

3E1101

Roll No. _____

Total No of Pages: 4**3E1101****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****BSC Aeronautical Engineering****3AN2-01 Advanced Engineering Mathematics-I****AE, AG, AN, CE, CR, EC, EI, ME, MH, MI****Time: 3 Hours****Maximum Marks: 120***Instructions to Candidates:**Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*1. Scientific Calculator2. NIL**PART – A****(Answer should be given up to 25 words only)****[10×2=20]****All questions are compulsory**

Q.1 State fundamental theorem of finite difference calculus.

Q.2 Write Trapezoidal formulas for integration.

Q.3 Apply Picard's method to find the first approximate solution of the problem

$$\frac{dy}{dx} = \frac{x^2}{1+y^2}, \text{ with } y(0) = 0.$$

Q.4 Write the Newton – Raphson's formula for transcendental equation.

- Q.5 What are the existence condition for Laplace Transform?
- Q.6 State convolution theorem for inverse Laplace Transform.
- Q.7 Define Fourier Transform.
- Q.8 Write down the formula for inverse sine transform.
- Q.9 Find z – Transform of unit impulse function $\delta_n = \begin{cases} 1, & n = 0 \\ 0, & n \neq 0 \end{cases}$
- Q.10 Find Z $\{a^n\}$

PART – B

(Analytical/Problem solving questions)

[5×8=40]

Attempt any five questions

- Q.1 The area of a circle of diameter d is given for the following values of d –

d	80	85	90	95	100
Area	5062	5674	6362	7088	7854

Find approximate value for the area of circles of diameter 82 and 91.

- Q.2 Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by

(a) Simpson's $\left(\frac{1}{3}\right)^{\text{rd}}$ rule and

(b) Trapezoidal rule.

Hence obtain the value of π by result obtained from (i) and (ii) taking six intervals.

- Q.3 Use Regula Falsi method to find a real root of the equation

$$x \log_{10} x - 1.2 = 0 \text{ Correct to five places of decimal.}$$

Q.4 Find the Laplace Transform of-

(a) $t e^{at} \sin at$

(b) $\frac{1}{t} (\cos at - \cos bt)$

Q.5 Apply convolution theorem to evaluate $L^{-1} \left\{ \frac{1}{s^2 (s^2 - a^2)} \right\}$

Q.6 Find the Fourier sine and cosine transform of $f(x) = e^{-x}$, $x \geq 0$. Also show that

$$\int_0^{\infty} \frac{x \sin mx}{x^2 + 1} dx = \frac{\pi}{2} e^{-m}, m > 0.$$

Q.7 Find $z^{-1} \left[\frac{z^2}{(z-\alpha)(z-\beta)} \right]$ by convolution theorem.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

Q.1 Use Newton's divided difference formula to find the value of $f(8)$ and $f(15)$ from the following data -

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

Q.2 Use, Runge - kutta method to find the approximate value of y for $x = 0.4$, if

$$\frac{dy}{dx} = x + y^2, \text{ given that } y = 1 \text{ when } x = 0, \text{ taking } h = 0.2.$$

Q.3 Solve by Laplace Transformation method -

$$(D^2 - 3D + 2) x = 1 - e^{2t}, x(0) = 1, x'(0) = 0$$

Q.4 Using Fourier sine transform solve $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$, $x > 0, t > 0$, subject to the condition

$$u(0, t) = 0$$

$$u(x, 0) = \begin{cases} 1 & \text{when } 0 < x < 1 \\ 0 & \text{when } x \geq 1 \end{cases}$$

It may be assumed that $u(x, t)$ is bounded, also u and $\frac{\partial u}{\partial x}$ approach zero as $x \rightarrow \infty$.

Q.5 Find $z \{\cos n\theta\}$ and $z \{\sin n\theta\}$.

3E1103

Roll No. _____

Total No of Pages: 2**3E1103****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****HSMC Civil Engineering****3CE1-03 Managerial Economics & Financial Accounting****Common For All Branches****Time: 2 Hours****Maximum Marks: 80***Instructions to Candidates:*

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[5×2=10]****All questions are compulsory**

- Q.1 Why do economic problems arise?
- Q.2 What is demand forecasting?
- Q.3 What does opportunity cost mean?
- Q.4 What do you mean by monopolistic competition?
- Q.5 What does a balance sheet depicts?

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Explain the deductive and inductive methods of constructing economic theory.
- Q.2 Explain with the help of curves the relationship between total cost, total variable cost and total fixed cost.
- Q.3 How does perfect competition differ from monopoly? Discuss.
- Q.4 Discuss the concepts of assets and liabilities.
- Q.5 Write short notes on comparative financial statements.
- Q.6 Explain the concept of elasticity of demand.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[2×15=30]

Attempt any two questions

- Q.1 What are the three methods of measuring national income? Elaborate.
- Q.2 Using suitable diagrams explain the Law of variable proportions.
- Q.3 Critically examine the Present Value Method and Internal Rate of Return Method for evaluating capital budgeting proposals.
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3E1131

Roll No. _____

Total No of Pages: 4**3E1131****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****ESC Civil Engineering****3CE3-04 Engineering Mechanics****Time: 2 Hours****Maximum Marks: 80***Instructions to Candidates:**Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*1. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[5×2=10]****All questions are compulsory**

Q.1 Give the necessary condition for statically determinate, indeterminate and unstable truss.

Q.2 Define modulus of rigidity.

Q.3 State parallel axes theorem with an example.

Q.4 Differentiate between leaf spring and coil spring and give their application.

Q.5 Differentiate between stress and pressure.

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

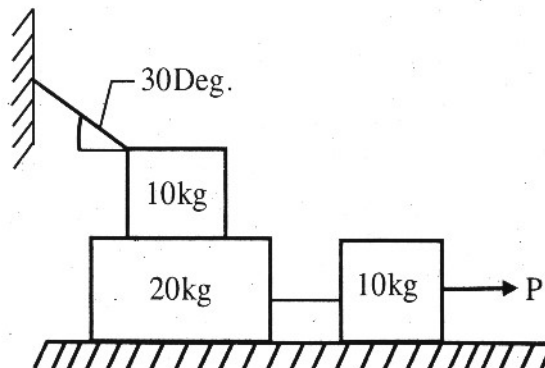
Q.1 The resultant of two forces F_1 and F_2 when acting at 20° is 24.635 N and when acting at 70° is 20.679 N. Find-

- (a) The magnitude of forces
- (b) The maximum and minimum resultant of these forces.
- (c) Resultant and its angle with larger force if they act at 40° .

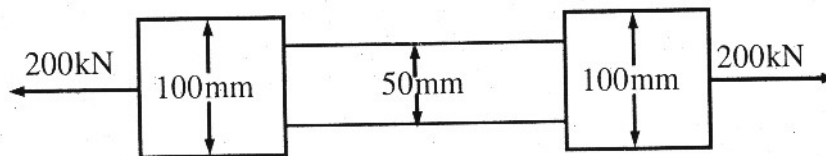
Q.2 The displacement of a body of mass 10 kg at any point of time is given by following equation.

$s = 2t^2 + t - 3$ where, s is in meters and t is in seconds. Find the force acting on the body, work done between 3 seconds to 6 seconds and power delivered at $t = 6$ sec.

Q.3 In the figure shown below, find the minimum force required, just to set the bottom blocks in motion. The bottom blocks are connected with each other with a string as shown and coefficient of friction can be assumed as 0.25.



- Q.4 A close coiled spring having radius 100 mm is manufactured from a wire having modulus of elasticity (E) = 2×10^5 N/mm². If number of turns in the spring are 50 and diameter of wire is 10 mm, then find the stiffness of the spring. Also determine the load required to produce a deflection of 10 mm. Assume Poisson ratio as 0.3
- Q.5 A thin cylinder of radius 500 mm is subjected to an internal pressure of 10 N/mm². Find the thickness of the cylinder if hoop stress and longitudinal stress are limited to 110 N/mm² and 75 N/mm². The efficiency of circumferential and longitudinal rivets is 90.9% and 60.6%.
- Q.6 A cylindrical bar as shown in figure is subjected to a force of 200kN at its extremities. Find the stress, change in length in the middle and end portions and final length of bar if modulus of elasticity is 2×10^5 N/mm²



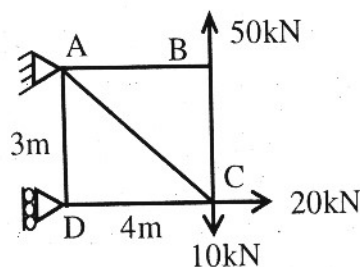
PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

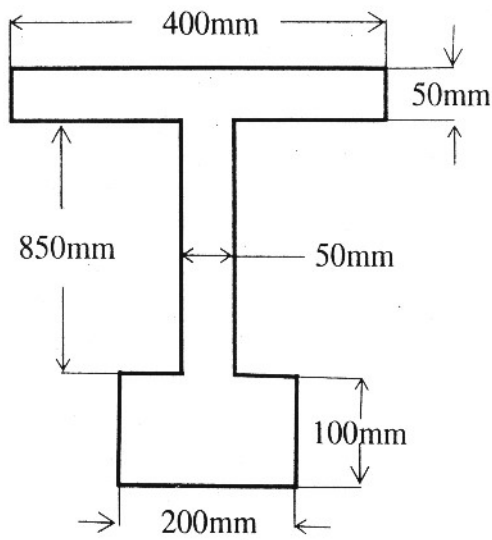
[2×15=30]

Attempt any two questions

- Q.1 Draw a neat sketch of stress strain curve of mild steel and explain all its salient points.
- Q.2 Analyze the following truss and find forces in all the members.



Q.3 Find the moment of inertia I_{xx} of the shape as shown below.



3E1132

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Total No of Pages: 4**3E1132****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****PCC Civil Engineering****3CE4-05 Surveying****Time: 3 Hours****Maximum Marks: 120***Instructions to Candidates:**Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*1. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[10×2=20]****All questions are compulsory**

- Q.1 What do you mean by indirect ranging? [2]
- Q.2 What is the relation between fore bearing and back bearing? [2]
- Q.3 What do you mean by magnetic meridian? [2]
- Q.4 What is magnetic declination? [2]
- Q.5 What do you mean by reciprocal levelling? [2]
- Q.6 What are the temporary adjustments of Vernier theodolite? Only name. [2]
- Q.7 What do you mean by contour interval? [2]
- Q.8 What is the arc definition of simple circular curve? [2]
- Q.9 Write the name of different system of tachometric measurements. [2]
- Q.10 Write any two properties of electromagnetic waves used in EDM instruments. [2]

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PART – B

(Analytical/Problem solving questions)

[5×8=40]

Attempt any five questions

- Q.1 A base line measured with a steel tape gives an approximate length of 1000 m. Compute the correct length of the base line at mean sea level when the pull at the standardization equal to 15kg. The applied pull is 23 kg. The cross – sectional area of tape is 0.0645 cm^2 and $E = 2.11 \times 10^{-6} \text{ kg/cm}^2$. Temperature T_m and T_o are 35°C and 15°C , respectively. The coefficient of thermal expansion of the material of the tape per $^\circ\text{C}$ is 11.5×10^{-6} . The difference in level of the two ends of base line is 2 m. $R = 6400 \text{ km}$. Elevation of base line above mean sea level = 1000 m. [8]
- Q.2 The following bearing were observed in running a compass traverse. [8]

Line	Fore bearing	Back Bearing
AB	$66^\circ 15'$	$244^\circ 0'$
BC	$129^\circ 45'$	$313^\circ 0'$
CD	$218^\circ 30'$	$37^\circ 30'$
DA	$306^\circ 45'$	$126^\circ 45'$

Find the correct fore and back bearing and the true bearing of the line, given that the magnetic declination is $1^\circ 40' \text{E}$.

- Q.3 To determine the height of a chimney a theodolite was kept at two stations I_1 and I_2 200 m apart, I_1 being nearer to the chimney. The reading at the benchmark (of RL 1020.375 m) were 1.35 m from station I_1 and 2.15 m from I_2 . The vertical angles to the top of the chimney were $19^\circ 30'$ and $8^\circ 15'$ from station I_1 and I_2 respectively. Find the horizontal distance and RL of the top of the chimney. [8]

Q.4 The following consecutive reading were taken with a level and a 4.0 m staff on a continuous sloping ground at a common interval of 30 m.

0.780, 1.535, 1.955, 2.430, 2.985, 3.480, 1.155, 2.365, 3.640, 0.935, 1.045, 1.630 and 2.545

The reduced level of the first point A was 180.750 m. calculate the reduced level of the points by height of instrument method. [8]

Q.5 (a) Discuss briefly the effect of curvature and refraction in levelling. Derive an expression for curvature, refraction and for curvature and refraction combined correction. [4]

(b) An observer stands on the top of a tower with his eye level at 85m. Determine the distance to visible horizon and the dip of horizon. The radius of earth may be taken as 6400 km. [4]

Q.6 Derive the expression for finding the RL of a point when the base of the object is inaccessible and the instrument station are in the same vertical plane. Instruments axis are not in same level. [8]

Q.7 (a) Describe the method used for setting out of culverts. [4]

(b) What is tilt distortion? Explain [4]

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×15=60]

Attempt any four questions

Q.1 Two Tangents intersect at chainage of 2500m. The deflection angle being $50^{\circ}30'$. Calculate the necessary data for setting out a curve of 15 chain radius to connect the two tangents if it is intended to set out the curve by Rankine's method of deflection angle. Take peg interval 20m, length of the chain being equal to 20 m. [15]

Q.2 What is total station? Explain the parts of total station and write the advantages of total station over the Vernier theodolite. [15]

Q.3 Derive the expression for distance and elevation formulae when – [15]

- (a) Staff is inclined to line of sight.
- (b) Staff is Normal to line of sight.

Q.4 While making reconnaissance survey through the woods, a surveyor with a hand compass, started a point A and walked a 1000 m in the direction of $S67^{\circ}45'W$ and reached a point B. Then he changed his direction and walked 512 m in the direction $N10^{\circ}20'E$ and reached point C. Then again he changed his direction and walked 1504 m in the direction $S65^{\circ}30'E$ and reached a point D. Now the surveyor wants to return to starting point A. In which direction should he move and how much meters should he walk. [15]

Q.5 Write correction applied to length measurement with chain or tape. [15]

3E1133

Roll No. _____

Total No of Pages: 4**3E1133****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****PCC Civil Engineering****3CE4 - 06 Fluid Mechanics****Time: 2 Hours****Maximum Marks: 80***Instructions to Candidates:**Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*1. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[5×2=10]****All questions are compulsory**

Q.1 Define Viscosity.

Q.2 Define Buoyant Force?

Q.3 Define stream line, Streak line and path line?

Q.4 Define Hydraulic gradient line and Total Energy line.

Q.5 Define the kinetic energy correction factor.

PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 A thin plate is placed between two flat surfaces h cm apart such that the viscosity of liquids on the top and bottom of the plates are μ_1 and μ_2 , respectively. Determine the position of the thin plate such that the viscous resistance to uniform motion of thin plate is minimum (Assume h to be very small).
- Q.2 Two tanks are filled with water of specific weight 9.81 kN/m^3 . The bottom of tanks are connected to an inverted U tube containing oil weighing 7.85 kN/m^3 . Find the difference in pressure between the two tanks when the manometer gives a reading of 0.8m .

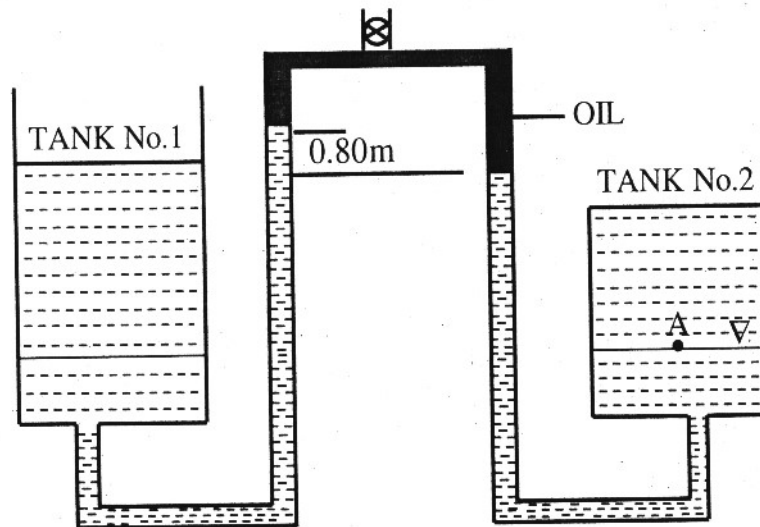


Fig. Q.2 (Part B)

Q.3 Two velocity components are given in the following cases, find the third component such that they satisfy the continuity equation.

(a) $u = x^3 + y^3 + 2z^2$; $v = -x^2y - yz - xy$

(b) $u = \log (y^2 + z^2)$; $v = \log (x^2 + z^2)$

(c) $u = \frac{-2xyz}{x^2 + y^2}$; $\omega = \frac{y}{(x^2 + y^2)}$

Q.4 State the assumptions made in Bernoulli's equation. Also derive the Bernoulli's equation.

Q.5 Derive the Darcy – Weisbach equation for head loss due to a flow in a pipe in terms of the friction factor f . For laminar flow, develop relations for the estimation of f and boundary shear stress in terms of flow parameters.

Q.6 Explain the following –

- (a) Newtonian fluid
- (b) Bingham Plastic fluid
- (c) Pseudoplastic fluid
- (d) Dilatant fluid
- (e) Ideal fluid

Also plot τ v/s $\frac{du}{dy}$ for each of them.

$\tau \rightarrow$ shear stress

$\frac{du}{dy} \rightarrow$ Velocity gradient

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [2×15=30]

Attempt any two questions

Q.1 An open cylinder 30cm in diameter and 50cm high is filled with water and rotated about its axis. Calculate the amount of water spilled when the speed of rotation is-

(i) 180 rpm

(ii) 240 rpm

Q.2 Oil of relative density 0.9 and dynamic viscosity 2.5 poise is pumped through a 100 mm diameter, 500mm long pipe at a rate of 2 lps.

(i) Find the Reynolds number of the flow.

(ii) Calculate pressure received at the pump if the outlet end, which is free is at 20m above the pump level.

(iii) What should be the power inputs if the overall efficiency of the pump set is 65%.

Q.3 For the following flows, determine the components of rotation about the various axes.

(i) $u = xy^3z$ $v = -y^2z^2$ $\omega = yz^2 - \frac{y^3z^2}{2}$

(ii) $u = 3xy$ $v = \frac{3}{2}x - \frac{3}{2}y^2$

(iii) $u = y^2$ $v = -3x$

3E1134

Roll No. _____

Total No of Pages: 3**3E1134****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****PCC Civil Engineering****3CE4-07 Building Material & Construction****Time: 3 Hours****Maximum Marks: 120***Instructions to Candidates:**Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*1. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[10×2=20]****All questions are compulsory**

- Q.1 What is the role of fly ash in concrete?
- Q.2 What do you understand by seasoning of timber?
- Q.3 Differentiate between mild steel and HYSD bars.
- Q.4 Write the name of different types of bond use in brick work.
- Q.5 Write any two comparison between stone and brick masonry.

- Q.6 Explain relative merits and demerits of Flemish bond.
- Q.7 Differentiate between arches and lintels.
- Q.8 Write down causes of dampness.
- Q.9 What is load bearing structure use in building construction?
- Q.10 What do you understand by light weight concrete blocks?

PART – B

(Analytical/Problem solving questions)

[5×8=40]

Attempt any five questions

- Q.1 Enlist of various laboratory tests performed on stone. Explain any four in detail.
- Q.2 Explain the role of fly ash in manufacturing of bricks and cement.
- Q.3 State and discuss different methods of seasoning of timber.
- Q.4 Explain causes of failure of foundation and their remedial measures.
- Q.5 Describe the various construction features of shell roof.
- Q.6 Explain types and methods of shoring and underpinning.
- Q.7 Explain various types of paints and varnish and their application in detail.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[4×15=60]

Attempt any four questions

- Q.1 What are various standard test performed on bricks? Explain any four with their procedure.

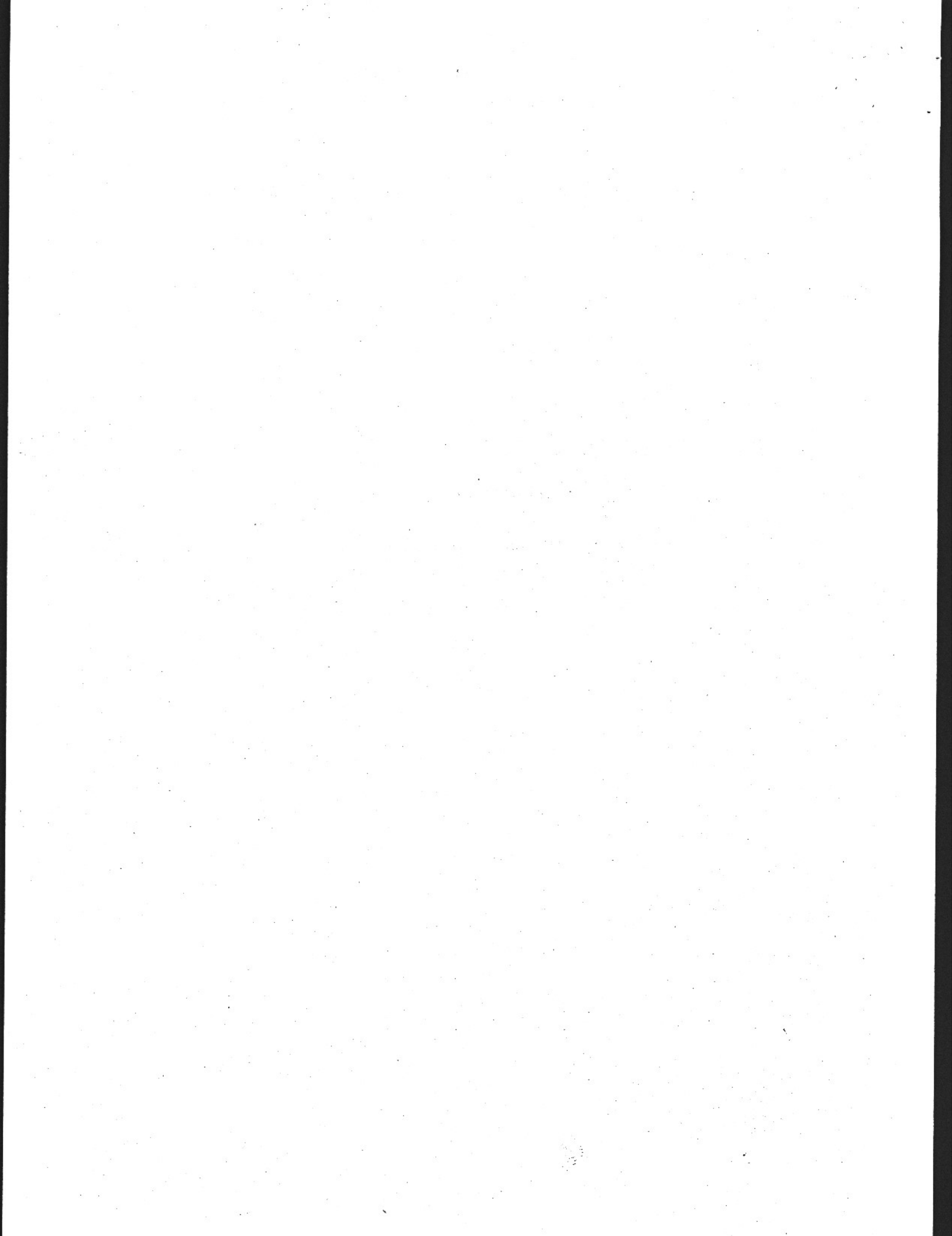
Q.2 What is mortar? Briefly describe lime and cement mortar. State the role of sand in mortar.

Q.3 Explain different types of stone masonry. Also describe their relative merits and demerits

Q.4 Explain the requirements of good staircase. Describe the constructions details and suitability of different types of stairs.

Q.5 Explain the following-

- (a) Flat slab and their application
 - (b) Methods and material for damp proofing
 - (c) Purpose and use of partition wall
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3E1621

Roll No. _____

Total No of Pages: _____

3E1621**B. Tech. III - Sem. (Back) Exam., Dec. 2019****Civil Engineering****3CE1A Strength of Materials-I****Time: 3 Hours****Maximum Marks: 80***Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT-I**

Q.1 (a) Draw a neat sketch of stress – strain curve for a mild steel bar subjected to tensile load. Also define the following terms: [8]

(i) Limit of proportionality

(ii) Yield point

(iii) Necking zone

(b) A steel rod 5m long and 25mm in diameter is subjected to axial tensile load of 45kN. Determine the change in length, diameter and change in volume of the rod.

(Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.25$) [8]

OR

Q.1 (a) Write short notes on the following -

[2×4=8]

- (i) Poisson's Ratio
- (ii) Elastic constant
- (iii) Complementary stresses
- (iv) Prismatic & Non - prismatic members

(b) A steel bar ABCD of varying sections is subjected to axial force as shown in

fig. 1. Find the value of P(Load) necessary for equilibrium if $E = 210 \text{ kN/mm}^2$.

Determine total elongation of the bar.

[8]

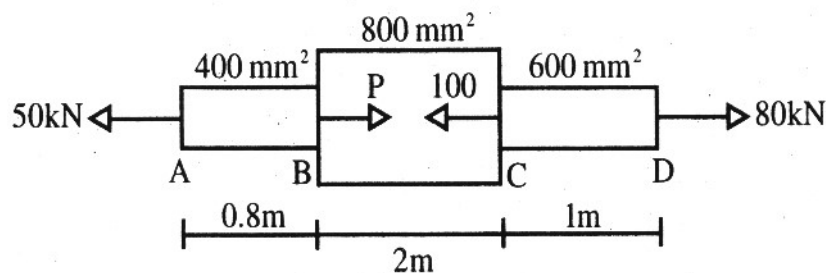


Fig.(1)

UNIT- II

Q.2 (a) Write short notes on the following -

[4×2=8]

- (i) Principal stresses and principal planes
- (ii) State of simple shear

- (b) Determine the moment of Inertia of an I – section as shown in fig. 2 about its centroidal axes about x – x axis and y – y axis - [8]

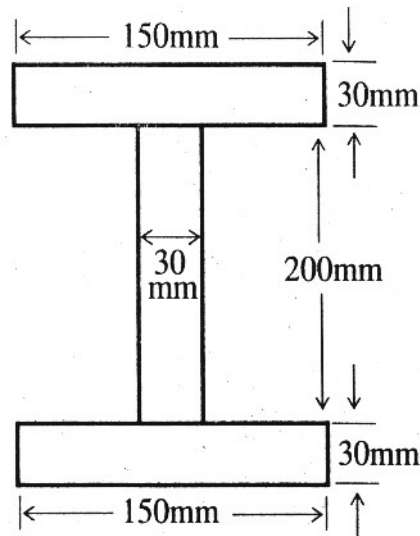


Fig.(2)

OR

Q.2 (a) Explain Polar Moment of Inertia. [4]

- (b) An element in plane stress is subjected to stresses $P_1 = 100 \text{ N/mm}^2$, $P_2 = 35 \text{ N/mm}^2$

and $\tau = (\text{shear stress}) = 25 \text{ N/mm}^2$ as shown in figure (3) using Mohr's circle

determine- [12]

(i) The principal stresses

(ii) The max shear stresses

(iii) The stresses acting on an element at an Angle = 38°

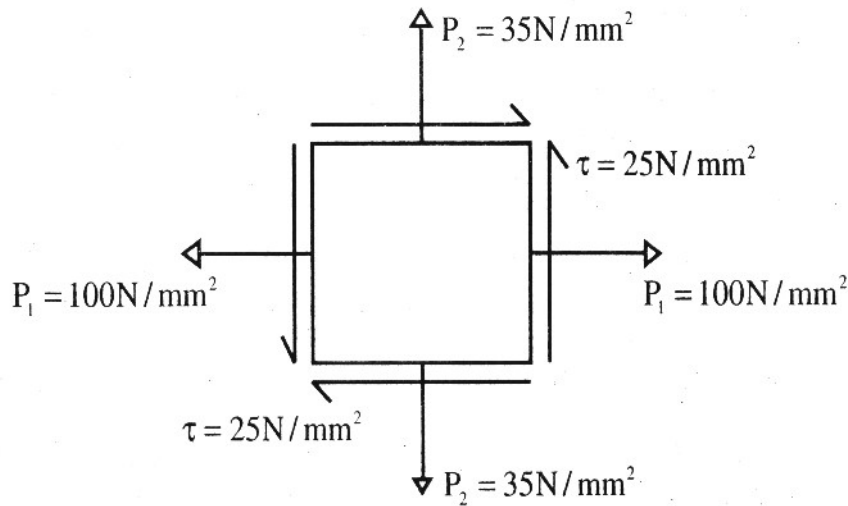


Fig.(3)

UNIT- III

Q.3 (a) Give the formula for Euler's theory for long column and also show different end

conditions of column with effective length.

[4]

(b) A 2 meter long solid circular column of dia. 40mm hinged at both ends is subjected

to an eccentric load of 50 kN. If the lateral deflection at the midpoint of column is

0.8mm, find the eccentricity (e) of the load and the maximum normal stress in the

column. Take $E = 2 \times 10^5 \text{ N/mm}^2$.

[12]

OR

Q.3 (a) Define Slenderness Ratio of a column and what are the assumptions and limitations of Euler's theory. [6]

(b) A spherical vessel having an inside diameter of 700mm and wall thickness of 10 mm is filled with water at gauge pressure of 6N/mm^2 . The pressure is lowered by allowing some water to escape and to reduce the pressure to Atm. The volume of water released is 885cm^3 . Find the bulk modulus of water.

(Take $E_{\text{steel}} = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.276$) [10]

UNIT- IV

Q.4 (a) Draw shear force and bending moment diagrams showing the value at different points for the beam shown in fig. 4. [8]

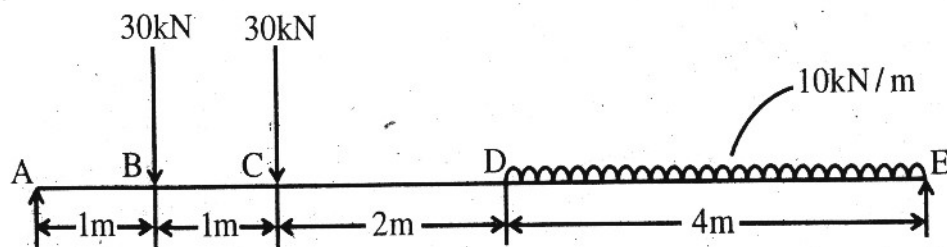


Fig.(4)

- (b) Draw the shear force and bending moment diagram for the cantilever beam as shown fig (5). [8]

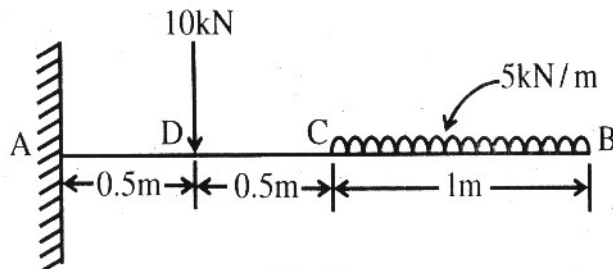


Fig.(5)

OR

- Q.4 (a) Derive the relationship between load, shear force and bending moment. [6]
 (b) Draw the SFD and BMD for Beam shown in figure (6). [10]

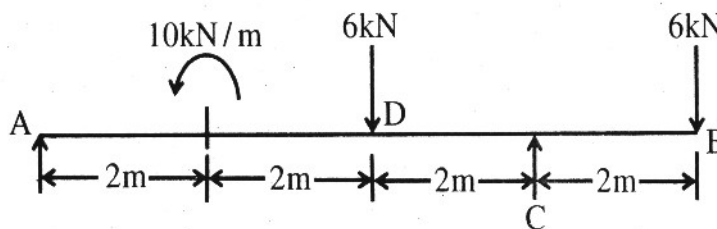


Fig.(6)

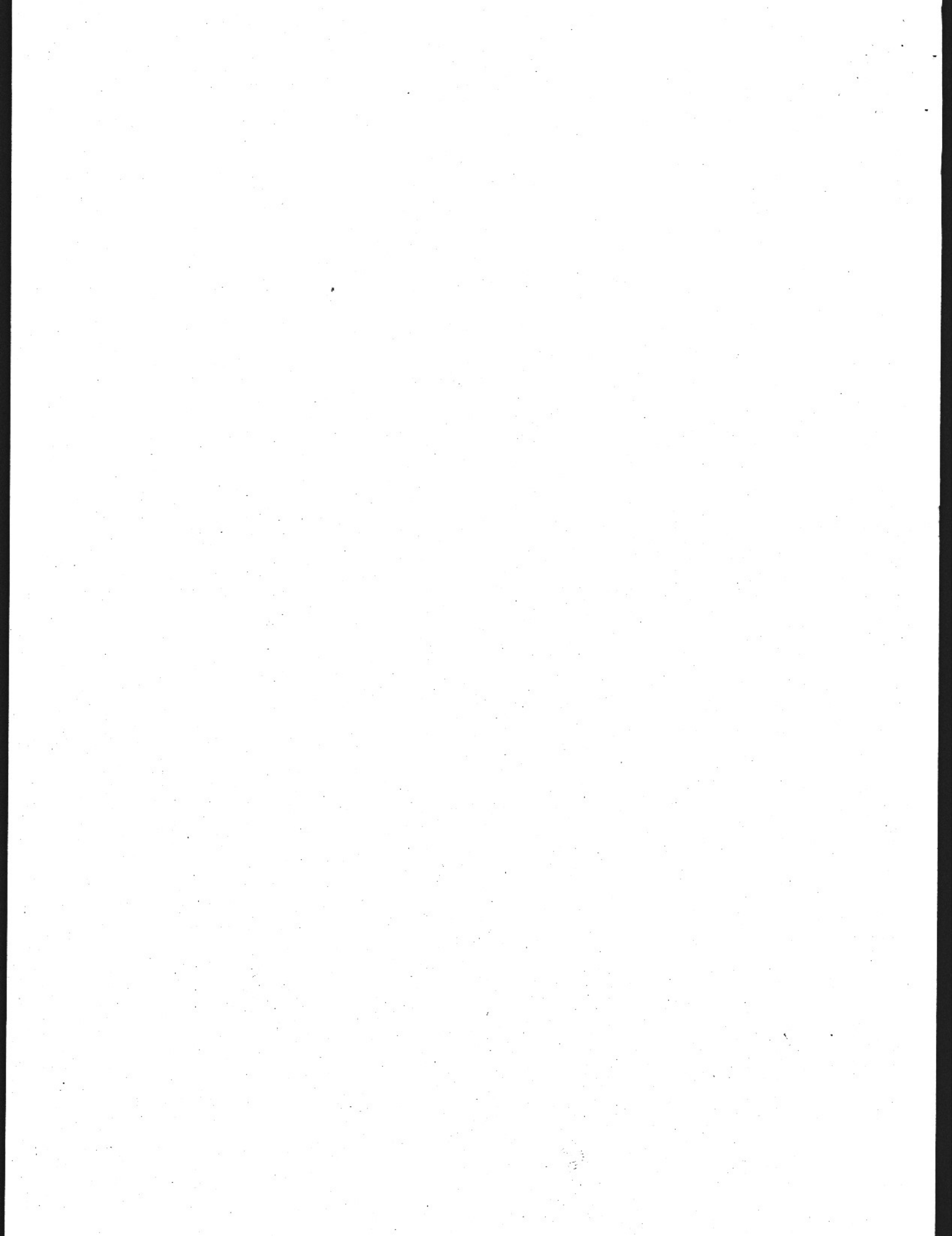
UNIT- V

- Q.5 (a) Write the assumption made in bending theory & also show bending equation with neat sketch. [6]
 (b) A steel tube 4m long having external & internal diameters of 100mm & 70 mm respectively is freely supported at each end carries a point load of $W(N)$ at a distance of 1.5m from one end. Evaluate 'W' if the maximum bending stress is not to exceed $120N/mm^2$. [10]

OR

Q.5 (a) A steel wire 10 mm diameter is bent into a circular arc of 20m radius. Determine the max stress included in it. Take $E = 2 \times 10^5 \text{ N/mm}^2$. [6]

(b) A beam 500mm deep of a symmetrical section has $I = 1 \times 10^8 \text{ mm}^4$ and is simply supported over a span of 10 metres. Calculate (a) the uniformly distributed load it may carry if the max bending stress is not exceeding 150 N/mm^2 (b) the max bending stress if the beam carries a central point load of 25 kN. [10]



3E1622

Roll No. _____

Total No of Pages: 3**3E1622****B. Tech. III Sem. (Back) Exam., Dec. 2019****Civil Engineering****3CE2A Civil Engineering Materials****Time: 3 Hours****Maximum Marks: 80***Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

Q.1 (a) What are the various standard test of stones? Give names of all these tests and explain any two of them. [8]

(b) What are the common building stones and their uses? [8]

OR

Q.1 (a) Discuss the various characteristics of a good building stone. [8]

(b) What do you understand by Dressing of stones? Explain with suitable sketches important methods of dressing of stones. [8]

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UNIT- II

- Q.2 (a) Explain important qualities of good brick. Give only different stages of manufacturing of bricks. [8]
- (b) What are the properties of fly ash and its use in manufacturing of bricks and cement? [8]

OR

- Q.2 (a) How are the tiles classified? Describe essential characters of some common type of roofing tiles. [8]
- (b) Describe the following tests on bricks –
- (i) Water absorption test [4]
- (ii) Compressive strength test [4]

UNIT- III

- Q.3 (a) Explain briefly manufacturing of Portland cement by dry process. [8]
- (b) What are the different types of cements and their uses? [8]

OR

- Q.3 (a) What is meant by fat lime and hydraulic lime? [8]
- (b) What is Gypsum? Give its properties and uses. [8]

UNIT- IV

- Q.4 (a) Explain classification of mortars? What is bulking of sand? [8]
- (b) What are the common defects of plastering? What are their causes and remedies? [8]

OR

- Q.4 (a) State and discuss different methods of seasoning of timber. [8]
- (b) Explain various types of paints and varnishes and their application in detail. [8]

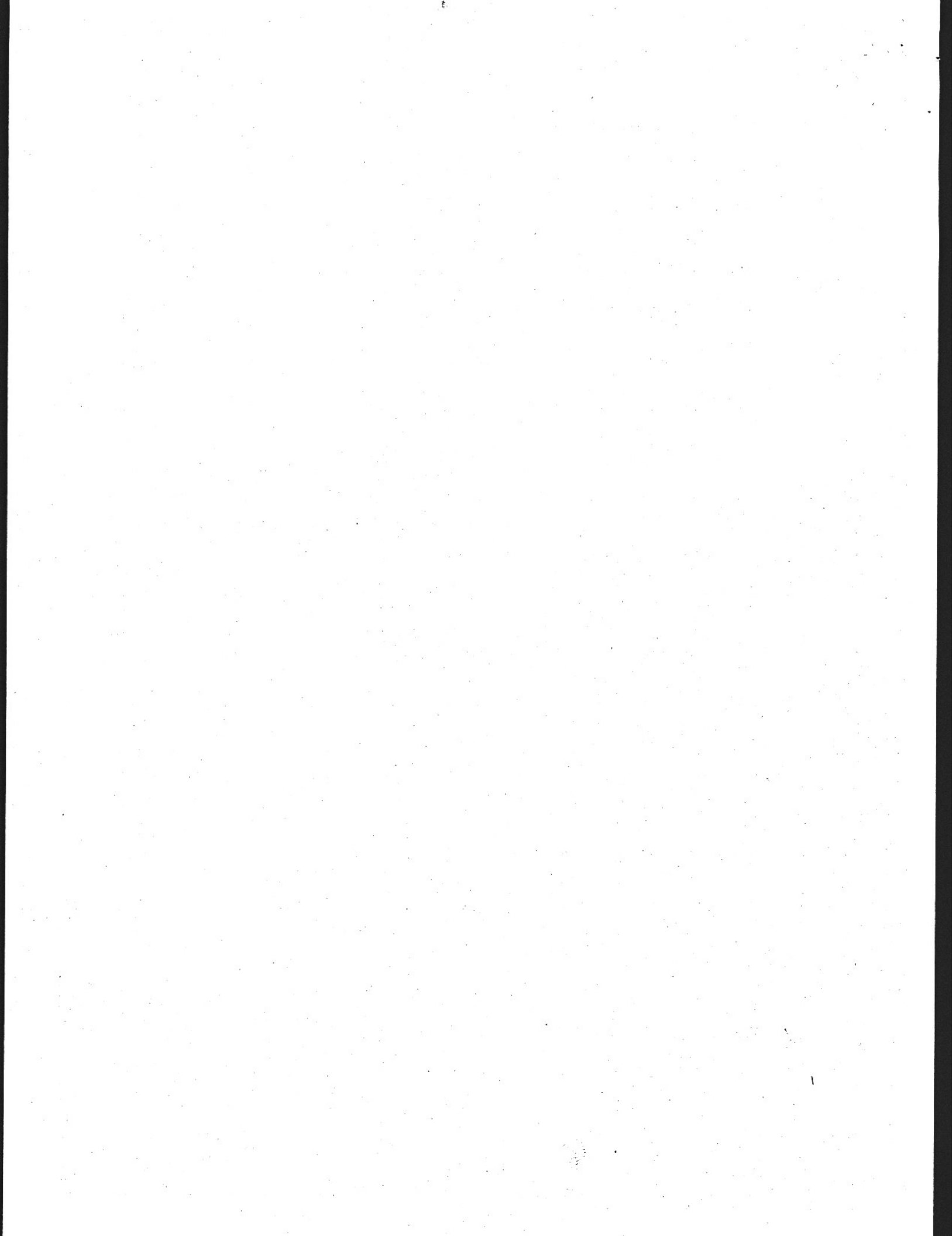
UNIT- V

- Q.5 (a) What are the types of glasses and their general properties? [8]
- (b) Explain the major industrial wastes used in building construction. [8]

OR

Q.5 Write short notes on the following (Any four): [4×4=16]

- (a) Plastic
 - (b) Stabilized block
 - (c) Silica fume
 - (d) Rice husk ash
 - (e) Asbestos
 - (f) Aluminium
-



3E1624

Roll No. _____

Total No of Pages: 2**3E1624****B. Tech. III Sem. (Back) Exam., Dec. 2019****Civil Engineering****3CE4A Construction Technology****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 26***Instructions to Candidates:*

*Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

Q.1 Discuss in brief (with diagram) the significance of shoring, underpinning and scaffolding. [16]

OR

Q.1 Discuss various types of foundation enumerating their significance. [16]

UNIT- II

Q.2 Discuss the materials for damp proofing in building and also methods for anti-termite treatment. [16]

OR

Q.2 Discuss the construction details and suitability of any two types of stairs. [16]

16.7

UNIT- III

Q.3 Discuss relative advantages and disadvantages of prefabricated construction. [16]

OR

Q.3 Discuss the various types of pitched roofs and roof covering materials for pitched roofs. [16]

UNIT- IV

Q.4 Discuss in brief the various dewatering equipments and pumping equipments. [16]

OR

Q.4 Discuss in brief various pile driving equipments and compaction equipments. [16]

UNIT- V

Q.5 Discuss for casting equipment requirements and points to be considered in selection of equipments. [16]

OR

Q.5 Discuss in brief maintenance management and its types. Also discuss preventive maintenance and its functions. [16]

3E1625

Roll No. _____

Total No of Pages: 3**3E1625****B. Tech. III - Sem. (Back) Exam., Dec. 2019****Civil Engineering****3CE5A Fluid Mechanics****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 26***Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

Q.1 (a) Explain Newton's law of viscosity with neat sketch. [8]

(b) Explain different types of fluids with neat sketch. [8]

OR

Q.1 (a) Calculate the capillary rise in mm in a glass tube of 4mm diameter when immersed in water. The value of surface tension for water is 0.0735 N/m and contact angle for water is 0° . [8]

(b) In an experiment the weight of 2.5m^3 of a certain liquid was found to be 18.75kN. Find the specific weight of liquid and also its density. [8]

UNIT- II

- Q.2 (a) Explain gauge pressure, vacuum pressure, and absolute pressure with neat sketch. [8]
- (b) A simple manometer containing mercury is used to measure the pressure of water flowing in a pipe line. The mercury level in the open tube is 60mm higher than that on the left tube. If the height of water in the left tube is 50mm, determine the pressure in the pipe in terms of head of water. [8]

OR

- Q.2 (a) A rectangular plate 2m side and 3m deep is immersed vertically in water. Determine the total pressure and center of pressure on the plate, when upper edge is horizontal and 3.5m below the free surface of water. [8]
- (b) A rectangular pontoon of 5m long, 3m wide and 1.2m deep is immersed 0.8m in sea water. If the density of sea water is 10kN/m^3 , find the metacentric height of the pontoon. [8]

UNIT- III

- Q.3 What is Bernoulli's theorem? Derive the formula for Bernoulli's theorem. Write down the assumptions made in Bernoulli's equation. [3+8+5=16]

OR

- Q.3 Explain venturimeter with neat sketch. Derive the formula for discharge when water is flowing in a horizontal venturimeter. [6+10=16]

UNIT- IV

Q.4 Explain development of momentum equation by control volume concept. [16]

OR

Q.4 (a) Describe in short various types of mouth piece. [8]

(b) Find the discharge from a 100mm diameter external mouth piece, fitted to one side of a large vessel, if the head over the mouthpiece is 4 meters. [8]

UNIT- V

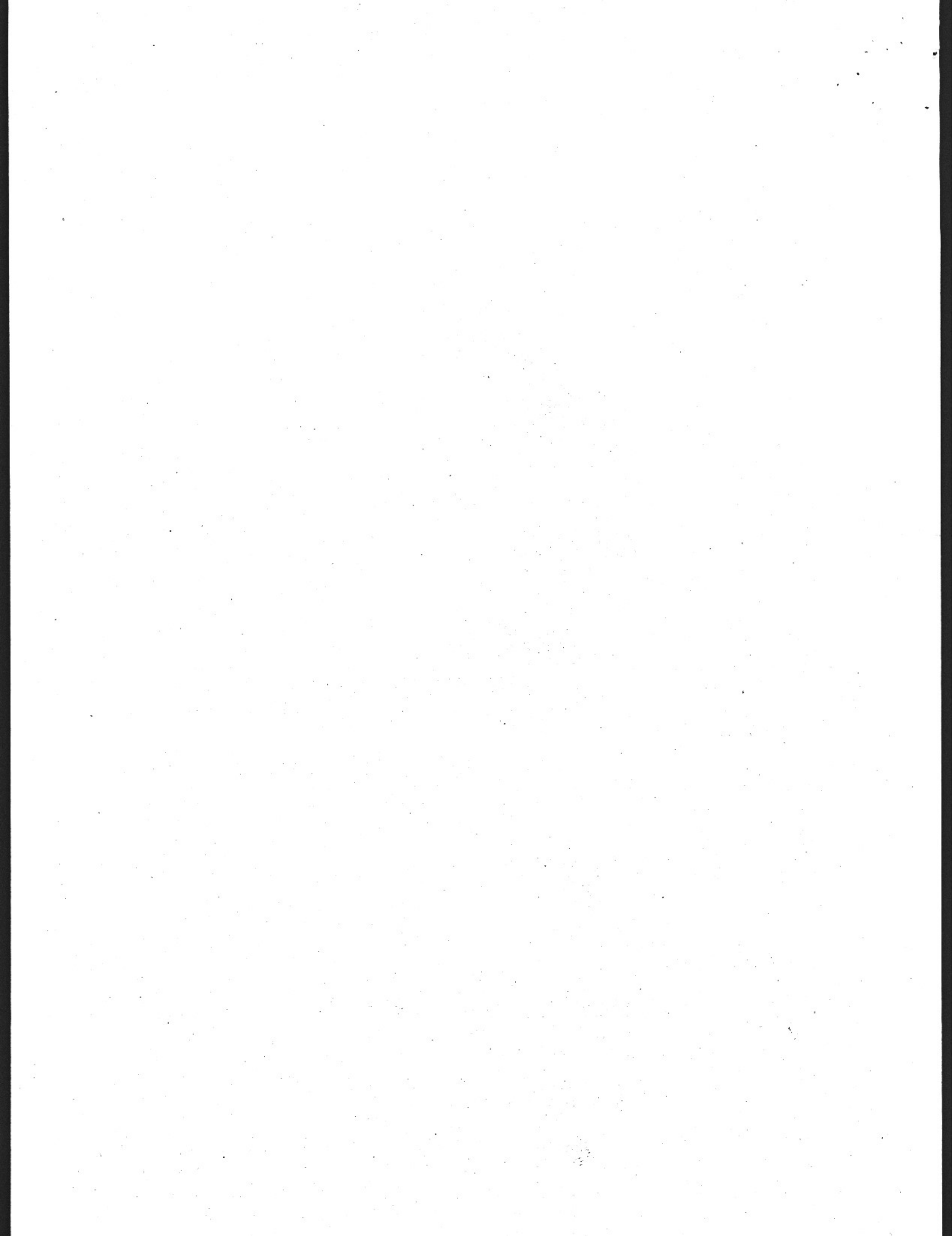
Q.5 (a) Derive Darcy's formula for loss of head in pipes. [8]

(b) Explain various losses in pipe. [8]

OR

Q.5 (a) Water flows through a pipe of 200mm in diameter, 60m long with a velocity of 2.5m/sec. Find the head loss due to friction by using Darcy's formula. Take $f=0.005$. [8]

(b) Derive the formula for power transmission through pipes. What is condition for maximum power? [6+2=8]



3E1626

Roll No. _____

Total No of Pages: 4**3E1626****B. Tech. III Sem. (Back) Exam., Dec. 2019****Civil Engineering****3CE6A Advanced Engineering Mathematics****Time: 3 Hours****Maximum Marks: 80**
Min. Passing Marks: 26*Instructions to Candidates:**Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.**Units of quantities used/calculated must be stated clearly.**Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*1. NIL2. NIL**UNIT- I**

Q.1 (a) Find the Fourier series for the function defined as- [8]

$$f(x) = \begin{cases} -1 & \text{for } -\pi \leq x < 0 \\ 0 & \text{for } x = 0 \\ 1 & \text{for } 0 < x \leq \pi \end{cases}$$

Hence prove that $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$ (b) (i) Find the Z- transform of $\{u_n\}$, where [4]

$$\{u_n\} = \begin{cases} u^n & \text{if } n < 0 \\ 3^n & \text{if } n \geq 0 \end{cases}$$

(ii) Find the Z- transform of $\{a^n \sinh n\theta\}$ if $n \geq 0$ [4]

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OR

- Q.1 (a) Obtain the constant term and the coefficient of the first sine and cosine terms that represents y as given in the table- [8]

x:	0	1	2	3	4	5
y:	9	18	24	28	26	20

- (b) Find the inverse Z- transform of [8]

$$\frac{z^2}{(z-\alpha)(z-\beta)} \text{ by convolution theorem.}$$

UNIT- II

- Q.2 (a) Find the Laplace transform of the following function-

(i) $e^{-2t}\cos^2 t$ [4]

(ii) $\frac{1}{t}(\cos at - \cos bt)$ [4]

- (b) Solve by Laplace transform [8]

$$\frac{d^2 y}{dx^2} + 4y = 2\sin x + 3\cos x$$

given that $y(0) = y'(0) = 2$

OR

- Q.2 (a) Apply convolution theorem and find inverse Laplace transform of [8]

$$\frac{1}{s^2(s^2-a^2)}$$

- (b) Find the solution of $\frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial t} + u$, [8]

$u(x,0) = 6e^{-3x}$ which is bounded for $x > 0, t > 0$.

UNIT- III

- Q.3 (a) Express the function $f(x) = \begin{cases} 1 & \text{for } |x| \leq 1 \\ 0 & \text{for } |x| > 1 \end{cases}$ [8]

As a Fourier integral, Hence evaluate $\int_0^\infty \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$

- (b) Solve the integral equation $\int_0^\infty f(x)\cos x dx = \begin{cases} 1-s, & 0 < s \leq 1 \\ 0, & s > 1 \end{cases}$ [8]

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OR

Q.3 (a) Find the Fourier sine and cosine transform of $f(x)$ [8]

$$\text{Where } f(x) = \begin{cases} 1, & \text{for } 0 < x < a \\ 0, & \text{for } x > a \end{cases}$$

(b) Using Fourier cosine transform, solve $\frac{\partial \theta}{\partial t} = c^2 \frac{\partial^2 \theta}{\partial x^2}$ [8]

Subject to the conditions-

(i) $\theta = 0$ when $t = 0, x \geq 0$

(ii) $\frac{\partial \theta}{\partial x} = -\mu$, a constant, when $x = 0$ and $t > 0$.

Assume that $\theta(x, t)$ and $\frac{\partial \theta}{\partial x}$ both tend to zero as $x \rightarrow \infty$,

UNIT- IV

Q.4 (a) Prove that

(i) $\Delta = E \nabla$ [4]

(ii) $\Delta^r y_k = \nabla^r y_{k+r}$ [4]

(b) Find the value of $y = f(x)$ at $x = 12$ for the following data- [8]

x:	10	15	20	25	30	35
f(x) = y:	35.3	32.4	29.2	26.1	23.2	20.5

OR

Q.4 (a) Use lagrange's interpolation formula to find $f(10)$ from the following data : [8]

x:	5	6	9	11
f(x):	12	13	14	16

(b) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ by using- [8]

(i) Trapezoidal Rule

(ii) Simpson's Y_3 Rule

UNIT- V

- Q.5 (a) Find the approximate value of y when $x = 0.6$, by Euler's method, for the equation [8]

$$\frac{dy}{dx} = 1 - 2xy ; y = 0 \text{ at } x = 0$$

by taking $h = 0.2$

- (b) Use Milne's method to obtain $y(0.4)$ for the differential equation $\frac{dy}{dx} = 2e^x - y$ given that [8]

x:	0	0.1	0.2	0.3
y:	2	2.01	2.04	2.09

OR

- Q.5 (a) Use fourth order Runge-kutta method to solve [8]

$$\frac{dy}{dx} = x + y,$$

Given that $y(0) = 1$ by taking $h = 0.1$ for $x = 0.1$ & 0.2

- (b) Use Picard's method to solve [8]

$$\frac{dy}{dx} = 1 + xy, \text{ given that for}$$

$$x_0 = 2, y_0 = 0$$

up to third approximation.

+

3E1623

Roll No. _____

Total No of Pages: 2**3E1623****B. Tech. III Sem. (Back) Exam., Dec. 2019****Civil Engineering****3CE3A Engineering Geology****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 26***Instructions to Candidates:*

*Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL2. NIL**UNIT- I**

Q.1 Explain the geological work by river. Critically analyze its difference with other environmental agents. [16]

OR

Q.1 Define geology and sub - division of geology. [16]

UNIT- II

Q.2 What is sedimentary rock? How does it form? Discuss various structures of sedimentary rocks. [16]

OR

Q.2 Write short note on –

(a) Formation of metamorphic rocks [8]

(b) Suitability of igneous rocks as building and road material. [8]

UNIT- III

Q.3 Write about the term joint. Describe various types of joints. [16]

OR

Q.3 Discuss the classification of folds with neat sketch. Also discuss the factors responsible for the occurrence of folds. [16]

UNIT- IV

Q.4 Describe geological considerations for the site selection of Dams. Also discuss the types of dams. [16]

OR

Q.4 Discuss the seismic reflection and refraction methods. [16]

UNIT- V

Q.5 (a) Enumerate the role of remote sensing in consideration of civil engineering. [8]

(b) Discuss the satellite imagery. [8]

OR

Q.5 (a) Discuss spectral reflectance curve [8]

(b) Explain GIS. [8]

3E1135

Roll No. _____

Total No of Pages: **2****3E1135****B. Tech. III - Sem. (Main / Back) Exam., Dec. 2019****PCC Civil Engineering****3CE4-08 Engineering Geology****Time: 2 Hours****Maximum Marks: 80***Instructions to Candidates:**Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)*1. NIL2. NIL**PART – A****(Answer should be given up to 25 words only)****[5×2=10]****All questions are compulsory**

Q.1 Define Geology & name various branches of Geology.

Q.2 Write five names of Igneous, Sedimentary & Metamorphic rocks.

Q.3 Define Fold, Fault & Unconformity.

Q.4 Name various Geophysical Methods applied for subsurface analysis.

Q.5 Define Remote Sensing & GIS.

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PART – B

(Analytical/Problem solving questions)

[4×10=40]

Attempt any four questions

- Q.1 Write an Essay on Scope of Geology for Civil Engineers.
- Q.2 Describe about identical characteristics of Igneous, Sedimentary & Metamorphic rocks.
- Q.3 Describe various types of Texture and Structures of Sedimentary rocks.
- Q.4 Define Parts of a Fold and Fault with diagram.
- Q.5 Describe various types of Dam and Draw a neat sketch showing various parts of a Dam.
- Q.6 Write a note on application of Remote Sensing in various fields.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)

[2×15=30]

Attempt any two questions

- Q.1 Describe classification of Folds with diagram.
- Q.2 Write an essay on Geological Investigation of a Dam Site.
- Q.3 Describe various Geophysical Methods applied for subsurface analysis.