONS :

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 **Attempt Any Six of the following:** **(18)**

(a) Define partnership and proprietorship.
(b) Give the classification of industry.
(c) Define Management. State its importance.
(d) What are various Resources of Management?
(e) State various welfare schemes in industry.
(f) Explain industrial safety.
(g) Explain importance of industrial safety.
(h) State advantages and limitations of joint stock company.

Q.2 **Attempt Any Four of the following:** **(16)**

(a) What are various functions of supervisor on shop floor ?
(b) What are various principles of Management ?
(c) State the importance of industry in Rural Area.
(d) What are the qualities of supervisor required ?
(e) State advantages of co-operative Enterprises.
(f) What are the factors to be considered while setting up industry ?

Q.3 **Attempt Any Two of the following:** **(16)**

(a) State the importance and activities of HR department in industry.
(b) Differentiate between Private Limited Company and Public Limited Company.
(c) Explain in brief Role and Responsibilities of supervisor in Industry.

SECTION-II

Q.4 **Attempt Any Six of the following:** **(18)**

(a) Describe the factors to be considered while choosing advertising media for new software for Engineering Drawing.

(b) Define :
- (i) Products Promotion with example
- (ii) Product Distribution with example

(c) Classify types of Capital.

(d) Classify Budget.

(e) Define :
- (i) Prime Cost
- (ii) Factory Cost
- (iii) Total Cost

(f) Define :
- (i) Overhead
- (ii) Depreciation
- (iii) Breakeven Point

(g) Differentiate element of cost with direct and indirect cost.

(h) Interpret the Break Even Chart if sales price is increased.

Q.5 **Attempt Any Four of the following:** **(16)**

(a) Explain " How Industrial relation affects the efficiency of Labour "

(b) Describe purchasing procedure for purchasing of concentrated sulphuric acid (H_2SO_4) for reputed chemical industries.

(c) Draw product life cycle and explain its stages.

(d) Explain the ways of distribution channel

(e) Define :
- (i) Liquidity Ratio
- (ii) Activity Ratio
- (iii) Leverage Ratio
- (iv) Profitability Ratio

(f) Explain the duties of store keeper.

Q.6 **Attempt Any Two of the following:** **(16)**

(a) What is an industrial dispute? What are the cause of dispute ?

(b) Explain various sources of finance.

(c) Classify the overhead in various group with suitable example.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER,2018

SEAT NO._____

TIME ALLOWED: 3 **PROGRAMME: CH/PL/CE.**

MAXIMUM MARKS: 100 **SEMESTER: III**

COURSE: APPLIED MATHEMATICS. **COURSE CODE: 160013**

INSTRUCTIONS: -

(1) Answer to the two sections must be written in separate Answer Books
(2) All Questions are compulsory.
(3) Use of Mathematical tables and pocket calculator (non-programmable) is permissible.
(4) Illustrate your answers with neat sketches, whenever necessary.
(5) Figures to the right indicate full marks.
(6) Assume suitable additional data, if necessary.
(7) The student should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION-I

Q.1 Answer any Six **(18)**

(a) Two fair dice are rolled. Determine the probability of getting.
i) Two sixes ii) No sixes

(b) An unbiased coin is tossed 5 times. Find the probability of getting at least 5 heads.

(c) Evaluate $\int_0^1 \frac{\log x}{x}\, dx$

(d) Find $\int \frac{2x+3}{x-2}\, dx$

(e) Solve using Reduction formula

$$\int_{-\pi/2}^{\pi/2} cos^4 x\, dx$$

(f) Evaluate: $\int \frac{(Sin^{-1}x)^{3/2}}{\sqrt{1-x^2}}\, dx$

(g) Determine volume of cone generated by line 4y = 3x about x axis between x = 0 to x = 4.

(h) Evaluate : $\int \left(\log_a a + e^{2\log_e x} + e^{x\log_e a}\right) dx$

Q.2 Answer any Four (16)

(a) The probability that a person stopping at petrol pump will ask for petrol is 0.80 & the probability that he will ask for water is 0.70 & probability that he will ask for both is 0.65. Find the probability i) That he will ask for neither petrol nor water. ii) That a person who has asked for water will also have asked petrol.

(b) If P(A) = 0.4 P(B) = 0.67 $P(A \cap B) = 0.15$ Find (l) P(A'UB') (μ) P(A UB)

(c) Find the area enclosed by the parabola $y = x^2 - 5x + 15$ & line $y = 3 + 3x$

(d) Evaluate: $\int \frac{1}{4+5\sin x}\,dx$

(e) Evaluate: $\int_0^1 x^2\sqrt{1-x}\,dx$

(f) If a random variable has a poisson distribution such that P (3) = P (4), Find P (0) and P (1)

Q.3 Answer any Two (16)

(a) Solve $\int \frac{3x+2}{\sqrt{2x^2+2x+1}}\,dx$

(b) Find the mean value of i^2 over the period, if 'i' is given by $i = 20 \sin 100\,t$

(c) If 5% of the electric bulb manufactured by company are defective. Find the probability that in a box of 50 bulbs

i) None is defective
ii) 3 bulbs are defective
iii) More than 5 bulbs are defective

Use both poisson & Binomial distribution to calculate the probability

SECTION-II

Q.4 Attempt any Six . (18)

(a) Find the order and degree of the differential equation

$$\frac{\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2}}{\frac{d^2y}{dx^2}} = C$$

(b) Form the differential equation by elimination the arbitrary constant from the equation $(x-a)^2 + y^2 = a^2$.

(c) Solve $(xy^2+x)\,dx + (yx^2 + y)\,dx = 0$

(d) Solve: $(x + y)^2 \frac{dy}{dx} = a^2$

(e) Find the integrating factor of
$(1+x^2)\frac{dy}{dx} + y = e^{\tan^{-1}x}$

(f) Show that there exists a root of the equation $x^2-2x-1 = 0$ in (-1,0) and find it approximately using bisection method by performing two iterations.

(g) Using false position method, find the root of the equation $x^2+x-3 = 0$ in the in the interval (1,2) by performing two iterations.

(h) Using Newton Raphson method find the root of the equations $x^3-x-1 =0$ up to two iterations by initial root 1.

Q.5 Attempt any Four **(16)**

(a) Verify that y = Sin (log x) is a solution of the differential equations
$x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

(b) Solve: Sec^2x. tany.dx + sec^2y.tanx dy = 0 and Find the particular solution if $y = \frac{\pi}{4}$ when $x = \frac{\pi}{4}$

(c) Solve: $\frac{dy}{dx} = Sin\,(x+y) + Cos(x+y)$

(d) Solve: $\frac{dy}{dx}$ + y tan.x = Cos^2x

(e) A constant e.m.f. E is introduced into an L-R circuit. The differential equation of the circuit is E-L $\frac{di}{dt}$ = Ri
Find the current at any time t given that i = 0 when t = 0

(f) Estimate the root for x^3 - 2x-5 = 0 in the internal (2,3) using Regula-falsi method, perform 3 iterations.

Q.6 Attempt any Two **(16)**

(a) Solve the following equations using Gauss eliminations method:

x +2y+3z = 14
2x + y + 2z = 11
2x +3y+z = 11

(b) Solve the following equations by Jacobi's method:
5x +2y+z =12
x+4y+2z = 15
x + 2y + 5z =20

(c) Solve $\frac{dy}{dx} = x^3y^3 - xy$

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLY TECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018

SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: III**
MAXIMUM MARKS: 100 **PROGRAMME: ME/CH/PE ENGG.**
COURSE: BASICS OF ELECTRICAL ENGG. **COURSE CODE: 160015**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All questions are compulsory.
3. Use of Mathematical and Steam Tables and pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper received is as per subject registered.

SECTION – I

Q.1 **Attempt any Six of the following.** **(18)**

(a) Calculate the values of resistances of three resistances of values 10Ω, 15 Ω & 20 Ω are connected in series & parallel.
(b) Define-
(i)Electric current (ii) Electric Potential (iii) Electric power
(c) Write the application of
(i)DC series motor. (ii)DC shunt motor (ii) DC compound motor
(d) Draw the characteristics for DC shunt motor.
(e) Define – Turns ratio, Voltage ratio & Current ratio.
(f) Differentiate group drive & Individual drive.
(g) State the applications of Induction Motor.
(h) Explain principle of resistance heating.

Q.2 **Attempt any Four of the following.** **(16)**

(a) Draw power triangle & state
(i)Active power (ii)Reactive power (iii) Apparent power
(b) Draw connection diagram for DC series motor & DC shunt Motor. Also write current equation & voltage equation of it.
(c) Explain any one speed control method of 3 phase Induction Motor.
(d) A 1-phase transformer with 800 primary turns & 200 secondary turns having primary voltage of 100 V. Calculate:
(i)Secondary voltage (ii) Maximum Flux
(e) List down the advantages & disadvantages of 3-phase Induction Motor.
(f) Stat Faraday's laws of electromagnetic Induction.

Q.3 **Attempt any Two of the following.** **(16)**

(a) Explain the working of 1-phase transformer also derive the EMF equation of it.
(b) Explain types of electric drives.
(c) List down the types of electric heating system. Also write down the advantages of electric heating system.

SECTION – II

Q.4 **Attempt any Six of the following.** **(18)**

(a) With the help of energy band diagrams show insulator, conductor & semiconductor.
(b) Draw the symbol of PN Junction diode. State its application.
(c) Draw the V/I characteristics of Triac.
(d) Draw the input & output waveform of a full wave bridge rectifier along with the circuit diagram.
(e) Define transducer. List different type of transducers.
(f) Draw the symbol of NAND gate. Write its truth table.
(g) Draw the block diagram of multiplexer.
(h) Distinguish between microprocessor & microcontroller.

Q.5 **Attempt any Four of the following.** **(16)**

(a) Discuss any two electronic components of your choice.
(b) With the help of neat symbol & characteristics explain the working of Zener diode.
(c) Draw the symbol of phototransistor. Explain its working in brief.
(d) With the help of neat circuit diagram & waveforms explain half wave bridge rectifier.
(e) Explain the working of pressure transducer in brief.
(f) With the help of neat diagram explain J-K flip flop.

Q. 6 **Attempt any Two of the following.** **(16)**

(a) Explain the working of two stage transistor amplifier. Also state its applications along with waveforms.
(b) Draw the symbols & truth table for following-
(i)AND gate (ii)OR gate (iii)NOT gate (iv) NOR gate
(c) With the help of pin diagram explain the working of demultiplexer (1:4). Also draw the block diagram for the same.

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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION NOVEMBER/DECEMBER, 2018
SEAT NO._____

TIME ALLOWED: 03 HOURS **SEMESTER: III**

MAXIMUM MARKS: 100 **PROGRAMME: MECHANICAL/PLASTICS**

COURSE: STRENGTH OF MATERIALS **COURSE CODE: 160017**

Instructions:

1. Answer to the two sections must be written in separate answer books.
2. All Questions are compulsory.
3. Use of pocket calculators (non-programmable) is permissible.
4. Illustrate your answer with neat sketches, wherever necessary.
5. Figure to the right indicate full marks.
6. Assume suitable additional data, if necessary.
7. The students should read the name and code of the subject and confirm that the question paper Received is as per subject registered.

SECTION-I

Q.1 **Attempt Any Six of the following** **(18)**

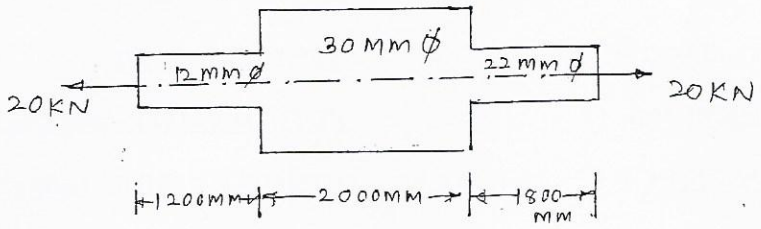
(a) Define (i) Strain (ii)Strain (iii) Young`s Modulus
(b) Explain the parallel axis theorem in details.
(c) Classify different mechanical properties.
(d) Calculate minimum diameter of steel wire to lift a load of 8.2 KN, if the permissible stress in wire is 120 MPa.
(e) Define (i) Resultant Stress (ii) Angle of obliquity
(f) Draw stress-strain diagram and explain it in detail.
(g) Give the definition of Lateral strain and linear strain.
(h) Explain the procedure to calculate Mohr`s circle.

Q.2 **Attempt Any Four of the following** **(16)**

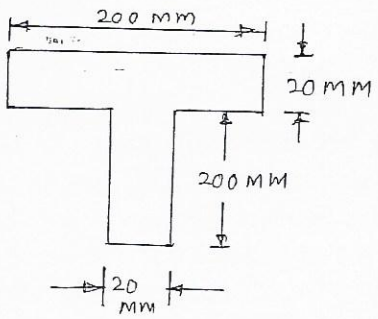
(a) A weight of 2KN falls on to a collar of the bar. Cross-Section of the bar is 20 mm x 20 mm and the length is 3m. If the weight falls through a height `h` and produces an instantaneous elongation of 3mm, find the value of 'h' Take E= 200 GPa.
(b) A metal rod 24 mm diameter and 2 m long is subjected to an axial pull of 40 KN. If the elongation of the rod is 0.5 mm. Find the stress induced and the value of Young`s Modulus.
(c) Explain the relation between E,G,K.
(d) Calculate moment of inertia and radius of Gyration of 60 mm diameter circle.
(e) A straight bar of uniform cross –section has a diameter of 10 mm. It is subjected to an axial pull of 20 KN. Find the normal and tangential stresses on a plane inclined at an angle of 30° to the axis of the bar.
(f) For a certain material, modulus of elasticity is 169 MPa. If Poisson`s ratio is 0.32, calculate the values of M[illegible]ulus of rigidity and bulk Modulus.

Q.3 **Attempt Any Two of the following** **(16)**

(a) A stepped bar is pulled by 20 KN as shown in fig. find the total elongation of bar, if $E = 1 \times 10^5$ N/mm^2.



(b) Find the Moment of Inertia of a 'T' section having top flange 200 mm x 20 mm and web 200 mm x 20 mm about the centroidal axis x-x and y- y.



(c) A point in a strained material is subjected to two mutually perpendicular stresses of 200 MPa (compressive) and 350 MPa (tensile). Determine the intensities of normal and tangential stresses on a plane inclined at 30° to the plane carrying 200 MPa stress.

SECTION-II

Q.4 **Attempt Any Six** **(18)**

(a) Define shear force and bending moment.
(b) What are various types of beam? Draw neat sketch of any one.
(c) State the relation between SF and BM.
(d) What is meant by moment of resistance and neutral axis?
(e) Write the equation of section modulus for hollow rectangular section and hollow circular section.
(f) What is eccentric loading? State two examples of eccentric loading.
(g) Compare hollow shaft and solid shaft.
(h) State the torsional formula and explain meaning of each term.

Q.5 **Attempt Any Four** **(16)**

(a) A hollow rectangular beam section square in size having outer dimensions 120 mm x 120 mm with thickness of material 20 mm is carrying a shear force of 125 KN. Calculate the maximum shear stress induced in the section.

(b) Define direct and bending stress. Draw the stress distribution diagram, if a rectangular section is subjected to direct and bending stress.

(c) A rectangular column 150 mm wide and 100 mm thick carries a load of 150 KN at an eccentricity of 50 mm in the plane bisecting the thickness . Find σ_{max} and σ_{min}.

(d) State the assumptions in the theory of torsion.

(e) The compressed air cylinder 1.4 m internal diameter and 20 mm thick is subjected to internal pressure of 1.6 MPa. Calculate the change in diameter. Take Poisson`s ratio = 0.28 and E = 2×10^5 MPa

(f) A cylindrical shell is 3 m long, 1 m diameter and 15 mm metal thickness. Calculate the circumferential strain and longitudinal strain, if the cylinder shell is subjected to internal pressure of 1.5 N/mm^2.
Take E = 2×10^5 N/mm^2; $\mu = 0.3$

Q.6 **Attempt Any Two** **(16)**

(a) (i) Draw S.F and B.M. diagram for a simply supported beam of span 'L' carrying a central point load ' W '. State the values of maximum S.F. and Maximum B.M.
(ii) A Cantilever beam of span 2.5 m carries three point loads of 1 KN, 2 KN and 3 KN at 1 m, 1.5 m and 2.5 m from fixed end. Draw SFD and BMD.

(b) (i) Draw SFD and BMD for a cantilever beam AB of 4m long having its fixed end at A and loaded with u.d.l of 2KN/m over entire span and point load of 3.5 KN acting upward at the free end of cantilever. Find the point of contra flexure if any.
(ii) A cantilever of 2.5m length caries a point load of 10 KN at free end and u.d.l of 5 KN/m for a distance of 1 m from free end. Draw SFD and BMD.

(c) (i) Find the polar modulus of a solid circular shaft of diameter 200 mm.
(ii)A solid shaft of 100 mm diameter is subjected to a torque of 6 KN.m. Find the maximum shear stress induced in the shaft.

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