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Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATIAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY, 2018

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: APPLIED MECHANICS

SEAT NO. _____
SEMESTER: Ist
PROGRAMME: Civil Engg.
CODE: 160001

INSTRUCTIONS:

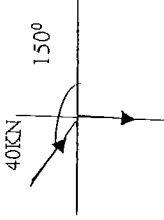
- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt all questions.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-prog.) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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.

- (1) Define. Rigid body, statics.
- (2) State parallelogram law of forces.
- (3) State Lami's theorem
- (4) Differentiate between Resultant & Equilibrant.
- (5) Resolve a force of 80 KN along two directions making angles 30° & 20° with it on opposite sides.
- (6) What is varignon's theorem of moment?
- (7) Resolve a force of 40KN inclined at 150° with axis as shown in fig.

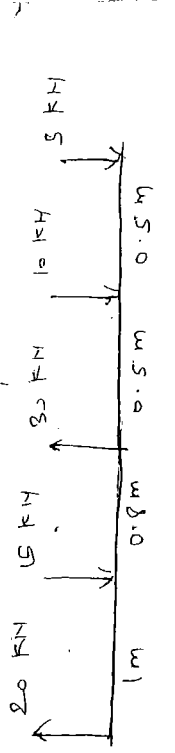


(8) Differentiate between Mass and Weight.

Q.2

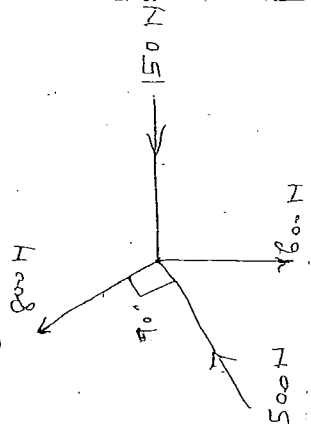
Attempt ANY FOUR of the following.

- (a) Find the resultant & point of application of resultant for force system as shown in fig.



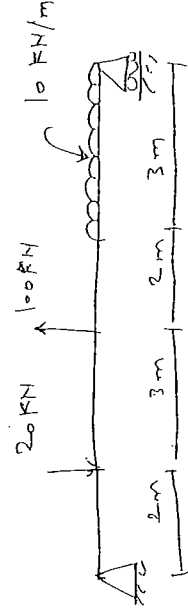
- (b) State properties of couple.
- (c) What are the different types of loads & end support of beam?
- (d) The sum of two forces is 9N. Their resultant which is perpendicular to the smaller force is of 6N. Find magnitude of the force.
- (e) Find the angle between two equal forces P, if their resultant is also equal to P.

(f) Find the resultant of all the forces as shown in fig.

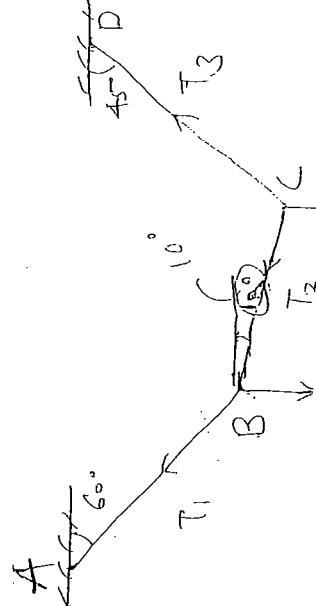


Q.3 Attempt ANY TWO of the following. (16)

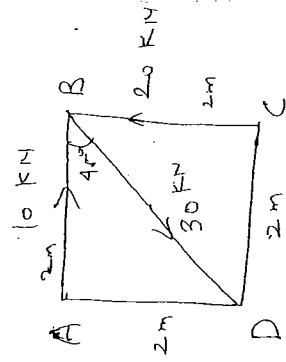
(a) For the beam shown in fig. calculate support reactions using analytical method.



(b) Find the weight 'W' & tension in the strings.



(c) A square ABCD of 2m side is subjected to forces of 10 kN, 20 kN, & 30 kN along AB, CB, & BD. Find magnitude, direction & position of the resultant with respect to A.



SECTION-II

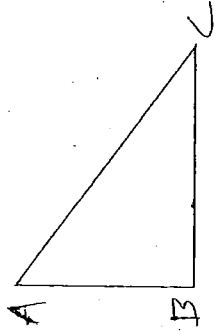
Q.4 Attempt ANY SIX of the following.

- (1) State law of polygon of forces.
- (2) Define angle of repose.
- (3) Define centre of gravity.
- (4) Define - Mechanical Advantage & Efficiency of Machine.

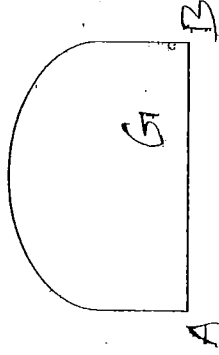
(18)

- (5) Find formula for centroid of following fig. with usual notations.

(a)



(b)



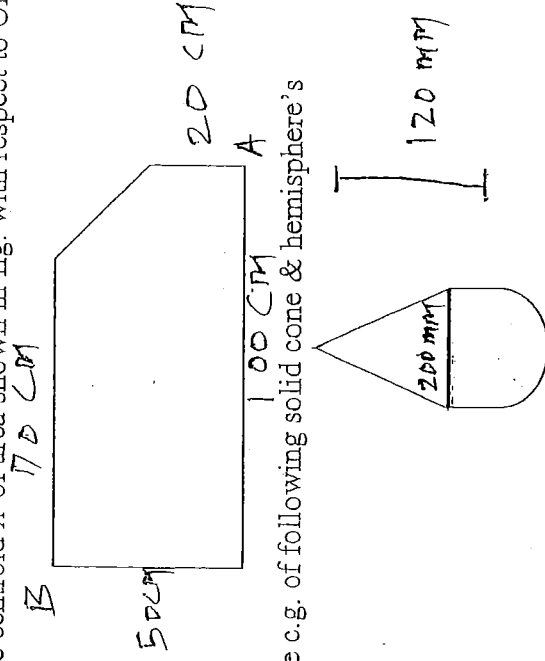
- (6) What is law of machine?
 (7) A body of weight 2000N rests in a horizontal plane. If the coefficient of friction is 0.4, find the horizontal force required to be applied parallel to the plane to move the body.
 (8) The velocity ratio of certain machine is 50. Determine the effort required to lift a load of 1500N if the efficiency of machine is 40%.

Q.5

Attempt ANY FOUR of the following.

(16)

- (a) A body weighing 150N is resting on a rough horizontal plane & can be just moved by a force of 50N applied horizontally. Find the coefficient of friction. Also find magnitude & direction of the resultant reaction.
 (b) In a machine an effort of 15N can lift a load of 300N & an effort of 25N can lift a load of 500N. Find law of machine.
 (c) Find the centroid \bar{X} of area shown in fig. with respect to OB line.

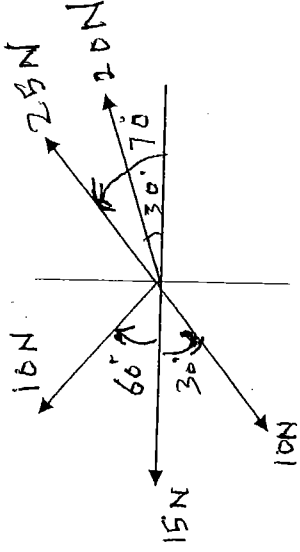


- (d) Find the c.g. of following solid cone & hemisphere's
 (e) What are the advantages & disadvantages of friction?
 (f) In differential axle & wheel the diameter of wheel is 400mm & the dia of axis are 100mm & 80mm. If an effort of 50N can lift a load of 1500N. Find V.R. & efficiency of machine.

Q.6 Attempt ANY TWO of the following.

(16)

- (1) Find graphically the resultant of concurrent force system shown in fig.



- (2) Following observations were made in an experiment as simple machine with V.R. = 60 Find law of machine & efficiency at load of 300N. Draw a graph.

Load	Effort
100N	10N
200N	14N

- (3) A ladder of weight 400N & length 10m is supported on smooth wall with its lower end 4m from the wall. The coefficient of friction between the floor & the ladder is 0.3. Show the forces acting on the ladder & find frictional force at floor.

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SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY-2018

TIME ALLOWED: 03 HOURS
 MAXIMUM MARKS: 100
 COURSE: BASIC MATHEMATICS

SEAT NO. _____
 SEMESTER: I
 PROGRAMME: ALL
 CODE: 160002

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt **ALL** questions from Section-I and Section-II.
- (3) All questions are compulsory.
- (4) Illustrate your answers with neat sketches, wherever necessary.
- (5) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (6) Figures to the right indicate full marks.
- (7) Assume suitable additional data, if necessary.

SECTION-I

Q.1

Attempt Any Six

(18)

- (a) Evaluate : $\frac{1}{\log_3 6} + \frac{1}{\log_8 6} + \frac{1}{\log_9 6}$
- (b) Find k if $\begin{vmatrix} 2 & -k & 7 \\ 3 & -4 & 13 \\ 8 & -11 & 33 \end{vmatrix} = 0$
- (c) Find x and y satisfying the matrix equation $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} x & y \\ 3 & -1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 9 & 4 \end{bmatrix}$
- (d) Use binomial theorem. Find approximate value of $\sqrt{30}$
- (e) Resolve into partial fractions $\frac{5x+1}{x^2+x-2}$
- (f) Find the 5th term of $(x+2y)^8$
- (g) If $A = \begin{bmatrix} 2 & 5 \\ 6 & 7 \end{bmatrix}$ find $A^2 + 4A + 2I$ where I is unit matrix
- (h) Find x if $\log_2(x^2 - 6x + 40) = 5$

Q.2

Attempt Any Four

(16)

- (a) Resolve into partial fractions $\frac{2x+3}{x^2(x-1)}$
- (b) Find the middle terms in the expansion of $\left[3x - \frac{x^3}{6}\right]^9$
- (c) Solve the equation by using determinant method $x + y + z = 3$; $x - y + z = 1$, $x + y - 2z = 0$
- (d) If $A = \begin{bmatrix} 2 & -1 & 1 \\ 3 & -4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 \\ -3 & 1 \\ 4 & -1 \end{bmatrix}$ Is the matrix AB non-singular?
- (e) Using properties of determinant show that $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0$
- (f) Find K if $(1 + \sqrt{3})^4 + (1 - \sqrt{3})^4 = K$

- Q.3** **Attempt Any Two** (16)
- Solve by matrix method
- (a) $2x + 3y - z = -3$, $5x + y + 3z = 10$, $4x + 3y - 2z = -3$
- (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 fractions $\frac{x^2+23x}{(x+3)(x^2+1)}$

SECTION-II

- Q.4** **Attempt Any Six of the following** (18)
- (a) Prove that $\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{3}{5}\right) - \tan^{-1}\left(\frac{8}{19}\right) = \frac{\pi}{4}$
- (b) Find the slope of the line $\frac{x}{6} + \frac{y}{4} = \frac{1}{3}$
- (c) Find the equation of the circle having radius 2 and touching the y -axis at $(0, -3)$
- (d) Find the equations of the tangent to the circle $x^2 + y^2 + 6x + 7 = 0$ at $(-2, 1)$
- (e) Find the centre and radius of the circle $2x^2 + 2y^2 - 6x + 4y - 3 = 0$
- (f) Find the value of K so that the lines $3x - y - 2 = 0$, $5x + ky - 3 = 0$ and $2x + y - 3 = 0$ are concurrent.
- (g) Find the acute angle between the line $2x + y - 1 = 0$ and $3x + y + 4 = 0$
- (h) Prove that $1 + \tan \theta \cdot \tan 2\theta = \sec 2\theta$

- Q.5** **Attempt Any Four of the following** (16)
- (a) Find the distance between the lines $5x - 12y + 1 = 0$ and $10x = 24y + 1$
- (b) Find the equations of the circle which passes through the points $(1, -2)$ and $(4, 3)$ and which has its centre on the line $3x + 4y = 7$
- (c) Find the equations of the tangent at the point $(4, 5)$ on the circle $x^2 + y^2 - 4x + 2y - 35 = 0$
- (d) In ΔABC , if $a = 25$ cm, $b = 52$ cm and $c = 63$ cm. Find $\sin A$.
- (e) In triangle ABC , if $A + B + C = \pi$, then prove that $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \cdot \sin B \cdot \sin C$
- (f) Find the equations of the line passing through $(-1, 1)$ and making an angle 45° with the line $2x + 3y = 6$

- Q.6** **Attempt Any Two of the following** (16)
- (a) Prove that $\cos^2 A + \cos^2 B - \cos^2 C = 1 - 2 \sin A \cdot \sin B \cdot \cos C +$
- (b) Find the equation of the perpendicular bisector of the line segment AB , where $A = (3, -4)$ and $B = (-4, 3)$
- (c) Find the equations of the tangents to the circle $x^2 + y^2 - 6x - 4y + 5 = 0$, which makes an angle of 45° with the x -axis.

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: COMMUNICATION SKILL
SEAT NO. _____
SEMESTER: I/II
PROGRAMME: ALL
CODE: 160003

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt ALL questions from Section-I and Section-II.
- (3) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (4) Illustrate your answers with neat sketches, wherever 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 Six) (18)**
- (a) How does the selection of media plays an important role in the process of communication?
 - (b) State two characteristics of communication.
 - (c) "Grapevine is closely related to the morale of the employees working in an organisation." Justify this statement with suitable examples.
 - (d) "Communication is life-blood of any organisation" Justify the statement with the help of suitable examples.
 - (e) Which type of communication is happening in the following situation? Explain its advantages
'The production manager of a company is communicating to the purchase manager of the same company.'
 - (f) What is sympathetic listening? Give an example.
 - (g) "Positive feedback motivates the sender." How far do you agree with the given statement? Explain with an example.
 - (h) How can the speaking skill be improved? (write any two techniques)
- Q.2. Attempt (any Four) of the following. (16)**
- (a) Do as directed
 - (i) _____ he is not eligible, he got the position (insert suitable conjunction)
 - (ii) The river is _____ the bridge (Insert suitable preposition)
 - (iii) Ganga is a holy river. (Under line noun & state its type)
 - (iv) Bombay is the most crowded city of India (change the degree)
 - (b) Fill in the blanks with correct form of (tense) of the verb given in bracket.
 - (i) We _____ (work) on the project since 2011.
 - (ii) I _____ to her yesterday (speak)
 - (iii) I _____ (wait) for you at the station.
 - (iv) Where there _____ (be) a will, there _____ (be) away.
 - (c) (i) Write antonyms of :-
 - (a) Transparent (b) Confident
 - (ii) Write synonyms of :-
 - (a) Guidance (b) Fragrance
 - (a) Clipping (b) Compounding
 - (d) Give two examples of each:-
 - (a) Clipping (b) Compounding
 - (e) Insert suitable heteronym-
 - (i) (a) He gave her a beautiful _____
(b) _____ me later, I will be at home.
 - (ii) (a) It's hot , so let's sit in the _____
(b) That _____ of red does not suit her.
 - (f) Give examples of:-
 - i) Capitanonyms
 - ii) Homophons
- Q.3. Answer the following:- (any Two) (16)**
- (a) What are the underlying causes that results in similarities or differences between systems of human and animal communication?
 - (b) Write in detail any four types of reading.
 - (c) Differentiate between listening & hearing.

SECTION-II

Q.4.

Answer the following (any Six)

(18)

- (a) Define essay. Explain any two types of essay.
- (b) Explain any three Cs of letter writing.
- (c) Explain the importance of business letters in business.
- (d) Nothing succeeds like a success. (Identify the tense and rewrite in simple future tense)
- (e) Give two examples of –
 - (i) Backformation
 - (ii) Conversion
- (f) Give two example of present perfect tense.
- (g) Use 'a', 'am', 'the' as articles in your own single sentence.
- (h) Make verb
 - (i) Private
 - (ii) Note

Q.5.

Answer the following (any Four)

(16)

- (a) Write you resume without disclosing your identity?
 - (b) As a store keeper of you organization place an order for office furniture with Décor furniture Bandra (west)
 - (c) Oxford international school requires first class B.Com graduate for the post of Accountant, Write an application to the Headmaster of school for the said post. Recently you purchased some electronics from shop located in your area, in spite of requesting many times the shopkeeper gives you bill without GST No. Write complaint letter to sale & tax inspector of your area to take strong action against shopkeeper.
 - (e) Give the list of Diphthongs.
 - (f) State Four qualities of report.
- Answer the following (any Two)**
- (a) As a chief construction engineer, investigate the reasons and submit you report on leakages from ceiling in newly constructed building.
 - (b) Write an essay on any one –
 - (i) Importance of value education
 - (ii) India – an emerging superpower
 - (c) Read the unseen passage and answer the questions.

Q.6.

Answer the following (any Two)

(16)

A man or woman makes a direct contact with society in two ways: as a member of some familial, professional or religious group, or as a member of a crowd. Groups are incapable of being as moral and intelligent as the individuals who form them: a crowd is chaotic, has no purpose of its own, and is capable of anything except intelligent action and realistic thinking.

Assembled in a crowd, people lose their power of reasoning and their capacity for moral choice. Their suggestibility is increased to the point where they cease to have any judgement or a will of their own. They become very excitable; they lose all sense of individual or collective responsibility. They are subjected to sudden excesses of rage, enthusiasm and panic. In a word, a man in a crowd behaves as though he had swallowed a large dose of some powerful intoxicant. He is a victim of what I have called 'herd poisoning'. Herd poison is an active, extravagant drug. The crowd intoxicated individual escapes from responsibility, intelligence and morality into a kind of frantic, animal mindlessness.

- 1] Which idea is predominantly expressed in this passage? (01)
- 2] Mention the two ways in which a man or woman makes direct contact with society. (02)
- 3] What is "Herd Poison"? (01)
- 4] How does the author describe the chaotic behavior of man? (01)
- 5] Mention two extreme behavioural patterns of man. (01)
- 6] With whom is a man in a crowd compared? Why? (02)

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AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY, 2018

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: ENGINEERING MATHEMATICS

SEAT NO. _____
SEMESTER: II
PROGRAMME: ALL
CODE: 160008

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt all questions each from Section I & Section II.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
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SECTION-I

Q.1

Attempt Any Six out of Eight

(18)

- (a) If $f(x) = \frac{2}{x^2} - 3x + 2$, find $f(1) + f(3)$
- (b) If $f(x) = 2x + 5$, $g(x) = x^2 - x$ find fog
- (c) Evaluate $\lim_{x \rightarrow 2} \frac{x^{10} - 1024}{x^5 - 32}$
- (d) If $f(x) = 4x^4 + 3 \cos x + x \cdot \sin x + 1$
- (e) Evaluate : $\lim_{x \rightarrow 2} \frac{x-2}{\sqrt{x}-\sqrt{2}}$
- (f) Evaluate: $\lim_{x \rightarrow a} \frac{x^{10} - a^{10}}{x - a}$
- (g) Evaluate : $\lim_{\theta \rightarrow \pi/2} \frac{1 - \sin^3 \theta}{\cos^2 \theta}$
- (h) Evaluate : $\lim_{x \rightarrow 0} \frac{e^{7x} - 1}{e^{3x} - 1}$

Q.2

Attempt Any Four out of Six

(16)

- (a) If $Y = e^x - \frac{1}{x} + \log_e x$ find $\frac{dy}{dx}$
- (b) If $f(x) = \frac{x+2}{4x-3}$ and $t = \frac{2+3x}{4x-1}$ show that $f(x) = x$
- (c) Determine $\frac{dy}{dx}$ if $Y = \frac{x^2+3}{x^2-2}$
- (d) Differentiate w.r.to x : $x \cdot \sin^{-1} x + \sqrt{1-x^2}$
- (e) Differentiate w.r.to x : $\log_e(\sec x + \tan x)$
- (f) Differentiate w.r.to x : $\sin^{-1}(2x \cdot \sqrt{1-x^2})$

Q.3

Attempt Any Two out of Three

(16)

- (a) If $Y = 2\cos(\log x) + 3 \sin(\log x)$, prove that $x^2 \cdot \frac{d^2y}{dx^2} + x \cdot \frac{dy}{dx} + y = 0$
- (b) Differentiate $\tan^{-1} \left[\frac{2x}{1-x^2} \right]$ w.r. to $\cos^{-1} \left[\frac{1-x^2}{1+x^2} \right]$
- (c) If $x = \tan^{-1} \left[\frac{2t}{1-t^2} \right]$ $y = \tan^{-1} (3t - t^3)$ find $\frac{dy}{dx}$

SECTION-II

Q.4

Attempt Any Six out of the following

(18)

- (a) If $z = 1 + 2i$ find the value of $z^2 - 2z + 6$
- (b) Find modulus and amplitude of $1 - i\sqrt{3}$
- (c) Find the gradient of the curve $y = \sqrt{x^3}$ at $x = 4$
- (d) Find the radius of curvature of the curve $y = x^3$ at $(2, 8)$
- (e) Convert exponential form into Cartesian form $6.e^{\frac{5\pi}{6}}$
- (f) If $\vec{a} = 2\hat{i} + \hat{j} + \hat{k}$, $\vec{b} = \hat{i} - \hat{j} - \hat{k}$, $\vec{c} = 2\hat{i} - 2\hat{j} - \hat{k}$ Find $\vec{a} \cdot (\vec{b} \times \vec{c})$
- (g) Find the angle between the vectors $\hat{i} + 2\hat{j} + 2\hat{k}$ and $\hat{i} - 2\hat{j} + 2\hat{k}$
- (h) Determine the area of the parallelogram formed by the two vectors $3\hat{i} + 2\hat{j}$ and $2\hat{j} + 4\hat{k}$

Q.5

Attempt Any Four of the following

(16)

- (a) Find all value of $(1 + i\sqrt{3})^{1/3}$
- (b) Using Euler's formula prove that $\cosh^2 x - \sinh^2 x = 1$
- (c) If magnitude of force 3 units acts in the direction $2\hat{i} + 3\hat{j} + 6\hat{k}$ at the point $(1, 1, 1)$. Find moment of force about the point $(-1, 2, 3)$
- (d) Find volume of the parallelepiped of having edges vectors $\hat{i} - \hat{j} + \hat{k}$, $2\hat{j} + 3\hat{k}$, $4\hat{i} + 8\hat{k}$
- (e) Find the equation of the tangent to the curve $Y = 9x^2 - 12x + 7$ which is parallel to the x axis.
- (f) A bullet fired into block of wood penetrates according to the lane $S = 18t - t^3/6$. How far does it penetrate?

Q.6

Attempt Any Two out of Three

(16)

- (a) If $x + iy = \sin(A + iB)$ prove that
 - (i) $\frac{x^2}{\cosh^2 B} + \frac{y^2}{\sinh^2 B} = 1$
 - (ii) $\frac{x^2}{\sin^2 A} + \frac{y^2}{\cos^2 A} = 1$
 - (b) Find the maximum and minimum values of the function $Y = 2x^3 - 3x^2 - 36x + 10$
 - (c) 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.
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AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY-2018

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: APPLIED MATHEMATICS

SEAT NO. _____
SEMESTER: III
PROGRAMME: IE/DE/EE
CODE: 160011

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt **ALL** questions from Section-I and Section-II.
- (3) All questions are compulsory.
- (4) Illustrate your answers with neat sketches, wherever necessary.
- (5) Use of Mathematical and Steam tables and pocket calculator (non-prog.) is permissible.
- (6) Figures to the right indicate full marks.
- (7) Assume suitable additional data, if necessary.

SECTION-I

Q.1

Attempt any six of the following .

- (a) Evaluate $\int \sin^3 x \, dx$
- (b) Evaluate $\int \frac{\cos x}{\sin(x+a)} \, dx$
- (c) Evaluate $\int_0^1 x^2 \cdot \cos x \, dx$
- (d) Evaluate $\int_0^1 \frac{dx}{1+x+x^2}$
- (e) Evaluate $\int_0^1 \frac{1}{1+\tan x} \, dx$
- (f) Evaluate $\int_5^{10} \frac{dx}{(x-1)(x-2)}$
- (g) Find the area above the X-axis bounded by $y = \sin x$ and the ordinate $x = \frac{\pi}{6}$ and $x = \frac{\pi}{3}$
- (h) Determine the volume of right circular cone generated by revolving the line $y = \frac{3}{4}x$ about X-axis between the ordinates $x = 0$ to $x = 4$.

(18)

Q.2

Attempt any four of the following

- (a) Evaluate $\int \frac{x^2-1}{(x^2+1)(x^2+3)} \, dx$
- (b) Find the centre of gravity (CG) of the area under the parabola $y = 4ax^2$, from $x = 0$ to $x = c$.
- (c) Evaluate $\int \log x \, dx$
- (d) Find the moment of Inertia of C uniform rod of length $2l$ about an axis through one end perpendicular to the rod.
- (e) Evaluate $\int \sqrt{x^2 - a^2} \, dx$
- (f) Prove that $\int_0^{\frac{\pi}{2}} \frac{x \cdot \sin x}{1+\cos^2 x} = \frac{\pi^2}{4}$

(16)

Q.3

Attempt any two

- (a) Evaluate $\int \frac{1}{3-2 \sin x} \, dx$
- (b) Evaluate $\int x \cdot \tan^{-1} x \, dx$

(16)

- (c) Find the centre of gravity of the area in the first quadrant enclosed by the curves $y = x^2$ and $y = x(2 - x)$

Q.4

Attempt any six

- (a) Find the order and degree of the equation

$$2 \frac{d^2 y}{dx^2} + 3 \sqrt{1 - \left(\frac{dy}{dx}\right)^2} - y = 0$$

- (b) From the differential equation by eliminating the arbitrary constants for equation

$$y = Ae^{3x} + Be^{-3x}$$

- (c) Solve :

$$\tan y \frac{dy}{dx} = \sin(x + y) - \sin(x - y)$$

- (d) Find $L(t^2 \cdot \sin 3t)$

- (e) Find the equation of the curve whose slope of tangent at any point is $3x - 4$ and which passes through the point $(3, -2)$

- (f) Find $L[\sin 2t \cdot \sin 3t]$

- (g) If $L[f(t)] = \frac{5}{s^2 + 35 - 9}$

$$\text{Find } L[f(t/2)]; L[f(t + 4)]; L[f(2t - 3)]$$

- (h) Find $L^{-1} \left[\frac{3s+12}{s^2+8} \right]$. State the property used to solve the inverse laplace.

Q.5

Attempt any four

- (a) Find $L[te^{-3t} \sin^2 t]$

- (b) Find $L \left[\frac{\cos bt - \cos at}{t} \right]$

- (c) Find $L^{-1} \left[\frac{3s+7}{s^2-2s-3} \right]$

- (d) Find $L^{-1} \left[\frac{2s^2-1}{(s^2+1)(s^2+4)} \right]$

- (e) Solve : $\frac{dy}{dx} + y = x^2$

- (f) The velocity of a particle at time t seconds from commencement of motion is given by $v = 5t^2 - t + 4$. Much distance does it cover in 3 seconds if it was initially at rest.

Q.6

Attempt any two

- (a) Apply convolution theorem to find

$$L^{-1} \left[\frac{s^2}{(s^2+4)(s^2+9)} \right]$$

- (b) Solve : $\frac{dy}{dt} + 3y = 1 + e^t$ given that $y(0) = -1$

- (c) Check whether following equation are exact D.E.? If it is exact D.E. then solve the D.E.

$$\text{a) } \frac{dy}{dx} + \frac{y \cos x + \sin y + x}{\sin x + x \cos y + x} = 0$$

$$\text{b) } \left[y \left(1 + \frac{1}{x} \right) + \cos y \right] dx + [x(1 - \sin y) + \log x] dy = 0$$

SECTION-II

(18)

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL /MAY 2018

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: ELECTRICAL ENGG MATERIALS.

SEAT NO. _____
SEMESTER: I
PROGRAMME: ELECTRICAL ENGG
CODE: 160301

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All questions compulsory
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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
(a) State principle of Ferromagnetic material.
(b) State the uses of carbon and Graphite for brushes.
(c) State the effect of temperature on resistance of different materials.
(d) Explain losses in magnetic materials.
(e) State uses of arc lamps.
(f) State the importance of fuse in electrical ckt.
(g) Define i) Ductility ii) Malleability
(h) List conductive and non- conductive electrical material. | (18) |
| Q.2 | Attempt any Four
(a) Discuss between Ferrous and non- Ferrous material.
(b) Discuss various mechanical properties of metals.
(c) Write properties of wire & cable material.
(d) What are the advantages of circuit breaker. List various circuit breaker.
(e) Establish how failure occur in materials and how to prevent them.
(f) What are the factors upon which fusing current depends? | (16) |
| Q.3 | Attempt any Two
(a) What is magnetic material? List various types of magnetic material.
(b) State advantages and disadvantages of fuse. Why earthing is required in domestic appliance.
(c) State and analyse electrical,thermal and chemical properties of metal. | (16) |

SECTION-II

Q.4 Solve any Six (18)

- (a) State the meaning of semi-conducting materials. Give example.
- (b) Define "Dielectric materials" give examples.
- (c) State the term i) Insulation Resistance with neat sketch.
- (d) Enlist the desirable properties of good insulating materials.
- (e) Define polarization and explain the polar dielectric with neat sketch.
- (f) Draw neat sketch of P type semiconductor & N type. Explain in brief.
- (g) State the proportions of poly carbonate (any three).
- (h) Enlist ceramic insulating materials.

Q.5 Attempt any Four (16)

- (a) Distinguish between P type and N type semi-conductors.
- (b) Give the proportions of liquid insulating materials. explain the term "Dielectric strength"
- (c) State the properties of Poly-styrene and give any two applications.
- (d) Explain with neat sketch the construction of capacitor of any one type.
- (e) Write a note on "Varnishes". State their application.
- (f) Explain the properties of 1) High density polyethylene (HDPE) and 2) Polyvinyl chloride (pvc)

Q.6 Attempt any Two (16)

- (a) Give the detailed classification of polymers & hence compare between thermoset and thermo plastics.
- (b) Explain the thermal classification of insulating materials as per IS 1271-1958.
- (c) Enlist various gaseous insulating materials & hence explain properties & applications of SF₆ in detail.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY 2018

SEAT NO. _____

TIME ALLOWED: 03 HOURS

SEMESTER: I

MAXIMUM MARKS: 100

PROGRAMME: ELECTRICAL ENGG.

COURSE: POWER GENERATION

CODE: 160302

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 calculator (non-programmable) is permissible.
- (5) Illustrate your answers with neat sketches, wherever necessary.
- (6) Figures to the right indicate full marks.
- (7) Assume suitable additional data, if necessary.
- (8) 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

Solve any SIX

(18)

- (a) Define voltage. Also write its unit.
- (b) Write various sources of energy.
- (c) State the meaning of conventional & nonconventional energy sources.
- (d) List thermal power station in Maharashtra along with their capacities.
- (e) Write application of diesel power station.
- (f) Write Principle of thermal power station.
- (g) Write units of 1) Current 2) Power 3) Energy
- (h) Draw single line diagram of electric power system

Q.2

Attempt any FOUR

(16)

- (a) What are the advantages of electrical energy than other types of energy?
- (b) What are the advantages of thermal power plant?
- (c) List the different component of diesel power plant.
- (d) Explain the function of Air preheater.
- (e) Write advantages & disadvantages of Diesel power plant.
- (f) Compare conventional & non-conventional energy.

Q.3

Attempt any TWO

(16)

- (a) Draw block diagram of thermal power plant.
- (b) Explain starting & stopping method of Diesel power plant.
- (c) Explain site selection of thermal power plant & explain economiser.

...2....

SECTION-II

Q.4

(18)

- Attempt any SIX.**
Enlist any three Hydro power plants in Maharashtra State along with their capacities.
(a) Give the names of Hydro turbines and state their suitable height of water head.
(b) Draw neat labelled diagram of hydrological cycle.
(c) Define Binding energy.
(d) Write fission reaction of Uranium atom.
(e) Define 'Load factor' and 'Diversity factor'.
(f) State 'maximum demand' and 'demand factor'.
(g) Describe 'Cold reserve' and 'hot reserve'.
(h)

Q.5

(16)

- Attempt any FOUR**
(a) Give merits and demerits of Hydro power plant.
(b) Explain the process of disposal of nuclear waste.
(c) Describe fissionable and fertile nuclear materials along with example.
(d) Discuss the factors to be considered for the selection of site for Nuclear power plant.
(e) Explain the function of and materials used for control and moderator used in nuclear reactor.
(f) A generating station has following daily load cycle
60MW for 6 hrs
20MW for 8 hrs
10 MW for 4 hrs.
100 MW for 6 hrs.
Find maximum demand and units generated per day.

Q.6

(16)

- (a) Explain the factors to be considered for the selection of site for Hydro power station. Also discuss the need and function of surge tank in hydro power station.
(b) Name different types of nuclear reactor and explain any one with neat diagram

(c) A generating station has the following daily load cycle:

Time (HRS)	0-6	6-10	10-12	12-16	16-20	20-24
LOAD (MW)	20	25	30	25	35	20

Draw the load curve and find maximum demand units generated per day, average load, load factor.

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: ELECTRICAL ENGG. FUNDAMENTALS

SEAT NO. _____
SEMESTER: II
PROGRAMME: ELECTRICAL ENGG.
CODE: 160303

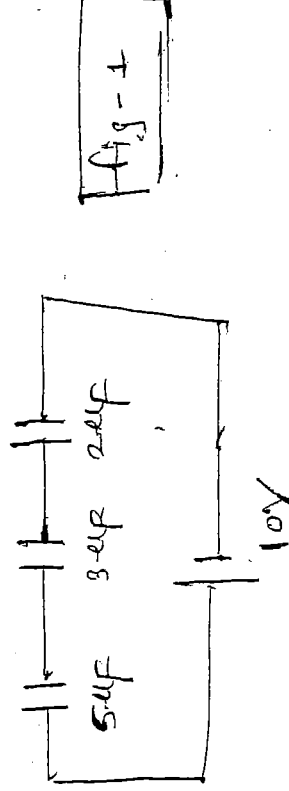
INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt ALL questions from Section-I and Section-II.
- (3) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (4) Illustrate your answers with neat sketches, wherever 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 out of Eight (18)**
- Define :
- (a) (i) Electric potential (ii) Electric current (iii) Resistance along with units.
 - (b) State Fleming's left hand and Right hand rule with neat sketch.
 - (c) State the concept 'Self-inductance'
 - (d) Define (i) Capacitance (ii) Permittivity (iii) Electric flux density
 - (e) State and explain Ohm's law with neat sketch.
 - (f) State the properties of magnetic flux (Any Three)
 - (g) What is meant by dot convention? State its importance.
 - (h) Define (i) Magnetic flux (ii) Permeability (iii) MMF along with units.

- Q.2 Attempt Any Four out of Six (16)**
- (a) A coil has a resistance of 3.46Ω at 40°C and 3.76Ω at 100°C . Find the resistance at 0°C and the temperature coefficient of resistance of 40°C .
 - (b) State and explain Faraday's Laws of Electromagnetic induction.
 - (c) Derive an expression for equivalent capacitance for the circuit shown below fig.1



- (d) State and explain Kirchoff's laws with neat sketch.
 (e) Explain the term series magnetic circuit and state the formula for reluctance.
 (f) Prove that $K = \frac{M}{\sqrt{L_1 L_2}}$ where K is coefficient of coupling. State its importance. (16)
- Q.3 Attempt Any two out of Three**
- (a) (i) Derive an expression for equivalent resistance connected in series and parallel.
 (ii) State and explain the factor which affect the resistance.
 (b) Explain the Meaning of Hysteresis loss and Eddy current loss.
 (c) Derive an expression for capacitance for a composite dielectric capacitor. Draw neat sketch.

SECTION-II

- Q.4 Solve Any Six out of Eight** (18)
- (a) Define (i) Amplitude (ii) Cycle (iii) Frequency
 (b) Explain concept of Admittance and Reactance.
 (c) Explain concept of leading and lagging phasors.
 (d) Explain the term "Resistance"
 (e) Explain balanced and unbalanced load.
 (f) Draw power triangle and explain its component.
 (g) Explain the concept of neutral shift.
 (h) State relationship between line and phase values of voltage and current in case of star connection.

- Q.5 Attempt Any Four out of Six** (16)
- (a) Explain Millman's theorem for neutral shift.
 (b) Write difference between series and parallel resonance circuit (any 4 points)
 (c) Draw vector diagram and expression for series combination of R-L circuit.
 (d) A resistance of 30Ω is connected in series with an inductor of 10 mH across a source of 100 V AC , 50 Hz , supply. Calculate the impedance, current and active power of the circuit.
 (e) Define the following terms:
 (i) Power factor (ii) Trac power (iii) Apparent power (iv) Reactive power
 (f) Explain resonance in AC parallel circuit write formula for resonant frequency.

- Q.6 Attempt Any Two out of Three** (16)
- (a) Derive relation between line voltage and phase voltage line current and phase current for Delta connection.
 (b) Explain Impedance triangle and admittance triangle with neat sketch
 (c) $V_1 = 60 \angle 40^\circ$, $V_2 = 6 + j4$. Calculate $V_1 + V_2$, $V_1 - V_2$, $V_1 \cdot V_2$ and $\frac{V_1}{V_2}$
 Write result in polar and rectangular form.

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

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: RENEWAL ENERGY SOURCES

SEAT NO. _____
SEMESTER: II
PROGRAMME: ELECTRICAL ENGG.
CODE: 160304

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt **ALL** questions from Section-I and Section-II.
- (3) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (4) Illustrate your answers with neat sketches, wherever 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) Write limitations of non conventional sources.
 - (b) What is meant by conventional and non conventional energy sources.
 - (c) Write advantages of use of renewable sources of energy.
 - (d) Write merits of solar energy.
 - (e) Write various applications of solar energy.
 - (f) Write demerits of geothermal energy.
 - (g) Name of the solar firm in India
 - (h) Name the forms of energy available from ocean.
- Q.2 Attempt Any Four (16)**
- (a) Compare conventional and non conventional energy sources.
 - (b) Explain the importance of solar power in the energy deficient India
 - (c) Write merits of geothermal energy.
 - (d) Explain site selection of tidal power plant.
 - (e) Explain the greenhouse effect and acid rain.
 - (f) Compare wind power plant and tidal power plant.
- Q.3 Attempt Any Two (16)**
- (a) Draw a block diagram of a photovoltaic power generation system and explain each block.
 - (b) Explain the operation of a tidal power plant and write sites in India
 - (c) How is electricity generated using geothermal energy ?

SECTION-II

- Q.4** **Attempt Any Six of the following** (18)
- (a) Define cut-in speed and cut-out speed with the help of neat diagram.
 - (b) Enlist the points to be considered while selecting site for windmills.
 - (c) State the principle of working of fuel cell.
 - (d) Draw a neat labelled diagram of fuel cell.
 - (e) Name the fuels used in fuel cell.
 - (f) Enlist the properties of Hydrogen.
 - (g) Name the hydrogen production methods.
 - (h) Enlist various applications of Hydrogen.
- Q.5** **Attempt Any four of the following** (18)
- (a) Discuss environmental impact due to wind mills.
 - (b) Give properties of Biogas.
 - (c) Describe energy plantation and name different modes of biomass power generation.
 - (d) Write social and economic benefits of biomass based power generation.
 - (e) Explain biological processes of Hydrogen production.
 - (f) List down the characteristics of the power plants supplying base load and peak load.
- Q.6** **Attempt Any Two of the following** (16)
- (a) Explain Wind Energy Conversion System with neat labelled diagram.
 - (b) Describe cogeneration in detail.
 - (c) Discuss the benefits of combined operation of power plants.

Shri Vile Parle Kelavani Mandal's
 SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
 AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY 2018

SEAT NO. _____
 SEMESTER: III
 PROGRAMME: ELECTRICAL ENGG
 COURSE: ELECTRICAL CIRCUIT & NETWORKS CODE: 160306

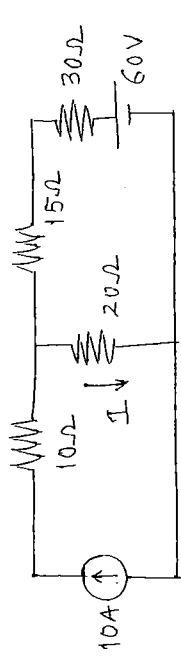
INSTRUCTIONS:

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

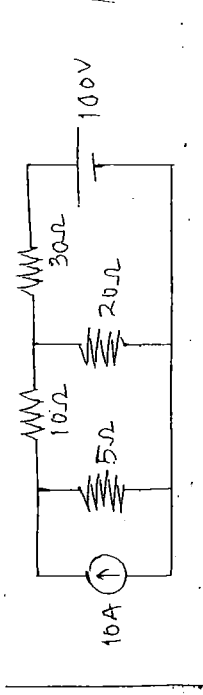
SECTION-I

- Q.1 Attempt any Six of the following (18)**
- (a) Define Linear and Non- linear elements.
 - (b) Define Active and passive elements.
 - (c) State Kirchoff's current Law with neat diagram.
 - (d) State Thevenin's theorem.
 - (e) State Reciprocity theorem.
 - (f) Define time constant of simple R-L circuit.
 - (g) Write the expression for rise and decay of voltage in R-L circuit.
 - (h) Define Transfer impedance.

- Q.2 Attempt any Four of the following (16)**
- (a) Using superposition theorem find current I.



- (b) Find current through 10Ω by using Norton's theorem



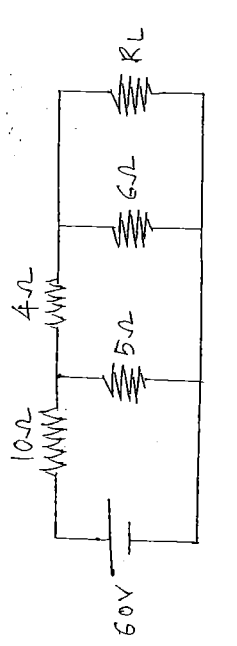
- (c) Explain initial conditions and their significance in electrical circuit.
- (d) Derive an expression for the energy stored in an inductor.
- (e) Derive an expression for voltage during charging process of capacitor.
- (f) Differentiate between mutual inductance and self-inductance.

Q.3

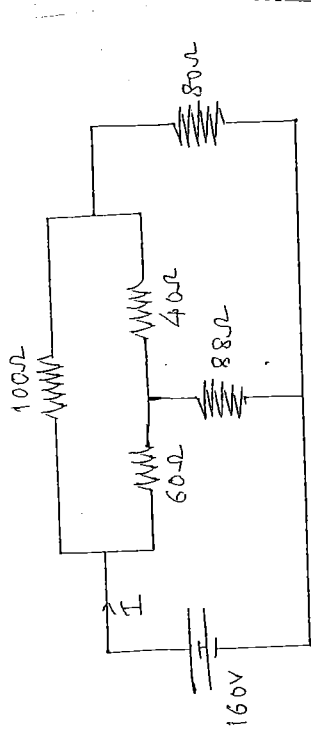
Attempt any Two of the following

(16)

- (a) In the circuit given below, find the value R_L for maximum power transfer to R_L .



- (b) Find current I supplied by the battery using star delta transformation for the circuit given below:



- (c) An $80 \mu\text{F}$ (microfarad) capacitor is connected in series with $5 \text{ M}\Omega$ (Megaohm) resistance across a 250 VDC supply, calculate:
 - i) Initial charging current
 - ii) Time taken for the voltage across the capacitor to grow 180V
 - iii) The voltage across the capacitor at 4 seconds after it is connected to supply.
 - iv) Time constant of circuit.

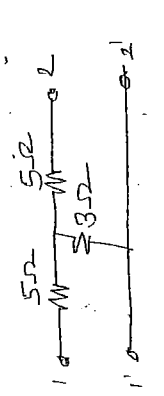
SECTION-II

Q.4

Solve any Six

(18)

- (a) Write a difference between 'a' & operator 'j'
 (b) Find the I parameter for following network



- (c) Define Ampere-hour efficiency & watt hour efficiency.
 (d) Define the balanced & unbalanced system.
 (e) Define positive and negative phase sequence components of 3 phase system.
 (f) Derive the condition of symmetry of Z- parameter.
 (g) Write the application of solar cells.
 (h) Define symmetrical components.

Q.5

Solve any Four

(16)

- (a) Derive the condition of symmetry of ABCD parameters.
 (b) In three phase 4 wire system the current in R, Y, B line under abnormal condition of loading are as under
 $\bar{I}_R = 100 \angle 30^\circ \text{ A}$, $\bar{I}_Y = 50 \angle 300^\circ \text{ A}$, $\bar{I}_B = 30 \angle 180^\circ \text{ A}$
 Calculate the positive and zero sequence current in R - line & return current in neutral wire.
 (c) A balance star connected load takes 75A from a balanced 3 phase, 4 wire supply. If the fuses in two of the supply line are removed. Find the symmetrical component of the line current before and after the fuses are removed
 (d) Find the Y parameter in two port network.
 (e) A battery of accumulator of emf 50volt and internal resistance 2Ω is charge on 100 volt direct mains. What series resistance will be required to give a charging current of 2A?
 (f) Define the following term
 i) Internal resistance of the cell
 ii) Back emf of the cell

Q.6

Solve any Two

(16)

- (a) Find the relation between h- parameter in term of Z- parameter.
 (b) Explain the construction and working of alkaline cell.
 (c) Explain symmetrical component method for analysis of three phase unbalance system.



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

SEAT NO. _____
SEMESTER: III
PROGRAMME: Electrical Engg.

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100

COURSE: Basic Electronics

CODE: 160307

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) Attempt ALL questions from Section I & Section II which are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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 (Three marks each)

(18)

- (a) What is doping? Why it is required in semi conductor devices.
- (b) State PIV rating for half wave and full wave rectifiers. Define PIV.
- (c) What is intrinsic semiconductor?
- (d) Draw characteristics of BJT in CE configuration.
- (e) Draw symbols of BJT (N-P-N & P-NP) type. What is the difference between these two types.
- (f) What is biasing of transistor? List types of biasing circuit.
- (g) List types of field effect transistor.
- (h) Draw equivalent circuit of JFET & List applications of JFET.

Q.2

Answer ANY FOUR out of SIX

(16)

- (a) Compare conductors, semi-conductors and insulators.
- (b) Explain hybrid parameter of transistor.
- (c) Draw symbol and characteristics of Power Transistor.
- (d) Draw high frequency equivalent circuit of transistor.
- (e) What is pinching effect in JFET.
- (f) Compare JFET & BJT

Q.3

Answer ANY TWO out of THREE (Eight marks each)

(16)

- (a) Draw neat circuit diagram of bridge rectifier using diode and explain its working with required waveforms.
- (b) State h-parameters of transistor for CE & CB configuration.
- (c) Draw construction diagram, symbol and characteristics of FET and describe its working in brief.

...2...

SECTION-II

Q.4 ANY SIX (18)

- (a) Distinguish between LED & LCD.
- (b) Enlist the applications of photo devices.
- (c) Draw and explain two transistor analogy.
- (d) Discuss the concept of amplifier.
- (e) Sketch the constructional diagram of LED.
- (f) Compare SCR & TRIAC (minimum 3 points)
- (g) Enlist the different configurations of amplifier.
- (h) Derive the expression of gain & draw a diagram of a two stage amplifier.

Q.5 ANY TWO (16)

(a) Give the applications of

- 1) SCR
- 2) DIAC
- 3) TRIAC
- 4) Amplifier (Class A, Class B)

- (b) Draw a labelled characteristics of SCR.
- (c) Sketch the circuit diagram & waveforms of Class B amplifier.
- (d) State & explain different feedback techniques.
- (e) Draw a neat diagram of Bootstrap circuit Amplifier.
- (f) A given amplifier has voltage gains, $AV_1 = 10$, $AV_2 = 20$ & $AV_3 = 40$. Compute the total / overall voltage gain & also determine the total dB voltage gain.

Q.6 ANY TWO (16)

- (a) Distinguish between class A, class B, class AB amplifiers.
- (b) Explain the operating principle along with the characteristics of TRIAC.
- (c) Discuss the construction & operation of photomultiplier tube.

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100

SEAT NO. _____
SEMESTER: III
PROGRAMME: ELECTRICAL ENGG.

COURSE: Electrical Transmission & Distribution CODE: 160308

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All questions are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of pocket calculator (non-programmable) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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 out of Eight. (18)**
- a. Draw single line diagram of Transmission system and explain it.
 - b. Explain foundation of sag in overhead transmission line.
 - c. Write requirements of Insulator.
 - d. Define string efficiency and write its formula.
 - e. Explain ACSR conductor.
 - f. Write limitations of EHVAC transmission system.
 - g. Explain – 1) Losses of Transmission line
2) Efficiency of Transmission line.
 - h. Define Transmission system and write its classification.

- Q.2 Attempt Four out of SIX (16)**
- a. Explain skin effect and Ferranti effect.
 - b. Describe R,L,C parameters of transmission line and write its effect on transmission line.
 - c. Explain effect of load power factor on performance of transmission line.
 - d. Write advantages of EHVDC transmission line.
 - e. Explain flashover voltage & puncture strength of insulator and write formula for safety factor of insulator.
 - f. Define corona and explain various factors affecting it.

- Q.3 Attempt any two out of THREE (16)**
- a. Explain with neat diagram suspension type insulator also write its advantages and disadvantages.
 - b. Explain with neat circuit diagram and vector diagram performance of medium length transmission line (T method)
 - c. A single phase overhead transmission line delivers 1000Kw at 30Kv at 0.8 p.f lagging. The total resistance and inductive reactance of line are 10 Ω & 15 Ω respectively. Determine i) sending end voltage
ii) sending end power factor iii) Transmission efficiency

SECTION – II

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

- a) Give classification of distribution system.
- b) Explain briefly the design consideration in distribution system.
- c) Draw neat labelled diagram showing all parts of single core cable.
- d) Describe briefly the required properties of insulating materials used in cables.
- e) Enlist various components of substation.
- f) Define sub-station. Give its classification.
- g) State the locations of voltage control equipment as well as various methods of voltage regulation.
- h) Describe off load tap changing transformer method of voltage control in brief. Also write its limitations.

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

- a) What do you understand by induction regulators? Describe three phase induction regulator.
- b) Draw the layout & schematic connection of a pole mounted substation.
- c) Explain the methods of cable laying in underground cables.
- d) Compare underground cable with overhead lines.
- e) Define & explain feeder, distributors and service mains.
- f) Describe Ring main system & interconnected system of distribution.

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

- a) A single phase a.c. distributor AB is fed from end A and has a total impedance of $(0.2 + j0.3)\Omega$. At the far end, the voltage $V_B = 240V$ and the current is 100 A at a power factor of 0.8 lagging. At the midpoint, a current of 100A is tapped at a power factor of 0.6 lagging, with reference to voltage at mid-point. Calculate the supply voltage VA and the phase angle between voltages at two ends.
- b) With neat diagram, describe Murray loop test for the location of (i) Earth fault and (ii) short circuit fault in an underground cable.
- c) Explain different connection schemes used in substations.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL / MAY 2018

TIME ALLOWED: 03 Hours
MAXIMUM MARKS: 100

SEAT NO. _____
SEMESTER: III
PROGRAM: Electrical Engg.

COURSE: Transformers & Induction Motors **CODE: 160309**

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All questions are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) 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) Distinguish between Core type & Shell type transformer (ANY 3 Points).
- b) State any three assumptions of an ideal transformer.
- c) Draw the phasor diagram of an ideal transformer on load for purely Resistive Circuit.
- d) Draw a neat circuit diagram of short circuit test on single phase transformer.
- e) Define voltage regulation of a transformer. State its formula.
- f) State the uses of Auto-Transformer.
- g) State the advantages of three phase transformer over single phase transformer.
- h) State the need of three phase transformation with two transformers.

Q.2 **Attempt ANY FOUR of the following.** **(16)**

- a) Derive EMF equation of a single phase transformer.
- b) Draw the phasor diagram of Actual Transformer on load for resistive inductive & resistive – capacitive load.
- c) A single phase transformer has 180 Φ 90 turns respectively in its secondary & primary windings. The respective resistances are 0.233 Ω Φ 0.067 Ω . Calculate the equivalent resistance of
 - a) primary referred to secondary
 - b) secondary referred to primary
 - c) total resistance referred to primary
- d) Derive the condition for maximum efficiency in case of single phase transformers.
- e) Compare Autotransformer & two winding transformer with respect to following points :
 - i) VA ratings
 - ii) Cost
 - iii) Losses & efficiency
 - iv) Core size
- f) State the uses of Tertiary windings in case of triple wound transformer.

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

- a) With the help of neat illustrations & phasor diagram explain Scott- connected Transformers.

- b) Consider a 20KVA, 2,200/220V, 50 Hz transformer. The OC/SC test results are as follows.
 OC Test 220 V, 4.2 A, 148 W (IV side)
 SC Test 86 V, 10.5 A, 360 W (hv side)
- c) State the advantages, Disadvantages and applications of Auto-Transformer.

SECTION-II

Q.4 Attempt ANY SIX out of EIGHT (18)

- a) Justify why three phase induction motor can never run on synchronous speed.
- b) Draw the power flow diagram of 3∞ induction.
- c) State the necessity of storter and enlist the functions of storter.
- d) List the advantage and disadvantages of shaded pole induction motor.
- e) Explain the working principle of single phase induction motor.
- f) Enlist methods of speed control of induction motor
- g) Compare between 3∞ induction motor and transformer.
- h) If the emf in the stator of a 4 pole, 3∞ induction motor has a frequency of 50 Hz and that in the rotor is 1.5Hz at what speed is the motor running and at what slip. Calculate percentage slip.

Q.5 Attempt ANY FOUR out of SIX (16)

- a) Explain the operation of capacitor start induction motor with the help of neat diagram.
- b) Derive an expression for starting torque & running torque of 3∞ induction motor.
- c) Draw neat sketch of start delta starker for 3∞ induction motor. Explain its working.
- d) Explain any two methods of speed control of 3 phase induction motor.
- e) A delta connected 6 pole, 50Hz, three phase induction motor has a rotor resistance of 0.15Ω per phase and experts maximum torque at 880 rpm. Calculate the percentage maximum torque that would be exerted at standstill condition and at 940 rpm.
- f) State the advantages and disadvantages of 3 phase induction motors.

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 universal motor with neat sketch.
- c) A 3 phase induction motor having a synchronous speed of 1200 rex/min draws 80kw from a 3 phase feeder. Copper losses and iron losses in the stator amount to 5KW. If the motor runs at 1152 rpm. Calculate
 - i) Active power transmitted to rotor
 - ii) Rotor copper loss
 - iii) Mechanical power developed
 - iv) Efficiency of the motor
 Assume friction and windge losses as 2 KW.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY 2018

SEAT NO. _____
SEMESTER: IV
PROGRAMME: ELECTRICAL ENGINEERING
CODE: 160312

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: SWITCHGEAR & PROTECTION

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All Questions are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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

- (a) Write difference between Isolator and Circuit Breaker.
- (b) Define fuse and state its various types.
- (c) Define Relay and give its classification.
- (d) State advantages of static Relay.
- (e) Explain need of Circuit Breaker in power system.
- (f) Write difference between MCCB and ELCB.
- (g) State the properties of Circuit Breaker contact materials.
- (h) State switching sequence of Isolator, Circuit Breaker and Earthing switch during normal and abnormal condition.

(18)

Q.2

Answer any Four out of Six

- (a) State advantages of SF₆ Circuit Breaker.
- (b) Draw characteristics of Impedance Relay and explain it.
- (c) Explain with neat diagram single Bus-Bar arrangement and write its disadvantages.
- (d) Draw characteristics of fuse and explain it.
- (e) Define pick-up, Under-Reach, Over-Reach of the Relay.
- (f) Write comparison of HRC fuse and Rewirable fuse

(16)

Q.3

Answer any Two out of Three

- (a) Explain with neat diagram recovery voltage, Restriking Voltage of Circuit Breaker. (16)
(08)
- (b) (i) Draw neat diagram of Bulk Oil Circuit Breaker and explain its arc quenching process. (06)
(ii) Define- (02)
 - (1) Making current capacity
 - (2) Breaking Current capacity of Circuit Breaker
- (c) (i) Explain with neat diagram Overcurrent Relay. (06)
(ii) State different Ratings of fuse. (02)

SECTION-II

Q.4

(18)

Attempt any Six of the following

- (a) Enlist the different faults in power system.
- (b) State the necessity of current limiting reactor.
- (c) State the meaning of main & auxiliary protection.
- (d) List out the protection schemes provided for feeders & transformer.
- (e) State the types of lighting arrestors.
- (f) Define surge. Draw a typical lighting voltage surge.
- (g) State the importance of neutral earthing.
- (h) Compare neutral earthing with equipment earthing.

Q.5

(16)

Attempt any Four of the following

- (a) State & explain different types of bus bar reactors.
- (b) Two 3-phase alternators of rating 1MVA, 3.3 KV. And 1.5 MVA, 3.3KV have percentage reactances of 10 and 18 respectively with respect to their ratings. Alternators are connected in parallel to bus bar. A 3-phase short circuit occurs on the bus midway between the alternators. Find short circuit KVA.
- (c) Explain restricted earth fault protection scheme provided to alternator.
- (d) Discuss the distance protection provided for long transmission line.
- (e) Explain the phenomenon of "Arcing ground".
- (f) State the merits & demerits of reactance earthing compared to solid earthing.

Q.6

(16)

Attempt any Two of the following

- (a) Enlist the requirements of motor protection. Explain the Overcurrent protection for three phase Induction motor.
- (b) Draw & explain the percentage differential protection scheme for a Star-Star connected power transformer. Also State its limitations.
- (c) With the help of diagram, describe the working of thyrite type arrester. Also write its advantages, limitation & applications.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY-2018

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: ELECTRICAL AND ELECTRONIC MEASUREMENTS

SEAT NO. _____
SEMESTER: IV
PROGRAMME: ELECTRICAL ENGG.
CODE: 160313

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All question are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-prog.)Is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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 out of Eight** (18)
- (a) Name any three system of units.
 - (b) State base quantities and their units of SI system.
 - (c) Give classification of resistance based on their.
 - (d) Name various methods of resistance measurement and also state the types of resistance it measures
 - (e) Draw basic AC bridge network.
 - (f) Define energy and state its unit.
 - (g) Name different adjustment which can be done in AC energy meter
 - (h) Write advantages (any three) of induction type energy meter.
- Q.2 **Attempt any Four out of Six** (16)
- (a) Give applications of DC potentiometers and explain any one in detail.
 - (b) Draw detailed circuit diagram of Crompton potentiometer.
 - (c) Describe errors occur in resistance measurement using the Wheatstone bridge.
 - (d) Explain the difficulties encountered in measurement of high resistance.
 - (e) Discuss the working of Maxwell's inductor bridge and derive the equation.
 - (f) Compare induction types energy meter and electronic energy meter.
- Q.3 **Attempt any Two out of Three** (16)
- (a) Discuss construction and working of Megger with neat labelled diagram.
 - (b) Derive the equations for Maxwell's Inductance, capacitance bridge. Also write its advantages and disadvantages.
 - (c) Discuss type single phase energy meter with neat labelled diagram

SECTION-II

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

- (a) State various methods of damping of measuring instruments & explain any one.
- (b) Compare between shunts AND multipliers (any 3 points)
- (c) Explain the construction of current transformer with the help of neat diagram.
- (d) Describe the working of rectifier type of instruments.
- (e) How is current range of a permanent magnet moving coil instrument extended with the help of shunts?
- (f) Draw the block diagram of digital counter and explain its working.
- (g) Derive the torque equation of electro-dynamometer type of wattmeter.
- (h) Explain the working of multimeter with diagram.

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

- (a) What are the different methods of producing controlling torque in an indicating instrument list their advantages and disadvantages?
- (b) Explain how high current and voltages are measured with the help of instrument transformers. Explain with the help of suitable diagram.
- (c) Describe the working and construction of induction type of wattmeter.
- (d) A 3-ph, 400V, motor load has a p.f. of 0.4. Two wattmeter's connected to measure the input. They show the input to be 30KW. Find the reading of each instrument.
- (e) Explain with neat diagram electronic voltmeter and wattmeter.
- (f) Explain the method of measuring reactive power for balanced load.

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

- (a) Explain the construction and working of attraction type and repulsion type of moving iron instrument with the help of neat diagram.
- (b) Explain the working and construction of potential transformer and explain the terms-Transformation ratio, Nominal ratio and burden for instrument transformers.
- (c) Describe the working of a universal shunt for multirange ammeter. Explain the disadvantages of shunts and multipliers when used for extension of range.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL/MAY 2018

TIME ALLOWED: 03 HOURS
MAXIMUM MARKS: 100
COURSE: DC & SYNCHRONOUS MACHINES

SEAT NO. _____
SEMESTER: IV
PROGRAMME: ELECTRICAL ENGG.
CODE: 160314

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All Questions are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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) State the different types of DC generator.
- (b) Compare different characteristics of the DC generator (Any three points)
- (c) Write down the applications of DC motor (Any Three)
- (d) What do you mean by armature reaction.
- (e) Draw the speed torque characteristics of DC series motor and state its importance in traction.
- (f) State the emf equation of torque equation of DC motor.
- (g) What are the different losses in dc machines.
- (h) What is the condition for maximum efficiency of dc machines.

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

- (a) Compare DC generator and DC motor (Any Four points)
- (b) A 440V, DC shunt motor has armature resistance of 0.8Ω and field resistance of 200Ω . Determine back emf when giving an output of 7.46 KW at 85% efficiency.
- (c) Explain the methods used for the speed control of DC series motor.
- (d) A 500V DC shunt motor runs at its normal speed of 250 rpm when the armature current is 200A. The resistance of armature is 0.12Ω . Calculate the speed when a resistance is inserted in the field reducing shunt field to 80% of normal value and armature current is 100 Ampere.
- (e) Draw and explain the construction of dc machine.
- (f) A four pole generator having wave wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming flux per pole to be 7mwb

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

- (a) Draw and explain the construction and working of brushless DC motor.
- (b) The open circuit characteristic of a d.c. shunt generator driven at rated speed is as follows:

Field Current (A)	0.5	1.0	1.5	2.0	2.5	3.0	3.5A
Induced vtg(V)	60	120	138	145	149	151	152V

P.T.O

If resistance of field circuit is adjusted to $53\ \Omega$ calculate open circuit voltage and load current when terminal voltage is 100V . Neglect armature reaction and assume an armature resistance of $0.1\ \Omega$.

- (c) (i) Explain ward Leonard Method of Speed Control.
(ii) Draw the following characteristics of DC shunt motor
(a) Speed- Armature current (b) Speed- Torque

SECTION-II

Q.4

Attempt Any Six out of Eight

(18)

- (a) State the working principle of synchronous generator.
(b) Define 'Regulation' of alternator. State its importance.
(c) Define 'Synchronising Power' state the equation of it.
(d) State the need of parallel operation of alternators.
(e) Explain the concept of rotating magnetic field with neat sketch.
(f) Define :
(i) Synchronous Reactance
(ii) Synchronous impedance
(iii) Pitch factor
(g) State: (i) Starting torque (ii) pull in torque and (iii) Pull out torque w.r.t synchronous motor.
(h) State the importance of damper winding in synchronous machines.

Q.5

Attempt Any Four out of Six

(16)

- (a) A three-phase, 16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is $0.03\ \text{Wb}$ and speed is $375\ \text{r.p.m}$. Find (i) Frequency (ii) Phase emf and (iii) line emf. Assume full pitched coil.
(b) Define 'Distribution Factor' and derive the equation for the same.
(c) What is meant by Synchronous Condenser? Explain with neat sketch.
(d) State and explain the conditions to be satisfied for parallel operation of alternators.
(e) A 400V , 3 phase synchronous motor gives a net mechanical output power of $7.4\ \text{KW}$ and operates at $0.8\ \text{pf}$ lagging. Its effective resistance is $0.7\ \Omega$. If the iron and mechanical losses are $550\ \text{W}$ and excitation losses are $750\ \text{W}$. Calculate: (i) armature current and (ii) commercial efficiency
(f) Explain the function of damper winding in case of synchronous machine.

Q.6

Attempt Any Two out of Three

(16)

- (a) Describe 'Two bright and one dark lamp' method of synchronisation of two alternators.
(b) From the following test results, determine the voltage regulation of 2000V , 1 phase alternator delivering a current of 100A at (i) Unity p.f. (ii) $0.8\ \text{p.f}$. leading and (iii) $0.71\ \text{p.f}$. lagging
Test Results : Full Load current of 100A is produced on short circuit by a field excitation of $2.5\ \text{A}$
: An emf of 500V is produced on open circuit by the same excitation. The armature resistance is $0.8\ \Omega$
(c) Describe 'V' curves and inverted 'V' curves of synchronous motor with neat sketch and vector diagrams.

Shri Vile Parle Kelavani Mandal's
SHRI BHAGUBHAI MAFATLAL POLYTECHNIC
AUTONOMOUS SEMESTER EXAMINATION APRIL / MAY 2018

TIME ALLOWED: 03 Hours
MAXIMUM MARKS: 100

SEAT NO. _____
SEMESTER: IV
PROGRAM: ELECTRICAL ENGG.

COURSE : Utilization of Electrical Energy **CODE : 160315**

INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All questions are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) Assume suitable additional data if necessary.
- (6) 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 6 out of 8. (18)

- a. Define Luminous Flux, Luminous intensity and Illuminance.
- b. Classify artificial sources of light based on their principle of operation.
- c. State the modes of heat transfer.
- d. Give classification of Electric heating based on the operating frequency.
- e. Write any three advantages of Electric Welding.
- f. Name the current control methods used in welding transformer.
- g. Write the applications of any three types of resistance welding.
- h. Give any three functions of Bureau of Energy Efficiency (BEE).

Q.2 Attempt ANY 4 out of 6 (16)

- a. State and prove Inverse square law of illumination.
- b. Compare direct lighting and indirect lighting scheme.
- c. Explain any four temperature control method in electric heating.
- d. State the principle and write applications of Dielectric heating.
- e. Compare metal arc welding and carbon arc welding.
- f. Describe the need of Energy Conservation.

Q.3 Attempt Any Two out of Three

- a. An office area of 30m x 15m x 2m is to be illuminated with fluorescent tubes to an average illumination of 250 lm/m² on the floor. Estimate suitable number and size of lamps. Assume coefficient of utilization of 0.6, maintenance factor of 0.7, space to height ratio of 1 and tubes are to be fitted on ceiling.

Wattage(W)	28	32	40	54
Efficiency(lm/W)	86	80	70	70

Also draw the layout.

PTO..

- (b) (i) State the characteristic features of heating element.
(ii) A resistance oven employing nichrome wire is to be operated from 220V, single phase supply and is to be rated at 16KW. If the temperature of the element is to be limited to 1170°C and average temperature of charge is 500°C, find the diameter and length of the element wire. Consider following data : Radiating efficiency = 0.57
Emissivity = 0.9
Specific resistance of nichrome = (1.09×10^{-6}) ohm-m
- (c) Explain the aspects of Energy conservation in detail.

SECTION-II

Q.4

Attempt ANY SIX of the following:

(18)

- (a) Draw the energy flow diagram.
(b) State the uses of energy audit instruments (ANY TWO)
(c) Draw the flow diagram of power system.
(d) State the features of energy efficient motors.
(e) State the various losses taking place in Transmission system.
(f) "Low power factor leads to large KVA ratings of equipments". Justify the statement.
(g) State the need of energy conserving equipments & devices.
(h) State the applications of maximum demand controller.

Q.5

Attempt ANY FOUR of the following.

(16)

- (a) Discuss the procedure adopted for Energy Audit.
(b) State the factors affecting the selection of suitable refrigeration system.
(c) State as to how energy conservation is obtained by improving load factor.
(d) Discuss ABC Analysis in brief.
(e) State the factors affecting efficiency of motors.
(f) Discuss the minimization techniques for reducing losses in Distribution System (ANY ONE)

Q.6

Attempt ANY TWO of the following:

(16)

- (a) Discuss in detail simple payback period calculations.
(b) Write a short note on Energy Efficient Transformer.
(c) Discuss KVAR controllers in details.

TIME ALLOWED: 03 HOURS

MAXIMUM MARKS: 100

**COURSE: ELECTRICAL ESTIMATION
& COSTING**

SEAT NO. _____

SEMESTER: IV

PROGRAMME: ELECTRICAL ENGG.

CODE: 160317

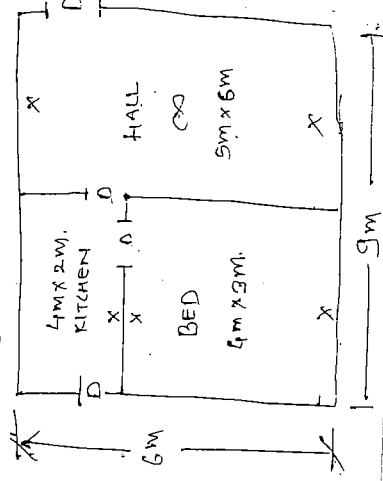
INSTRUCTIONS:

- (1) Answer to the two sections must be written in separate answer books.
- (2) All Questions are compulsory.
- (3) Illustrate your answer with neat sketches, wherever necessary.
- (4) Use of Mathematical and Steam tables and pocket calculator (non-programmable) is permissible.
- (5) Figures to the right indicate full marks.
- (6) Assume suitable additional data, if necessary.
- (7) 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. (6 × 3M) (18)**
- (a) State the different types of wires used in residential building electrification.
 - (b) State the main selection criteria for the rating of wires.
 - (c) State the types of service connection.
 - (d) State the criterion to decide the number of lighting & power circuit in residential installation.
 - (e) Enlist the types of electrical installations.
 - (f) Draw the symbol of
(i) Two way switch (ii) Exhaust fan (iii) Energy motor
 - (g) What is continuity test of wires?
 - (h) Enlist the protection devices used in residential building electrification.
- Q.2. Attempt any Four of the following. (16)**
- (a) Write down the four general requirements of electrical installations.
 - (b) How to reduce the earth resistance in the installation.
 - (c) State any two standard IE rules related to electrical installation.
 - (d) Compare between ELCB & MCB.
 - (e) Compare the underground service connections and overhead service connection.
 - (f) Consider a room having 2 light point, two fan points, and one 5 amp socket out. Draw its wiring diagram and schematic diagram.

- Q.3. Attempt any Two of the following. (16)**
- (a) Explain the types of testing for wiring installation for verification of current, earthing and insulation resistance.
 - (b) Write down the sequence in steps to be followed to prepare estimate & costing for a residential installation.
 - (c) Estimate quantity schedule of material and their complete cost required for casing capping wiring system used in a house the plan of which is shown in fig-1. Assume height of ceiling of 3.5 m.



SECTION-II

- Q.4. (18)**
Attempt any Six out of Eight (3 marks each).
Find the input current of 3-ph, 400v 50Hz, 1 HP induction motor of 85% efficiency proposed to be installed in workshop. Assume P.F. = 0.8 at full load.
- (a) Name the starters used for following motors:
(i) DC shunt motor (ii) DC series motor
(iii) Induction motor of medium rating
- (b) State the desirable properties of cable.
- (c) Differentiate between commercial & residential installation electrification.
- (d) Define bus bar. Also state the factors on which size of bus bar chamber is dependent.
- (e) What is contract? State the role of contractor.
- (f) Define-
- (g) (i) Tender (ii) Earnest money deposit (EMD) (iii) Security deposit (SD)
- (h) List down the principles of various stages involved in execution of work.
- Q.5. (16)**
Attempt any Four out of Six.
- (a) State the important guidelines about motor wiring.
- (b) Write any four requirements for commercial installation.
- (c) Explain earthing of commercial installation.
- (d) Write the difference between wires & cables.
- (e) State the criteria for selecting contractor & supplier.
- (f) Describe the process of setting administrative approval in contracts.
- Q.6. (16)**
Attempt any Two out of Three. (8 marks each)
- (a) Write the procedure for opening of tender.
- (b) State the sequence to be followed to prepare estimation of commercial installation.
- (c) Prepare complete estimate to install 3 ph, 400V, 50Hz, 3HP, Induction motor have to be used for grinding purpose in small workshop having room size of 3 m × 3 m. Assume the necessary data required for estimation (Refer table Attached)
