CE - III SEM

B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Automobile Engineering
3AE2 – 01 Advance Engineering Mathematics - I
AN, AG, AE, CE, CR, EC, EI, ME, MH, PT

Time: 3 Hours   Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Find the Laplace transform of -

$$f(t) = \begin{cases} \cos t & 0 < t < 2\pi \\ 0 & t > 2\pi \end{cases}$$

Q.2 What is unit step function?

Q.3 Find the Z-transform of sequences -

$\{u_n\} = \{25, 10, 5, 3, 2, 1, 0, 5\} \quad -3 \leq n \leq 4$

Q.4 Find the inverse Z-transform of $\log\left(\frac{z}{z+1}\right)$ by power series method.

Q.5 State Convolution Theorem for Fourier transform.

Q.6 Find the Fourier transform of $f(x) = \begin{cases} 1 & \text{for } |x| < 1 \\ 0 & \text{for } |x| > 1 \end{cases}$.

Q.7 Prove $E = 1 + \frac{1}{2}\delta^2 + \delta\sqrt{1 + \frac{\delta^2}{4}}$.

Q.8 By using Lagrange's formula, find x corresponding to y = 10 of following data -

x	10	15	17	20
y	3	7	11	14

Q.9 Find the first approximation value of x by Newton-Raphson method of $f(x) = xe^x - 2$ upto three decimal places.

Q.10 Write formula of Milne's Predictor Corrector Method.

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt all five questions

Q.1 Find the inverse Laplace transform of $\frac{2s^2-1}{(s^2+1)(s^2+4)}$.

Q.2 Find Fourier sine and cosine transform of -

$$f(x) = \begin{cases} x & \text{for } 0 < x \le 1 \\ 2-x & \text{for } 1 < x < 2 \\ 0 & \text{for } x \ge 2 \end{cases}$$

Q.3 If $\bar{u}(z) = \frac{2z^2 + 3z + 4}{(z-3)^3}$, $|z| > 3$, then show that $u_1 = 2$, $u_2 = 21$ and $u_3 = 139$.

Q.4 Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by using –

   (i)   Trapezoidal rule

   (ii) Simpson 1/3 rule

Q.5 Given $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$. Determine $y(0.02)$ and $y(0.04)$ by using modified Euler's method.

Q.6 By using Stirling formula, find u_{32} from the following data -

$u_{20} = 14.035$, $u_{25} = 13.674$, $u_{30} = 13.257$

$u_{35} = 12.734$ $u_{40} = 12.089$, $u_{45} = 11.309$

Q.7 Solve linear difference equation $u_{n+2} + 6u_{n+1} + 9u_n = 2^n$ given $u_0 = 1 = u_1$.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 From the following table of values of x and y find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x = 1.2 -

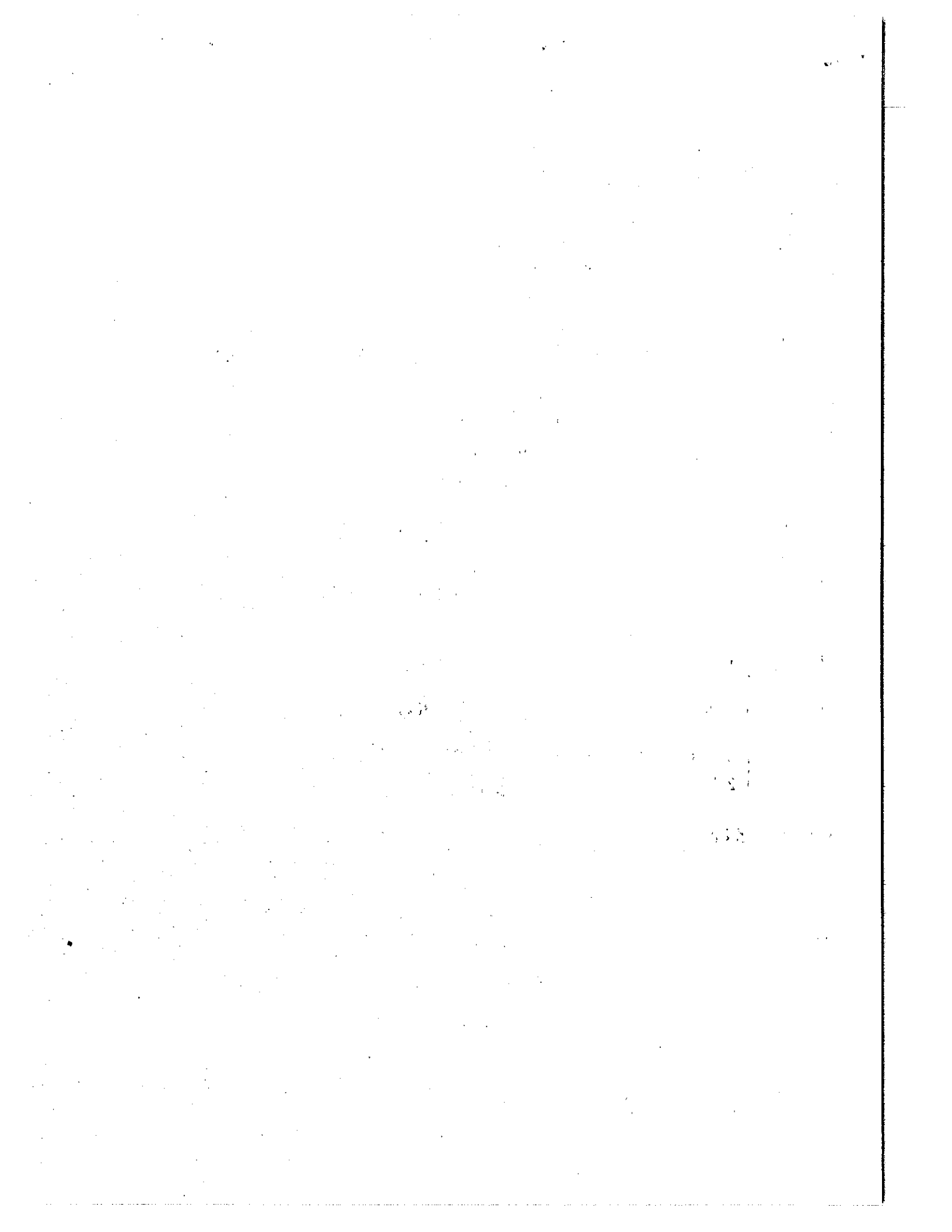| x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.72	3.32	4.06	4.96	6.05	7.39	9.02

Q.2 If $\frac{dy}{dx} = x + y^2$ use Runge-Kutta method to find an approximate value of y for x = 0.2, given that y = 1 when x = 0. Use Laplace transform to solve.

Q.3 $(D^2 + 9)y = \cos 2t$, $y(o) = 1$, $y(\pi/2) = -1$.

Q.4 Obtain the Fourier transform of $f(x) = \begin{cases} x^2 & |x| \le a \\ 0 & |x| > a \end{cases}$. Hence evaluate

$$\int_0^\infty \cos\left(\frac{as}{2}\right) \frac{(a^2s^2 - 2)\sin as + 2as \cos as}{s^3} . ds$$

Q.5 Find $Z\{a^{|n|}\}$ and hence find $Z\left\{\left(\frac{1}{2}\right)^{|n|}\right\}$.

3E1211

3E1211

B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Civil Engineering
3CE4-07 Building Materials and Construction

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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. NIL _____   2. NIL _____

PART – A   [10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1   Name the classification of stones.

Q.2   Write any four defects in tember.

Q.3   What are the important properties of mortar?

Q.4   Define the following -

     (a)   Stretcher

     (b)   Queen closer

Q.5   Define precast and In-situ construction.

Q.6   What is the purpose of foundation in a building?

Q.7   Write any four effects of dampness in a building.

Q.8   Define common rafter.

Q.9   Name any four requirements of good staircase.

Q.10   What are the materials used for construction & expansion joints? Name any four.

PART – B   [5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1   Why it is important to study the properties of Building Material?

Q.2   Differentiate between mild steel rods & HYSD bars.

Q.3   Sketch the elevation of a brick wall built in -

(1)   English bond

(2)   Double Flemish bond

Q.4   Write a note on -

(1)   Spread footing

(2)   Strap footing

Q.5   Write a note on -

(1)   Shoring

(2)   Underpinning

Q.6 What are the factors to be considered while selecting a roof covering?

Q.7 With the help of a neat sketch, explain -

(1) Tread and Riser

(2) Flight and Landing

PART – C   [3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1 Write the requirements of good building stones. Explain the factors causing deterioration of stone work and preservation of stone work.

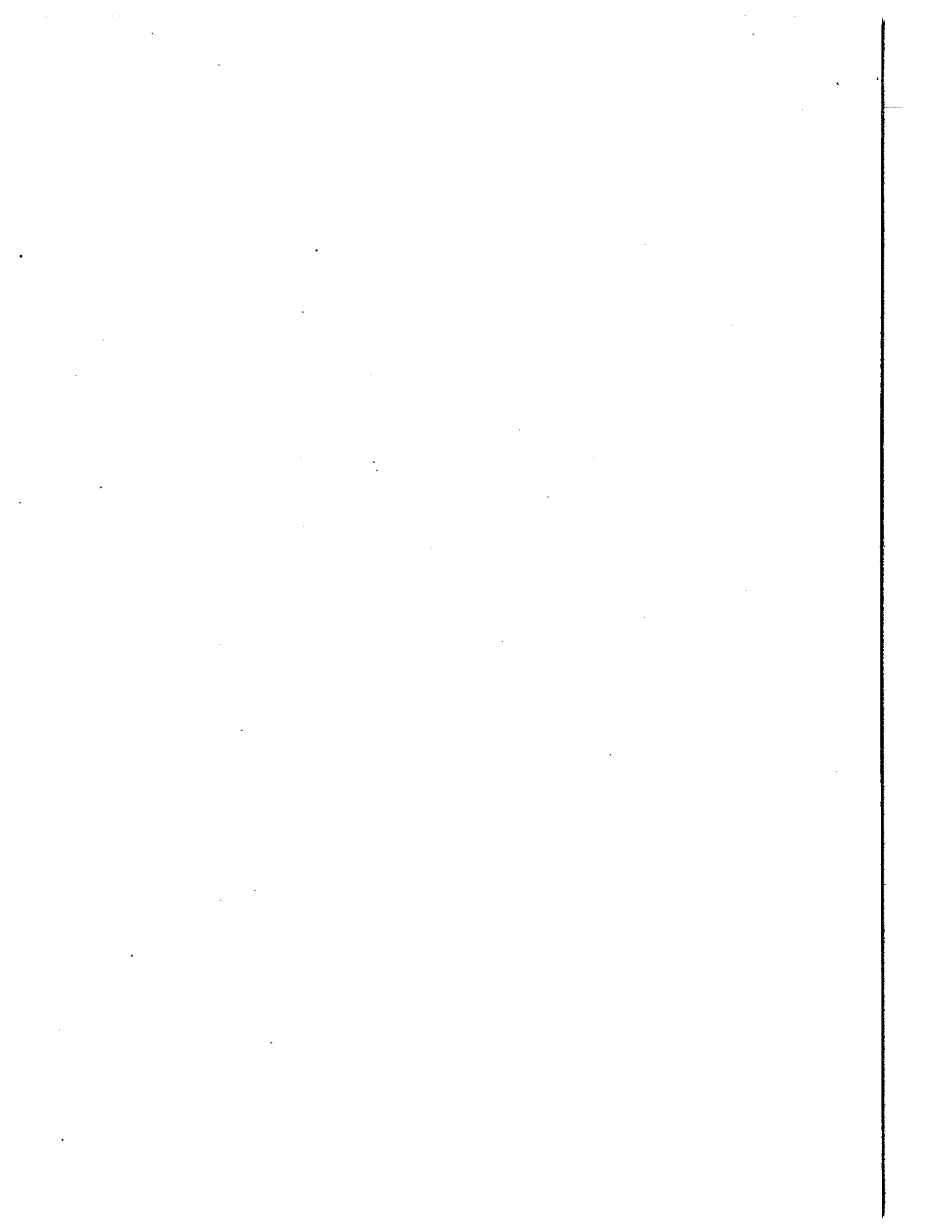Q.2 Explain briefly the essential of good foundation.

Q.3 Explain the following types of walls -

(a) Load bearing wall

(b) Partition wall

Q.4 Describe the construction details and suitability of different types of stairs.

Q.5 Draw a neat sketch of an arch and explain the technical terms used.

3E1212

B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Civil Engg.
3CE4-08 Engineering Geology

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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)

NIL _____   2.   NIL _____

PART – A   [10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1   Explain the term weathering.

Q.2   Define fracture mineral properties.

Q.3   Using a diagram, define "river meandering".

Q.4   Define fold and fault.

Q.5   Describe the term joints in structural geology.

Q.6   Name the different types of dams.

Q.7   Define remote sensing & GIS.

Q.8 What are the advantages of remote sensing?

Q.9 Discuss the texture of igneous rocks.

Q.10 Define the electrical methods of geophysical investigation.

PART – B [5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1 What is unconformity? Describe the different types of unconformities.

Q.2 Briefly describe the seismic method to subsurface analysis.

Q.3 What are the classifications of fold?

Q.4 What are the effects of faulting?

Q.5 Explain the texture and structure of sedimentary rocks.

Q.6 Describe about the characteristics of igneous, sedimentary and metamorphic rocks.

Q.7 Write a short note on -

(i) Aerial photographs

(ii) Satellite Imageries

PART – C [3×10=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1 Define remote sensing and describe advantages and limitation of remote sensing and G.I.S. in different field of civil engineering.

Q.2 Briefly describe the various geological and engineering properties of rocks that are important in selection of rocks as building material.

Q.3 Summaries the geological consideration for site selection of dam site.

Q.4 Describe the different geophysical methods used for subsurface analysis.

Q.5 What is fault? Describe the various types of fault along with neat sketch.

3E1213

3E1213

B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Civil Engineering
3CE3-04 Engineering Mechanics

Time: 3 Hours   Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]
All questions are compulsory

Q.1 State and explain the Law of Polygon of Forces.

Q.2 State the Lami's theorem.

Q.3 Define the polar moment of inertia.

Q.4 Differences between angle of friction and angle of repose.

Q.5 State the principle of virtual work.

Q.6 Explain the principle of conservation of energy.

Q.7 Define the stiffness of springs.

Q.8 Define the Hook's law and modulus of rigidity.

Q.9 What are the different types of supports?

Q.10 Define the complementary shear stress.

PART – B

(Analytical/Problem solving questions) [5×4=20]

Attempt any five questions

Q.1 Draw the free body diagram of a block of mass M resting on rough surface and subject to an inclined force.

Q.2 Four forces of magnitude P, 2P, $3\sqrt{3}$ P and 4P are acting at point O. The angles made by these forces with x-axis are 0°, 60°, 150° and 300° respectively. Find the magnitude and direction of the resultant force.

Q.3 A simply supported beam of span 9 m carries a uniformly varying load from zero at end A to 900 N/m at end B. Calculate the reactions at the two ends of the support.

Q.4 Two spheres of diameter 12 cm and 4 cm rest on three planes as shown in fig.1. The weight of the bigger sphere is 40 N and that of smaller one 20 N. Determine the normal reaction of the plane.
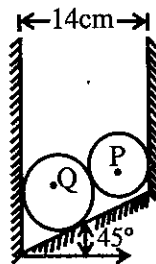

Fig.1

Q.5 A ladder of 5 m length and 50 N weight rest on a horizontal ground and against a smooth vertical wall at an angle of 60° with vertical. When a man of 100 N stands on a ring 2 m from the foot of the ladder, it is on the point of slipping. Determine the coefficient of friction between the ladder and ground.

Q.6 Write note on the following –

    (a)   Open coiled spring

    (b)   Leaf spring.

Q.7 Explain the stress-strain diagram for an elastic ductile material.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 (a)   A seamless spherical shell is of 0.8 m internal diameter and 4 mm thickness. It is filled with fluid under pressure until its volume increases by 50 cubic centimeters. Determine the fluid pressure, taking $E = 2 \times 10^5$ N/mm^2 and Poisson ration = 0.3.

    (b)   A cylindrical shell 2 m long and 90 cm internal diameter and 10 mm metal thickness is subjected to an internal pressure of 1.65 N/mm^2. Determine maximum intensity of shear stress. Take $E = 2 \times 10^5$ N/mm^2 and Poisson ration = 0.3.

Q.2 Determine the moment of inertia of a T – section as shown in figure 2, about the horizontal axis passing through the centroid of the section.
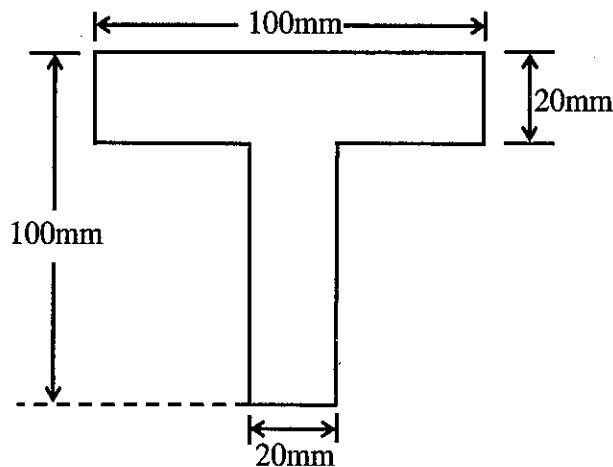

Fig.2

Q.3 (a) A simply supported beam is loaded as shown in fig.3. Using the method of virtual work, determine the reactions at the supports A and B.

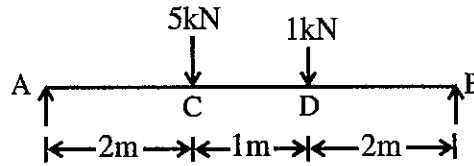5kN   1kN

A   B
        C   D
|←—2m—→|←1m→|←—2m—→|

Fig.3

(b) State and explain the work and energy theorem.

Q.4 Determine the force in all the members of a cantilever truss as shown in fig.4.

10kN   10kN
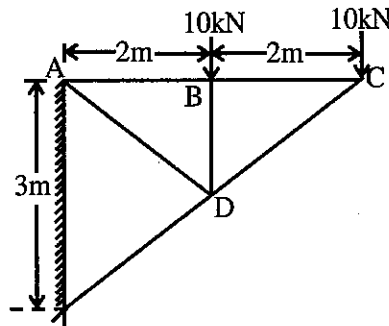
|←—2m—→|←—2m—→|
A   C
      B
3m
         D

Fig.4

Q.5 A bar of 25 mm diameter is subjected to a pull of 40 kN. The measured extension on gauge length of 200 mm is 0.085 mm and the change in diameter is 0.003 mm. Calculate the Poisson's ratio and the values of three elastic module.

3E1214

B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Civil Engineering
3CE4-06 Fluid Mechanics

Time: 3 Hours   Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 What is a Newtonian fluid? Is water a Newtonian fluid?

Q.2 Can the coefficient of compressibility of a fluid be negative? How about the coefficient of volume expansion?

Q.3 Give a real-world application of Pascal's Law.

Q.4 Define the resultant hydrostatic force acting on a submerged surface and the center of pressure.

Q.5 What is the definition of a Path line? What do Path lines indicate?

Q.6 What do you understand by the terms: (i) Total acceleration and (ii) convective acceleration?

Q.7 State Bernoulli's Theorem. List out its engineering application.

Q.8 What is hydraulic diameter? How is it defined?

Q.9 Which has a greater minor loss coefficient during pipe flow: gradual expansion or gradual contraction?

Q.10 Define a steady flow field in the Eulerian reference frame.

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1 Determine the viscosity of a liquid having kinematic viscosity 6 stokes and specific gravity 1.9.

Q.2 The barometric pressure at sea level is 760 mm of mercury while that on a mountain top is 735 mm, if the density of air is assumed constant at 1.2 kg/m³. What is the elevation of the mountain top?

Q.3 A stream function is given by Ψ=5x-6y. Calculate the velocity components and also magnitude and direction of the resultant velocity at any point.

Q.4 A body of dimensions 1.5 m × 1.0 m × 2.0 m weighs 1962N in water. Find its weight in air.

Q.5 A pitot-static tube is used to measure the velocity of water in a pipe. The stagnation pressure head is 6m and static pressure head is 5m. Calculate the velocity of flow assuming the coefficient of tube equal to 0.98.

Q.6 A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of diameter 300 mm at the rate of 300 litres per sec. Find the head lost due to friction for a length of 50 m of the pipe.

Q.7 The head of water over the centre of an orifice of diameter 20 mm is 1 m. The actual discharge through the orifice is 0.85 litre/s. Find the co-efficient of discharge.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 Derive an expression for the loss of head due to sudden enlargement of a pipe.

Q.2 A laminar flow is taking place in a pipe of diameter 200 mm. The maximum velocity is 1.5 m/s. Find the mean velocity and the radius at which this occurs. Also, calculate the velocity at 4 cm from the wall of the pipe.

Q.3 If for a two-dimensional potential flow, the velocity potential is given by $\phi=x(2y-1)$. Determine the velocity at the point P(4, 5). Determine also the value of stream function Ψ at the point P.

Q.4 Derive an expression for the time period of the oscillation of a floating body in terms of radius of gyration and meta-centric height of the floating body.

Q.5 A rectangular orifice of 2 m width and 1.2 m deep is fitted in one side of a large tank. The water level on one side of the orifice is 3 m above the top edge of the orifice, while on the other side of the orifice, the water level is 0.5 m below its top edge. Calculate the discharge through the orifice if $C_d = 0.64$.
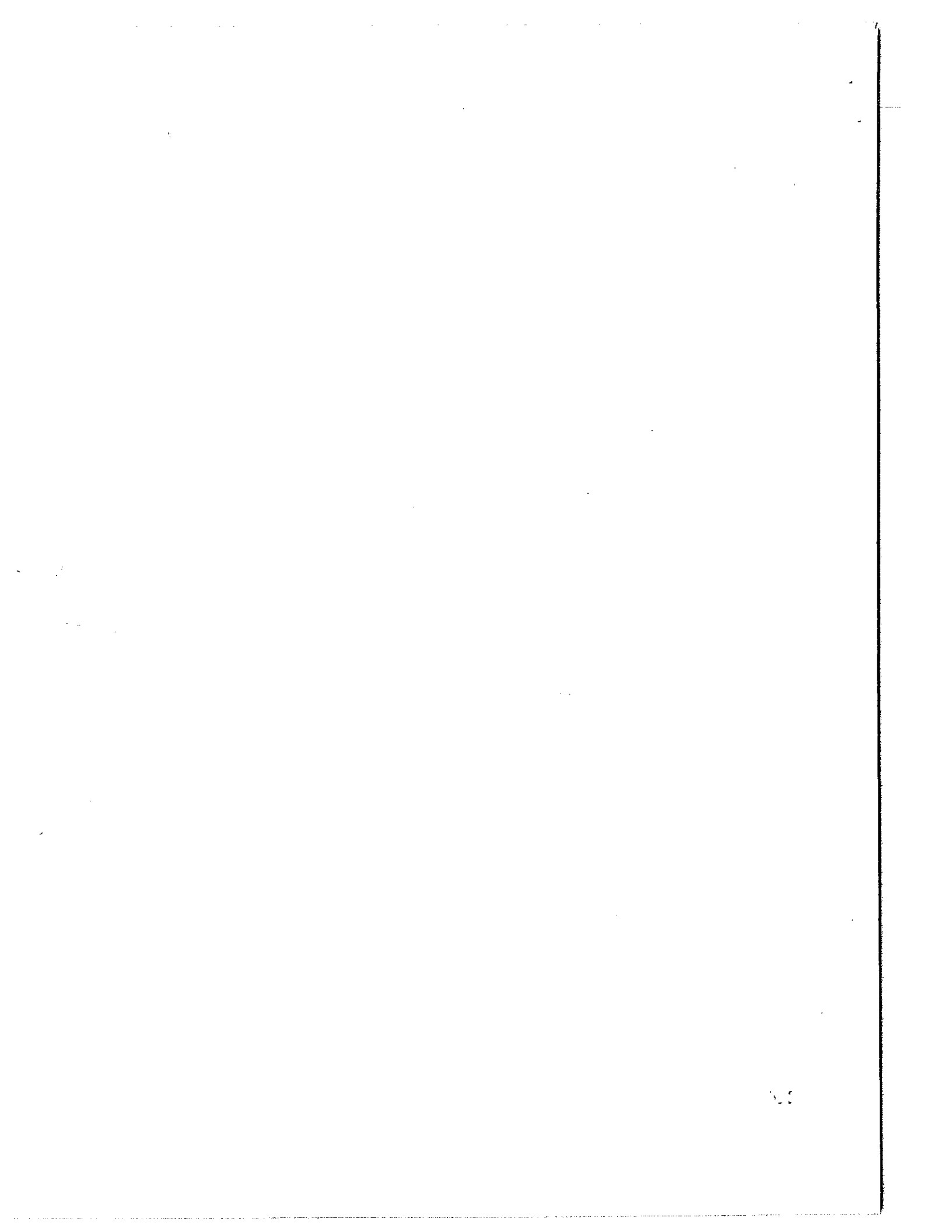
3E1215

3E1215

B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Civil Engineering
3CE4-05 Surveying

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]
All questions are compulsory

Q.1 Explain the term "Ranging" of a line.

Q.2 Define Traverse Survey.

Q.3 What is back bearing?

Q.4 What is an Index error?

Q.5 Define reciprocal levelling.

Q.6 What is a tachometer and for what purpose is this used?

Q.7 Name different types of curves.

Q.8 Define reduced bearing.

Q.9 What is meant by temporary adjustment of a compass?

Q.10 What are the different uses of contours?

PART – B

(Analytical/Problem solving questions)   [5×4=20]
Attempt any five questions

Q.1 What is a well-conditioned triangle? Why it is preferred? Examine whether a triangle having sides 80 m, 60 m and 40 m is a well – conditioned triangle or not?

Q.2 Explain the rules for the adjustment of the closing error of a traverse.

Q.3 State the procedure for measuring horizontal angle with a theodolite by the method of direct measurement.

Q.4 Mention the various stages of complete setting out works for a curve.

Q.5 Describe different systems of tachometric measurements. What is the speciality of staff used in tachometry?

Q.6 What is EDM? State the principle and types of EDM.

Q.7 What are the characteristic parts of a level? Explain with the help of a neat sketch.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]
Attempt any three questions

Q.1 In laying out of a 15 m × 28 m rectangular plot, a 30 m tape is to be used. When uniformly stretched, the length of the chain is found to be 30.02 m. What measurements with the tape should plot the correct dimensions? What should the tape measure for the diagonal of the plot?

Q.2 What is closing error? Why such errors need adjustment? Give the sequence of graphical adjustment of closing error. What are the sources of such errors?

Q.3 The following readings are successively taken from an instrument in a levelling work – 0.255, 0.385, 0.520, 1.780, 1.895, 2.300, 1.785, 0.335, 0.858, 1.255. The position of the instrument was changed after taking 3rd and 6th readings. Draw out the form of a level field book and enter the above readings. Assume the R.L. of the first point as 80.0 m. Calculate the R.Ls of all the points using Rise and Fall System and apply usual arithmetic check.

Q.4 Explain the different methods of setting out curves? Also, explain how the friction on the road surface reduces super elevation?

Q.5 Describe the instruments and methods for laying out buildings.

3E1250

3E1250

3E1250
B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Artificial Intelligence & Data Science
Technical Communication
Common to all Branches

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three 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. NIL _____ 2. NIL _____

PART – A

(Answer should be given up to 25 words only) [10×2=20]

All questions are compulsory

Q.1 What are the four main features of technical communication?

Q.2 What are linguistic abilities?

Q.3 Name the different types of manuals?

Q.4 Which is more reliable- Print Media or Online Media? Why?

Q.5 What is the meaning of document design?

Q.6 What are the steps in Technical Proposal Writing?

Q.7 Mention the types of technical article.

Q.8 How can you improve your Speaking Skills?

Q.9 What is the difference between Listening and Hearing?

Q.10 Why is reading important for improving Communication Skills?

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1 Discuss the aspects of Technical Communication in detail.

Q.2 Draft a report on various curricular and co-curricular activities organized in your department/college to be published on RTU website.

Q.3 There is no canteen in your company. Write a proposal to establish a canteen in your College/Institute.

Q.4 Discuss the difference between agenda and minutes of meeting. What are the objectives of agenda?

Q.5 Correct the following sentences:
    (1)   She always felt inferior than her younger sister.
    (2)   I have visited Niagara Falls last weekend.
    (3)   The woman which works here is from Rajasthan
    (4)   She's married with a dentist.

Q.6 Explain the form/ format/ structure/ style of writing Official Notes.

Q.7 What are some strategies for an effective editing and proofreading?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 What is Style in Technical communication? Explain the guidelines for writing a good technical document.

Q.2 Define the term technical communication. Explain the process (cycle) of communication in detail.

Q.3 What is a Technical Report? Explain in detail about the type, characteristic and objectives of Technical Report.

Q.4 Describe the factor which influence information and document design.

Q.5 Evaluate your education, professional training, skills, accomplishments and achievement, interest/ activities and experience. Write a **resume** for the post of computer executive.

3E1131

3E1131

3E1131

B. Tech. III - Sem. (Back) Exam., February - 2023
ESC Civil Engineering
3CE3-04 Engineering Mechanics

Time: 2 Hours   **Maximum Marks: 80**
Min. Passing Marks: 28

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. NIL _____   2.   NIL _____

PART – A   [5×2=10]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1   What do you understand by the "Polygon law of forces"?

Q.2   What forces are omitted in virtual work?

Q.3   Define the term "Limiting friction".

Q.4   Explain the Hooke's Law.

Q.5   Define the area moment of inertia.

(Analytical/Problem solving questions)

Attempt any four questions

Q.1 Cylinder 1 of diameter 200 mm and cylinder 2 of diameter 300 mm are placed in a trough as shown in fig-1. If a cylinder 1 weighs 800 N and cylinder 2 weighs 1200 N, determine the reaction developed at contact surfaces A, B, C and D. Assume all contact surfaces are smooth.
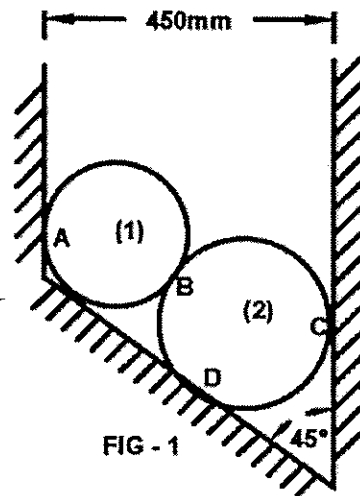

FIG - 1

Q.2 A beam, 8 m long, rests on supports 5 m apart, the right-hand end overhanging its support by 1 m and the left hand one by 2 m. The beam carries a point load of 250 kN at middle of the supported length, 60 kN at the extreme right-hand end and 40 kN at the left-hand end. Evaluating the reactions at the supports by using virtual work method.

Q.3 A ladder 5 m long rests on a horizontal ground and leans against a smooth vertical wall at an angle of 70° with the horizontal. The weight of the ladder is 300 N. The ladder is on the verge of sliding when a man weighing 750 N stands on a rung 1.5 m high. Calculate the coefficient of friction between the ladder and the floor.

Q.4 A Pump lifts 40 m^3 of water to a height of 50 m and delivers it with a velocity of 5 m/s. What is amount of energy spent during this process? If the job is done in half an hour, what is the input power of the pump which has an overall efficiency of 70%?

Q.5   A close-coiled helical spring has coil diameter D, wire diameter d and number of turn n. The spring material has a shearing modulus G. Derive an expression for the stiffness k of the spring.

Q.6   A bar of 400 mm length is 20 mm in diameter for the first 200 mm and 10 mm in diameter for the remaining 200 mm length. If it is loaded as shown in figure-2, find total elongation. $E = 2.1 \times 10^5 N/mm^2$.
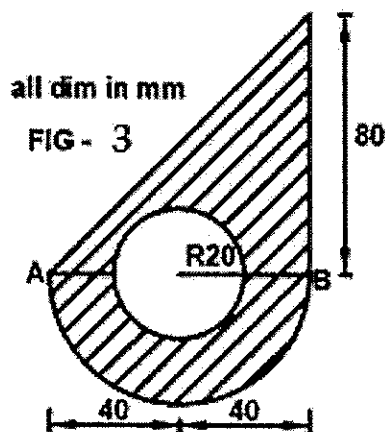

FIG - 2
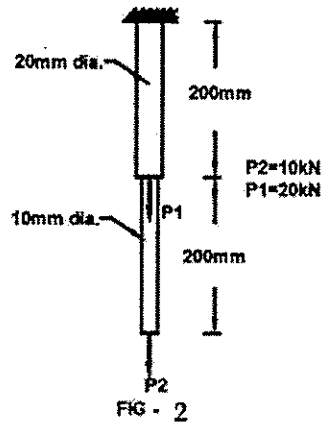
PART – C   [2×15=30]

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any two questions

Q.1   Find the moment of inertia of shaded area shown in fig-3 about the axis AB.

Q.2 Determine the forces in the members FH, HG and GI in the truss shown in fig-4. Each load is 10 kN and all the triangles are equilaterals with sides equal to 4 m.
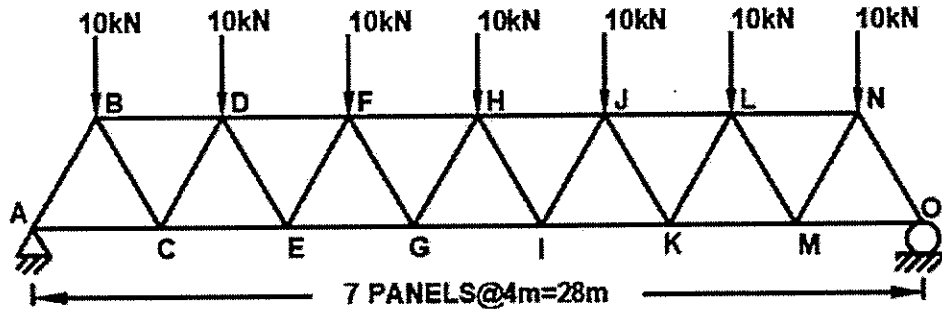

FIG - 4

Q.3 A rope making $1\frac{1}{4}$ turns around a stationary horizontal drum is used to support a weight W (Fig.- 5). If the coefficient of friction is 0.3 what range of weight can be supported by exerting a 600 N force at the other end of the rope.
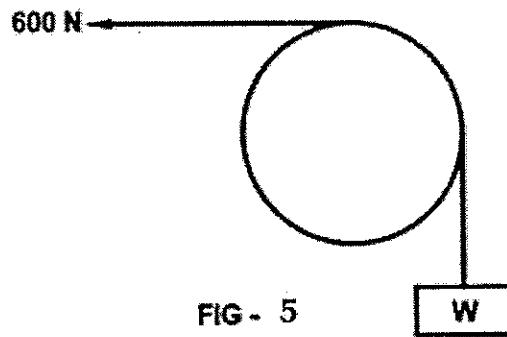

FIG - 5

3E1132

3E1132

B. Tech. III - Sem. (Back) Exam., February - 2023

Civil Engineering

3CE4-05 Surveying

Time: 3 Hours   **Maximum Marks: 120**

Min. Passing Marks: 42

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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   **[10×2=20]**

All questions are compulsory

Q.1 What is Engineer's chain?

Q.2 What is the use of cross staff?

Q.3 Define true meridian.

Q.4 What is local attraction?

Q.5 What is parallax?

Q.6 Define tachometry.

Q.7 Which equipment are required for stadia survey?

Q.8 What is distomat?

Q.9 What is meant by setting out works?

Q.10 Define superelevation.

PART – B

(Analytical/Problem solving questions)   [5×8=40]
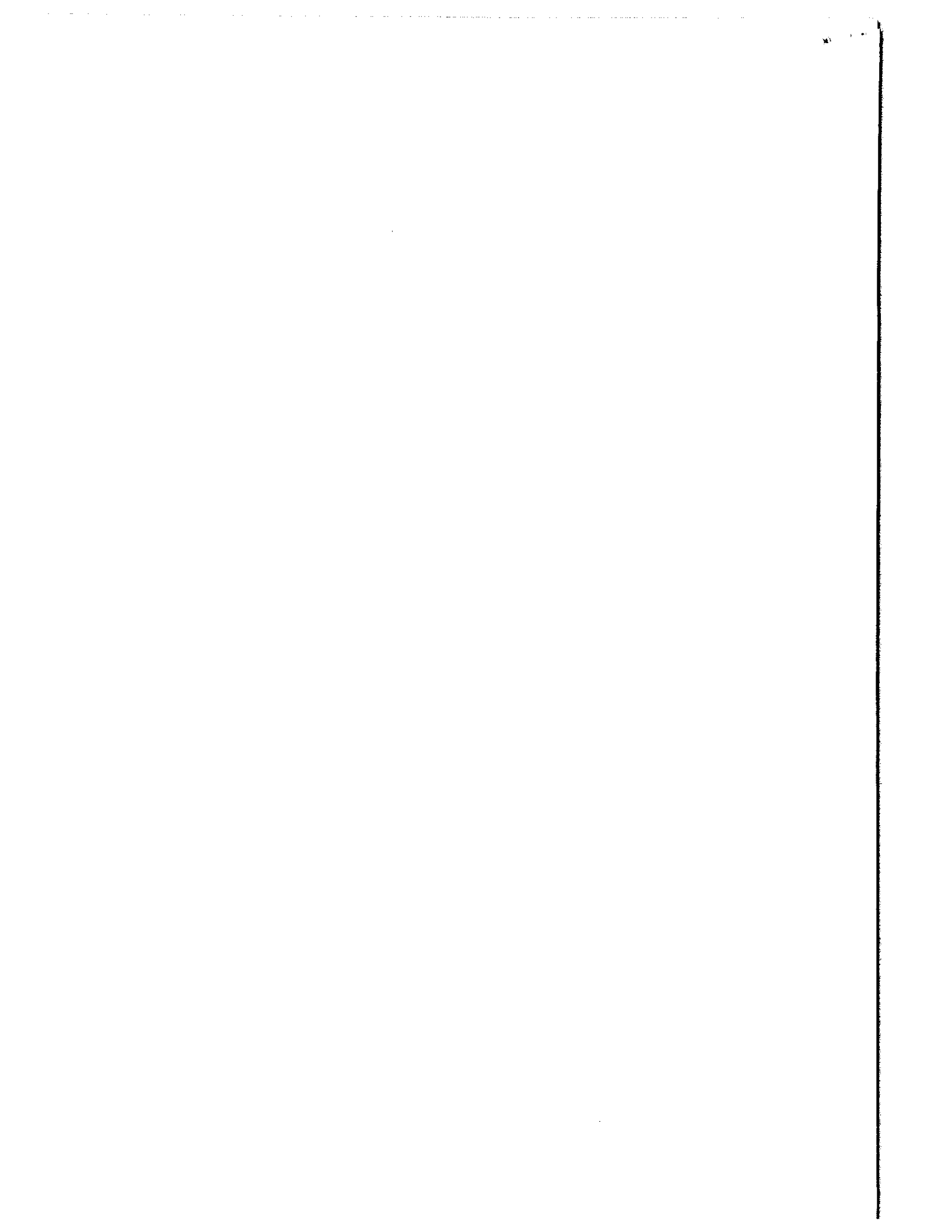## Attempt any five questions

Q.1 The length of a chain line when measured with a 20 m chain, was found to be 1341 m. But a 30 m chain, which had one link missing between 25 m and 30 m was used for the purpose, the line was found to be 1345 m long. What was the error in the 20 m chain?

Q.2 Differentiate errors from mistakes and identify some common mistakes in chaining. What are the different errors in field observations? How does the cumulative errors differ from compensating errors?

Q.3 Describe different parts of a surveyor's compass. Explain the use of prismatic or surveyor's compass in measuring the bearing of a line.

Q.4 Explain, why the adjustment of theodolite is needed to be made at every shifted position of the instrument? Give the stepwise procedure for the temporary adjustment.

Q.5 How do you classify levels? What is a Dumpy level? What are the different modifications of the same? Describe them.

Q.6 Explain, how tacheometry may be employed in any surveying? How would you determine the tacheometric constants?

Q.7 Explain the setting out works for culverts.

PART – C

Attempt any four questions

Q.1 What is closing error? Why such errors need adjustment? Give the sequence of graphical adjustment of closing error. What are the sources of such errors?

Q.2 The following readings were taken with a dumpy level and a 4 m levelling staff on a continuously sloping ground at 30 m intervals: 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250. The RL of the starting point was 80.750 m. Rule out a page of a level book and enter the above readings. Carry out reduction of heights by collimation method. Apply arithmetic checks including the checks on I.S. Determine the gradient of the line joining the first and the last point.

Q.3 Explain, what determines the nature of the curves? Classify them with examples.

Q.4 Give the theory of 'Stadia Tacheometry'. Make salient observations on the tacheometric equations.

Q.5 What is a total station? Describe its parts with a neat sketch. What are the advantages and applications of it? Explain with suitable examples.

3E1133
B. Tech. III - Sem. (Back) Exam., February - 2023
PCC Civil Engineering
3CE4 – 06 Fluid Mechanics

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 With neat sketch write different types of Non-Newtonian fluid.

Q.2 Define Kinematic Viscosity.

Q.3 What are absolute pressure, gauge pressure, atmospheric pressure and vacuum pressure?

Q.4 What are conditions of floating bodies equilibrium?

Q.5 What is velocity potential and stream function?

PART – B

(Analytical/Problem solving questions)   [4×10=40]
Attempt any four questions

Q.1 A steel ball of 2mm diameter and density 8000kg/m³ dropped into a column of oil of specific gravity 0.8 attains a terminal velocity of 2mm/s. Determine the viscosity of the oil.

Q.2 Determine the maximum weight that may be supported by a hot air balloon of 10m diameter at a location where the air temperature is 20°C, while the hot air temperature is 80°C. The pressure at location is 0.8bar. R = 287 J/(kg.K). Assume pressure is same inside & outside.

Q.3 Determine the total force and its point of action on an annular lamina of 1m internal diameter and 3m outer diameter placed on an inclination of 30° to the horizontal under water. The depth of center of lamina from water surface is 8m.

Q.4 Determine stream function in case of free vertex. State the meaning of symbols used.

Q.5 Water flows through a horizontal venturimeter of 0.6m and 0.2m diameter. The gauge pressure at the entry is 1bar. Determine the flow rate when throat pressure is 0.5bar vacuum. Barometric pressure is 1bar.

Q.6 In a hydro system the flow availability was estimated as 86.4×10^3 m³/day. The head of fall is 600m. The distance from dam to power house is 3000m. The available pipe have friction factor 0.014. Determine the pipe diameter for transmitting maximum power.

PART – C

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

Q.1 Water is drawn from two reservoirs at same water level through pipe 1 & 2 which gain at a common point. $D_1 = 0.4$m, $L_1 = 2000$m, $f_1 = 0.024$, $D_2 = 0.35$m, $L_2 = 1500$m, $f_2 = 0.021$. Water from the common point is drawn through pipe 3 of 0.55m diameter over a length of 1600m to the supply location. The total head available is 25.43m. Determine the flow rate through the system. The value of $f_3 = 0.019$.

Q.2 Derive the expression for (D/h) for a hollow right circular cylinder of outer diameter D & inner diameter kD of height h to float vertically in a liquid of relative density S.

Q.3 Derive velocity distribution equation for fully developed laminar flow in pipe. State meaning of every symbol used.

3E1134

3E1134
B. Tech. III - Sem. (Back) Exam., February - 2023
Civil Engineering
3CE4-07 Building Materials and Construction

Time: 3 Hours   **Maximum Marks: 120**
                                         Min. Passing Marks: 42

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. NIL _____   2. 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 dimension and tolerance?

Q.2 What are the important qualities of timber?

Q.3 What do you mean by the term 'Pointing'?

Q.4 What is Ashlar Masonry?

Q.5 What are the structural components of a building?

Q.6 What is Grillage Foundation?

Q.7 What is underpinning?

Q.8 Name any four causes of failure of foundations?

Q.9 Why are expansion joints used in construction?

Q.10 What do you mean by shell roof?

PART – B

(Analytical/Problem solving questions)   **[5×8=40]**

Attempt any five questions

Q.1   Describe the properties and uses of lime in construction?

Q.2   What are the function of a foundation? Mention the situations during which pile foundations are adopted?

Q.3   Sketch the elevation of a brick wall built in (1) English Bond (2) Flemish Bond. Compare the merits and demerit of English bond and Flemish bond.

Q.4   What is the purpose and use of partition wall?

Q.5   Explain fire-resistance construction?

Q.6   Write a note about the suitability of the arch?

Q.7   List the classification of pitched roof. With neat sketches explain any two of them?

PART – C

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

Attempt any four questions

Q.1   Briefly explain the various field and laboratory tests conducted on bricks to find its suitability for construction?

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

Q.3   List the types of flooring and explain the method of laying of cement concrete flooring in detail.

Q.4   Explain the sources of dampness and also explain the method of dame proofing.

Q.5   Explain the requirements of good staircase and with the help of a neat sketch explain –

    (1)   Tread and Riser

    (2)   Flight and Landing

3E1135

3E1135

B. Tech. III - Sem. (Back) Exam., February - 2023
PCC Civil Engineering
3CE4 – 08 Engineering Geology

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

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. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 Explain "Hydraulic Action".

Q.2 What is under-saturated rocks?

Q.3 Explain linear and planar structures.

Q.4 Write various parts of fault.

Q.5 Differentiate between 'P' – waves and 'S' – waves.

PART – B

(Analytical/Problem solving questions)   [4×10=40]

Attempt any four questions

Q.1 How will you identify a mineral in hand specimen on the basis of physical properties? Also, describe physical properties of orthoclase feldspar and biotite.

Q.2 Discuss Tyrrell's Tabular Classification of igneous rocks.

Q.3 Describe various types of unconformities using appropriate diagrams.

Q.4 Write notes on the following –

(i) Tunnel along a core of an anticline fold

(ii) Significance of rock types at a dam site

Q.5 What is geophysical method of subsurface analysis? Describe seismic method in detail.

Q.6 Explain application of remote sensing in construction of a dam.

PART – C

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

Attempt any two questions

Q.1 Write detailed notes on the following –

(i) Structure of metamorphic rocks

(ii) Sedimentary structures

(iii) Texture of igneous rocks

Q.2 Describe various types of fold and explain their engineering considerations using diagrams.

Q.3 (i) Describe application of remote sensing in urban planning.

(ii) Describe significance of GIS in civil engineering.