

3E1206

Roll No. _____

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3E1206

B.Tech. III Sem. (Main) Examination, April/May - 2022**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, All five Questions from Part B and three questions out of five questions from Part C .

Schematic diagrams must be shown wherever necessary. Any data 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 (As mentioned in form No.205)

PART - A**(Word limit 25)**

1. Evaluate, $\Delta^6(ax-1)(bx^2-1)(cx^3-1)$ (10×2=20)
2. Prove that, $\left(\frac{\Delta^2}{E}\right)x^3 = 6x$ (if $h=1$)
3. Using Newton-Raphson's method, find the root of $x^4 - 12x + 7 = 0$ which is near to $x=2$.
4. Find the z-transform of unit impulse function which is given by $\delta_n = \begin{cases} 1 & \text{if } n=0 \\ 0 & \text{if } n \neq 0 \end{cases}$
5. Find inverse Z Transform of $\frac{5z}{(2-z)(3z-1)}$.
6. Find the Laplace transform of $f(t) = \begin{cases} \sin t & 0 < t < \pi \\ 0 & t > \pi \end{cases}$.
7. Find inverse Laplace transform of $\frac{s+2}{(s-2)^3}$

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- Write the Formulae of Fourier complex transform Fourier cosine transform and their inverse also.
 - Write the formulae of Simpson 1/3 rule and Simpson 3/8 rule.
 - By using Picard's method, solve the equation $\frac{dy}{dx} = y - x$ with $x=0, y=2$ upto third order of approximation.

PART - B

(Word limit 100)

- From the following table find the number of students who obtained (5×4=20)

a) Less than 45 marks.

b) More than 45 marks.

Marks obtained: 30-40 40-50 50-60 60-70 70-80

No's of students: 31 42 51 35 31

- Find the approximate value correct to three places of decimal of the real root of the equation $x^3 - 3x + 4 = 0$, using method of false position three times in succession.

- Find the Fourier Sine and Cosine transform of $f(x) = \begin{cases} x & \text{for } 0 < x \leq 1 \\ 2-x & \text{for } 1 < x < 2 \\ 0 & \text{for } x \geq 2 \end{cases}$

- If $\bar{u}(z) = \frac{2z^2 + 5z + 14}{(z-1)^4}$ for the sequence $\{u_n\}, n \geq 0$ Evaluate u_2 and u_3 .

- Find Inverse Laplace transform of $\frac{S}{S^4 + 4a^4}$

PART - C

(Any Three)

(3×10=30)

- Solve $(D^2 + 9)y = \cos 2t$, given that $y(0) = 1, y(\pi/2) = -1$.

- Obtain Fourier transform of $f(x) = \begin{cases} x^2 & \text{for } |x| \leq a \\ 0 & \text{for } |x| > a \end{cases}$

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

- Solve by z transform of $u_{n+2} - 6u_{n+1} + 8u_n = 2^n + 6n$.

4. Using Milne's Predictor-Corrector Method, obtain the value of y for $x = 0.4$ for the following equation $\frac{dy}{dx} = 2e^x - y$, given that

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

5. A slider in a machine moves along a fixed straight rod. Its distance $x(\text{cm})$ along the rod is given below for various values of time $t(\text{sec})$

$t \Rightarrow$	0	0.1	0.2	0.3	0.4	0.5	0.6
$x \Rightarrow$	30.28	31.43	32.98	33.54	33.97	33.48	32.13

Evaluate

- Velocity for $t = 0.1, 0.5$ and 0.3
- Acceleration for $t = .02, .33$ and $.58$

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	B.Tech. III sem. (Main) Examination, April/May - 2022	
	Technical Communication Common to All Branches	

Time : 2 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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 (As mentioned in form No. 205).

PART - A

(word limit 25)

(10×2=20)

1. What is a Technical Project Proposal?
2. Define Linguistic Ability in short.
3. Enlist two factors which determine Information Design.
4. Suggest two ways for enhancing Listening Skills.
5. Give a comprehensive definition of Technical Communication.
6. Discuss importance of Technical communication for engineers in brief.
7. Write a short note on Technical Discourse.
8. Distinguish between the Agenda and Minutes of Meeting?
9. List any two characteristics of Technical Documents.
10. Name the different types of Technical Articles.

PART - B

(word limit 100)

(5×4=20)

1. Discuss the forms of technical communication, giving suitable examples.
2. Distinguish between the Print Media and Online Media.
3. Enlist the features, Types and structure and Format of Technical Reports.

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4. Correct the following sentences :

1. I have seen him yesterday.
 2. We had gone to the movies last night.
 3. I had spoken to them about my holiday.
 4. You must attend your teacher's instructions.
 5. The hen has lain six eggs.
 6. I have seen him a moment ago.
 7. They discussed about the whole matter.
 8. We are playing tennis every day.
5. Write a letter to the Editor of a magazine Expressions, New Delhi on the deterioration in the standard of living in your city. Give suggestions for improvement.

PART - C

(Any three)

(3×10=30)

1. Mention the Aspects of Technical Communication in detail.
 2. Describe the importance of reading and understanding Instructions and Technical Manuals for engineering students.
 3. Describe the process of Technical Writing in detail.
 4. What is Report Writing? What is the structure of a report?
 5. You are Yogi/Yogita, a B.Tech III SEM student. You need the transcript of your mark sheets from your college. Write an email to the Chairman, Examination Office requesting him to issue the same in 120 words.
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3E1200**3E1200**

B.Tech. III Sem. (Main) Examination, April/May - 2022
Managerial Economics and Financial Accounting
Common to All Branches

Time : 2 Hours**Maximum Marks : 70****Instructions to Candidates:**

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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 (As mentioned in form No.205)

PART - A**(word limit 25)****(10×2=20)**

1. What is dividend pay out ratio?
2. Define oligopoly.
3. Explain the relationship b/w. Average cost and Marginal cost with the help of a diagram.
4. Define production possibility curve.
5. Explain the law of demand.
6. Distinguish between consumer goods and capital goods. Which of these are final goods?
7. Define price Elasticity of supply.
8. What is fund flow statement?
9. Distinguish between stock and flow with examples.
10. Define production function.

PART - B**(word limit 100)****(5×4=20)**

1. "Economics is an art" Explain. Also explain the basic economic activities of an economy.
2. Explain briefly any three factors which lead to 'Decrease in Demand'.
3. Explain the relationship between ATC, AVC and MC with a suitable example.
4. "Under perfect competition the seller is a price taker whereas under monopoly he is the price maker". Explain.

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5. How will you calculate cash flows from operating activities by direct/indirect method? Explain with example.

PART - C

(Any three)

(3×10=30)

1. The following trading and profit & loss Account of Fantasy Ltd. for the year 31/3/2000 is given below.

Particular	Rs.	Particular	Rs.
To opening stock	76,250	By sales	5,00,000
"Purchases	3,15,250	"Closing stock	98,500
"Carriage & Freight	2,000		
"Wages	5,000		
"Gross profit b/d	2,00,000		
	5,98,500		5,98,500
To Administratin expenses	1,01,000	By Gross profit b/d	2,00,000
"Selling & Dist expenses	12,000	"Non-Operating incomes :	
"Non - operating expenses	2,000	"Interest on securities	1,500
"Financial Expenses	7,000	"Dividend profit on shares	3,750
Net profit c/d	84,000	"Profit on sales of shares	750
	2,06,000		2,06,000

Calculate :

- Gross profit Ratio.
 - Expenses Ratio.
 - Operating Ratio.
 - Net Profit Ratio.
 - Stock turnover Ratio.
2. What are the capital budgeting techniques explain with suitable example.
3. When the price of a commodity is Rs. 20 per unit, its quantity demanded is 800 units. When its price rises by Rs. 5 per unit, its quantity demanded falls by 20%. Calculate the price elasticity of demand. Is its demand elastic? Give reason for your answer.
4. Given below is the cost schedule of a firm. Its Average Fixed cost is Rs. 20 when it produces 3 units
- | | | | |
|-----------------------------------|----|----|----|
| Output (Q) units | 1 | 2 | 3 |
| Average variable cost (AVC) (Rs). | 30 | 28 | 32 |
- Calculate its Marginal cost and Average total cost at each given level of output.
5. Describe the steps involved in the estimation of National Income by income method. State any two precautions that must be taken while estimating national Income by this method.

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3E1213**3E1213**

B.Tech. III Sem. (Main) Examination, April/May - 2022
Civil Engineering
3CE3-04 Engineering Mechanics

Time : 2 Hours**Maximum Marks : 70****Instructions to Candidates:**

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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.

(As Mentioned in form No. 205)

PART - A

(word limit 25)

(10×2=20)

1. Write down the expression of stiffness for spring.
2. Write the names of different types of friction.
3. State the Lami's theorem.
4. Write the conditions for equilibrium of a body.
5. What is the difference between close coiled helical springs and open coiled helical springs.
6. State the principle of virtual work.
7. What do you mean by complementary shear stress.
8. What is the value of poisson's ratio for mild steel.
9. What are the units of work done.
10. What are the various characteristics of a force?

PART - B

(word limit 100)

(5×4=20)

1. A load with as mass 5 kg was lifted up by a pulley to the height of 0.8 m for pile work. (Use, $g = 9.81 \text{ ms}^{-2}$). What is Potential Energy the load.
2. Explain Stress - Strain Curve of mild steel in tension showing its all principal points.

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3. Two forces of 100 N and 150 N are acting simultaneously at a point. What is the resultant of these two forces, if the angle between them is 45° ?
 4. State and explain Newton's laws of mechanics.
 5. Explain the method of sections and method of joints for plane truss.

PART - C

(Any three)

(3×10=30)

1. Four forces of magnitude P , $2P$, $3\sqrt{3}P$, and $4P$ are acting at a 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.
 2. Bring out the differences among perfect, deficient and redundant trusses.
 3. Find the moment of inertia of a rectangular section 60 mm wide and 40 mm deep about its centre of gravity.
 4. A trolley of mass 200 kg moves on a level track for a distance of 500 metres. If the resistance of the track is 100 N, find the work done in moving the trolley.
 5. A circular rod of diameter 16 mm and 500 mm long is subjected to a tensile force 40kN. The modulus of elasticity for steel is 200 kN/mm^2 . Find
 - i. Stresses.
 - ii. Strain.
 - iii. Elongation of the rod due to applied load.
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	B.Tech. III Sem. (Main) Examination, April/May - 2022 Civil Engg. 3CE4-05 Surveying	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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 (As mentioned in form No.205)

PART - A

(word limit 25)

(10×2=20)

1. Define bearing of a line.
2. In which areas does the compass surveying is not recommended?
3. What is reciprocal levelling?
4. What do you mean by contour?
5. What are the different methods for setting out curves?
6. How a curve may be designated?
7. What is tacheometer?
8. Write down the values of additive and multiplying constants for a tacheometer.
9. What is meant by setting out works?
10. What is a Distomat?

PART - B

(word limit 100)

(5×4=20)

1. Convert the whole circle bearings of 30°, 112°, 180° and 358° into quadrantal bearings.
2. What are the different uses of contours?
3. Calculate the radius of 2° curve.

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4. How would you determine the tacheometric constants?
 5. Explain the instruments and methods for laying out buildings.

PART - C

(Any three)

(3×10=30)

1. ABCD is a traverse. The included angles are measured as $\angle A = 110^\circ$, $\angle B = 54^\circ$, $\angle C = 125^\circ$ and $\angle D = 71^\circ$. Calculate the bearings of the traverse lines with A as origin and AB as arbitrary meridian.
2. The following readings are successively taken from an instrument in a levelling work:
0.255, 0.385, 0.520, 1.785, 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 properly. 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.
3. Explain the following :
 - a. The necessity of transition curve.
 - b. No slip condition for a vehicle passing through a curve of radius R.
Show that no slip condition dictates the minimum radius of the curve.
4. Describe total station with its parts in a neat sketch. What are the major advantages and applications of it.
5. What is photogrammetry surveying? Explain its principle, types, advantages and disadvantages as well as applications.

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	B.Tech. III Sem. (Main) Examination, April/May - 2022	
	Civil Engineering 3CE4-06 Fluid Mechanics	

Time : 2 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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 (As mentioned in form No.205)

PART - A

(word limit 25)

(10×2=20)

1. Define specific Gravity.
2. State Newton's Law of Viscosity.
3. Name the types of fluid's flow.
4. Define "Pascal's Law"?
5. What is mean by Absolute pressure and Gauge pressure?
6. Define uniform and Non Uniform flow.
7. Write the Bernoulli's equation applied between two sections with losses.
8. What is Hagen Poiseuille's formula?
9. Give the formula for velocity distribution.
10. Give the expression for the coefficient of friction in viscous flow.

PART - B

(word limit 100)

(5×4=20)

1. Discuss Newtonian and Non - Newtonian fluids with characteristics plots.
2. Derive the equation of capillary rise, stating meaning of terms used with neat sketches.
3. With neat sketch explain gauge pressure and absolute pressure.

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4. Derive Euler's equation of motion for flow along a stream line.
 5. Briefly discuss various types of minor losses in pipe flow.

PART - C

(Any three)

(3×10=30)

1. The rate of flow of water through a horizontal pipe is $0.25 \text{ m}^3/\text{s}$. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller is 11.772 N/cm^2 . Determine.
 - i. Loss of head due to sudden enlargement.
 - ii. Pressure intensity in the large pipe.
 - iii. Power lost due to enlargement.
 2. What are the different applications of Bernoulli's equation? Give the expression for rate of flow through venturimeter.
 3. Give the classification of notches and weirs. Find the discharge over a triangular notch and stepped notch.
 4. Two water tanks are connected by a pipe line of 25 cm diameter and 350 m long. The flow rate is $0.4 \text{ m}^3/\text{s}$. Find the difference in head between the two tanks. Take $f = 0.007$ for the pipe.
 5. A 15 cm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 15.10 cm. Both cylinders are 25 cm high. The space between the cylinders is filled with a liquid whose viscosity is unknown. If a torque of 12.0 Nm is required to rotate the inner cylinder at 100 rpm determine the viscosity of the fluid.
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	B.Tech. III Sem. (Main) Examination, April/May - 2022 Civil Engg.	
	3CE4-07 Building Materials and Construction	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all ten questions From Part A, All five Questions from Part B and three questions out of five questions from Part C .

Schematic diagrams must be shown wherever necessary. Any data 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 (As mentioned in form No.205)

PART - A(Word limit 25)

1. Draw a standard Brick with dimensions? (10×2=20)
2. What are the major classifications of stones? Give 2 examples in each?
3. What do you mean by Decay of Timber?
4. Write down the causes of dampness?
5. What is load bearing structure use in building construction?
6. What is Ashlar masonry?
7. List the various types of Roofs?
8. Enumerate the different name of foundation?
9. Differentiate between Headers and stretchers in brick bonds?
10. What are the different methods of plastering?

PART - B(Word limit 100)

1. What are the characteristics of a good timber? Define seasoning of timber.(5×4=20)
2. What are the various types of floors? Explain the utility of any two.
3. Explain causes of failure of foundation?
4. What are different tools required in the process of blasting and explain the process of blasting with neat sketches?
5. Differentiate between English and Flemish bond of brick masonry?

PART - C (Any three)

(3×10=30)

1. What are the tests to which a stone should be subjected before it is selected for building purpose?
 2. What are the major types of foundations used in buildings? Sketch and explain their suitability?
 3. A hospital building is under construction. Being a civil Engineer, what are the various building services you have to keep in mind for the hospital building?
 4. Explain the requirements of good staircase. Describe the suitability of different types of stairs?
 5. State various component of a building? Discuss the functional requirement of super structures?
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3E1212**3E1212**

B.Tech. III Sem. (Main) Examination, April/May - 2022
Civil Engineering
3CE4-08 Engineering Geology

Time : 2 Hours**Maximum Marks : 70****Instructions to Candidates:**

Attempt all ten questions from Part A. All five questions from Part B and three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data 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)

PART - A

(word limit 25)

(10×2=20)

1. Write scopes of Geology in Civil Engineering?
2. Describe unconformity in rocks?
3. Define fracture mineral properties?
4. Explain the term erosion?
5. Discuss about the Geological time scale?
6. Explain the texture of Metamorphic rocks?
7. What are engineering properties of rocks?
8. Differentiate structural geology and engineering geology?
9. What are the types of weathering?
10. Describe the terms fold and fault?

PART - B

(word limit 100)

(5×4=20)

1. Describe the features formed by river erosion?
2. Classify different types of faults?
3. Explain the texture and structure of sedimentary rocks?

4. Describe the seismic method for subsurface analysis?
5. Differentiate the various processes of Metamorphism?

PART - C

(Any three)

(3×10=30)

1. Explain the field and in - situ test for site construction?
 2. Discuss the recognition of fold in field also classify folds?
 3. Describe the geological consideration for site selection of Dam?
 4. Discuss the application of Remote sensing and GIS in various fields of Civil Engineering?
 5. Describe the Geophysical methods applied to civil Engineering for subsurface analysis.
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3E1101

3E1101

B.Tech. III Sem. (Back) Examination, April / May - 2022
Aeronautical Engineering
3AN2-01 Advanced Engineering Mathematics - I
AE, AG, AN, CE, EC, EI, ME, MH, MI

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 from Part B and Four questions out of Five from Part C.

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)*

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. State Fundamental theorem of finite difference calculus.
2. Prove that $\Delta' y_k = \nabla' y_{k+r}$.
3. Write Newton's - Gregory forward interpolation formula.
4. What is the application of numerical methods in engineering?
5. Write the formula of Regula Falsi method.
6. Define Laplace transform.
7. Evaluate $L^{-1} \left\{ \frac{1}{s(s-1)} \right\}$.
8. Find Fourier cosine transform of $f(x) = e^{-x}$.
9. Show that $F_s \{ x f(x) \} = -\frac{d}{ds} \bar{f}_c(s)$.
10. Prove that $z \{ a^n \} = \frac{z}{z-a}$, $n \geq 0, z \neq a$.

Part - B

(Analytical/Problem solving questions)

Attempt any five questions

(5×8=40)

1. Find the values of y for x = 15 and x = 25 from the following table :

x	5	10	15	20	25	30
y	7	10	-	17	-	28

2. From the following table calculate angular velocity when $t = 0.6$ seconds :
- | | | | | | | | |
|----------|---|------|------|------|------|------|------|
| t | 0 | 0.2 | 0.4 | 0.6 | 0.8 | 1 | 1.2 |
| θ | 0 | 0.12 | 0.49 | 1.12 | 2.02 | 3.20 | 4.67 |
3. Using Newton Raphson's method find the real root of $x^4 - 12x + 7 = 0$ which is near to $x = 2$, correct to three places of decimals.
4. Obtain Laplace transform of the following functions :
- $e^{-3t}(2\cos 5t - 3\sin 5t)$.
 - $\int_0^\infty te^{-3t} \sin t \, dt$.
5. Apply convolution theorem to evaluate $L^{-1}\left\{\frac{1}{s^2(s^2 - a^2)}\right\}$.
6. Solve the integral equation $\int_0^\infty f(x) \cos sx \, dx = \begin{cases} 1-s, & 0 \leq s \leq 1 \\ 0, & s > 1 \end{cases}$.
7. Find the sequence $\{u_n\}$ if $\bar{u}(z) = \frac{2z^2 - 10z + 13}{(z-2)(z-3)^2}$, $2 < |z| < 3$.

Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **Four** questions

(4×15=60)

- Use Euler's method with $h = 0.1$, to find the solution of the equation $\frac{dy}{dx} = x^2 + y^2$ with $y(0) = 0$ in the range $0 \leq x \leq 0.5$.
- Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by
 - Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule and
 - Trapezoidal rule. Hence obtain the value of π by the result obtained from (i), taking six intervals.
- Solve $(D^2 + 9)y = \cos 2t$, given that $y(0) = 1$, $y(\pi/2) = -1$ by laplace transform technique.
- Find $f(x)$, if its sine transform is $\frac{s}{s^2 + 1}$.
- If $\bar{u}(z) = \frac{2z^2 + 5z + 14}{(z-1)^4}$ for the sequence $\{u_n\}$; $n \geq 0$ evaluate u_2 and u_3 .

3E1102	Roll No. _____	[Total No. of Pages : 3]
	3E1102	
	B.Tech. III Sem. (Back) Examination, April / May - 2022 HSMC Aeronautical Engineering 3AN1-02 Technical Communication All branches	

Time : 3 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 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)*

Part - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. What is meant by technical communication?
2. Write about two types of technical documents.
3. Discuss any two importance of technical communication.
4. What is meant by minutes of meeting?
5. Write in brief about advanced technical communication.

Part - B

(Analytical/Problem solving questions)

Attempt any **four** questions

1. a) What is the role of feedback in the process of technical communication? (5+5)
 b) Write all the kinds of technical documents.
2. a) "A business letter should be as heard that it can replace the writer as completely as possible". Discuss. (5+5)
 b) Prepare one format of "Business letters of direct approach". (5+5)

(5+5)

3. i) Correct the following sentences;
- a) The gentry of the city was present at the meeting.
 - b) I asked Seema if Anju has already been married.
 - c) Politics are a dirty game.
 - d) If I would complete work on time I maybe reaching on time.
 - e) Kashmir were beautiful place when I see.
- ii) a) What are the forms of technical discourse ? Explain.
4. What are the editing strategies to achieve appropriate technical style. (10)
5. You have been asked to provide the confidential credit information of a firm Quoting your business policies , write a refusal letter to that party of information technology firm. (10)
6. What is meant by a proposal? Explain the need of a proposal and structure of proposal. (10)

Part - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any **two** questions

1. a) Draft formal report according to the various steps included.(2*15=30)
b) Write the various characteristics and structure of technical reports.
2. Artificial intelligence (AI) is making a difference to how legal work is done, but it isn't the threat it is made out to be. AI is making impressive progress and shaking up things all over the world today. The assumption that advancements in technology and artificial intelligence will render any profession defunct is just that, an assumption and a false one. The only purpose this assumption serves is creating mass panic and hostility towards embracing technology that is meant to make our lives easier. Let us understand what this means explicitly for the legal world. The ambit of AI includes recognizing human speech and objects, making decisions based on data, and translating languages. Tasks that can be defined as 'search-and-find' type can be performed by AI. Introducing AI to this profession will primarily be for the purpose of automating mundane, tedious tasks that require negligible human intelligence. The kind of artificial intelligence that is employed by industries in the current scene, when extended to the law will enable quicker services at a lower price. AI is meant to automate a number of tasks that take up precious working hours lawyers could be devoted to tasks that require discerning, empathy, and trust- qualities that cannot be replicated by even the most sophisticated form of AI. The legal profession is one of the oldest professions in the world. Thriving over 1000 years; trust, judgement, and diligence are the pillars of this profession. The most important pillar is the relationship of trust between a lawyer and clients, which can only be achieved through human connection and interaction. While artificial

intelligence can be useful in scanning and organizing documents pertaining to a case, it cannot perform higher-level tasks such as sharp decision making, relationship-building with valuable clients and writing legal briefs, advising clients, and appearing in court. These are over and above the realm of computerization. The smooth proceeding of a case is not possible without sound legal research. While presenting cases lawyers need to assimilate information in the form of legal research by referring to a number of relevant cases to find those that will favour their client's motion. Lawyers are even required to thoroughly know the opposing stand and supporting legal arguments they can expect to prepare a watertight defense strategy. AI, software that operates on natural language enables electronic discovery of information relevant to a case, contract reviews, and automation generation of legal documents. AI utilizes big-data analytics which enables visualization of case data. It also allows for creation of a map of the cases which were cited in previous cases and their resulting verdicts, as per the website Towards Data Science. The probability of a positive outcome of a case can be predicted by leveraging predictive analytics with machine learning. This is advantageous to firms as they can determine the return on investment in litigation and whether an agreement or arbitration should be considered

- a) On the basis of your understanding of the above passage, make notes on it using headings and subheadings. Also apply an appropriate title to it.
 - b) Write a summary of the passage in about 80 words.
3. Write a job application for the post of programmer as you see the advertisement in news paper.

Attach your CV. (Prepare your cv here according to job requirements.)

Roll No. _____

[Total No. of Pages : 2]

3E1133**3E1133****B.Tech. III Sem. (Back) Examination, April/May - 2022****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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

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

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory**(5×2=10)**

1. Explain the term specific Gravity and specific weight.
2. Define Manometer and its uses.
3. Explain the term centre of pressure and Hydrostatic force.
4. State Bernoulli's Theorem. Give also relation.
5. Explain continuity equation with relation and example.

PART - B

(Analytical/Problem solving questions)

Attempt any four questions**(4×10=40)**

1. Explain surface tension. Derive the General equation for surface tension and therefore derive the equation for pressure inside a droplet.
2. What is Capillary rise. Derive the expression for capillary rise when glass tube is dipped in water.
3. Derive the formula for discharge when water is flowing through horizontal venturimeter.
4. Derive the Bernoulli's equation for incompressible fluids stating assumptions clearly.

5. Explain the following :
 - i. Major energy loss.
 - ii. Minor energy loss.
 - iii. Loss due to sudden enlargement.
 - iv. Loss due to contraction.
6. Derive Darcy - Weisbach formula for determining friction loss in pipe flow.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any two questions

(2×15=30)

1. A Venturimeter with a 150 mm diameter at inlet and 100 mm throat is laid with its axis horizontal and is used for measuring the flow of oil specific gravity 0.9. The oil mercury differential Manometer shows a gauge difference of 200 mm. Assume coefficient of meter as 0.98. Calculate the discharge. (15)
2. Water is discharged from a tank to another tank with 30 meters difference of water levels through a pipe 1200 meters long. The diameter for the first 600 meter length of the pipe is 400 mm and 250 mm for the remaining 600 metres long. Find the discharge in litres per second through the pipe taking into consideration the friction losses only. Assume the coefficient of friction as 0.009 for both the pipes. (15)
3. a) Derive Darcy's equation for the determination of loss of head due to friction in pipe line. (7)
 - b) The water is flowing through a pipe having diameter 200 mm and 100 mm at section 1 and 2 respectively. The rate of flow through pipe is 35 litres per second. The section 1 is 6 m above datum and section 2 is 4 m above datum. Calculate the total head. (8)

3E1135	Roll No. _____	[Total No. of Pages : 2]
	3E1135	
	B.Tech. III Sem. (Back) Examination, April / May - 2022 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 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)*

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory

(5×2=10)

1. What is slip in a fault?
2. What is Weathering?
3. What is Active Remote sensing?
4. What do you know by term 'Petrology'?
5. What is a Plunging fold?

PART - B

(Analytical/Problem solving questions)

Attempt any four questions

(4×10=40)

1. Why do rocks tilt and fold in the earth's crust?
2. Explain weathering by carbonation and oxidation.
3. What are the forces acting on Dam structure?

- 9
4. Write short notes on :
 - a. Aerial photographs.
 - b. Satellite Imageries.
 5. Draw and describe Geological time scale.
 6. Describe Electro Magnetic Radiation (EMR) and spectrum.

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions

(2×15=30)

1. Explain Geological investigation for site selection of site for Dams.
 2. How Remote sensing is used in civil engineering work?
 3. What is texture and structure of sedimentary rock? Explain with figure?
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Roll No. _____

[Total No. of Pages : 3]

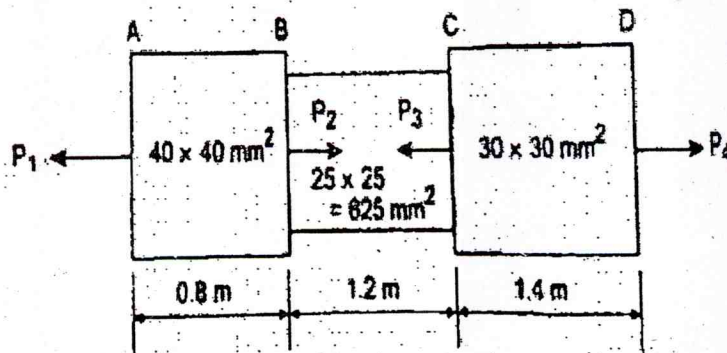
3E1621**3E1621****B.Tech. III sem. (Old Back) Examination, April/May - 2022****Civil Engineering****3CE1A Civil Engineering****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

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 (As mentioned in form No.205)

UNIT - I

1. a) Define Stress and strain, what is the difference between ultimate strength, Yield stress and permissible stress? (6)
- b) Calculate the force P_3 and change in length for the following figure. Take $E = 200 \text{ kN/mm}^2$; $P_1 = 120 \text{ kN}$; $P_2 = 220 \text{ kN}$; and $P_4 = 160 \text{ kN}$. (10)

**(OR)**

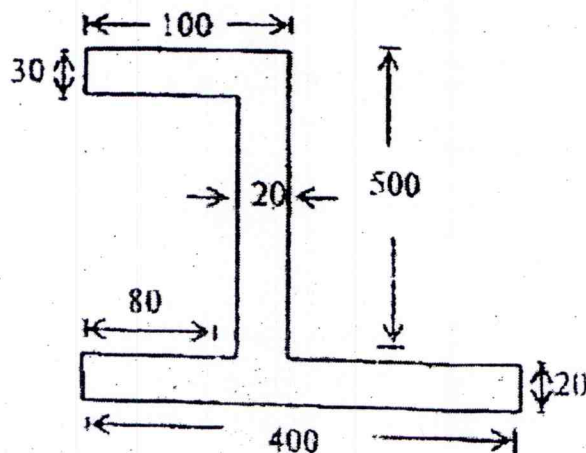
1. a) Explain Hooke's law with the help of stress - strain diagrams. (6)
- b) Give relation between Elastic constants Modulus of Elasticity (E), Poisson's ratio ($1/m$), Bulk Modulus (K) and Modulus of Rigidity (N). (10)

UNIT - II

2. a) What do you understand by principal stresses and principal planes? (4)
- b) At a point in a strained material the principal stresses are 100 N/mm^2 (tensile) and 60 N/mm^2 (compressive). Determine the normal stress, shear stress and resultant stress on a plane inclined at 50° to the axis of major principal stress. Also determine the maximum shear stress at the point. (12)

(OR)

2. a) Give definition of Polar moment of inertia and principal moment of inertia. (4)
 b) Determine the principal moments of inertia for the given cross section. (12)



All dimensions are in mm.

UNIT - III

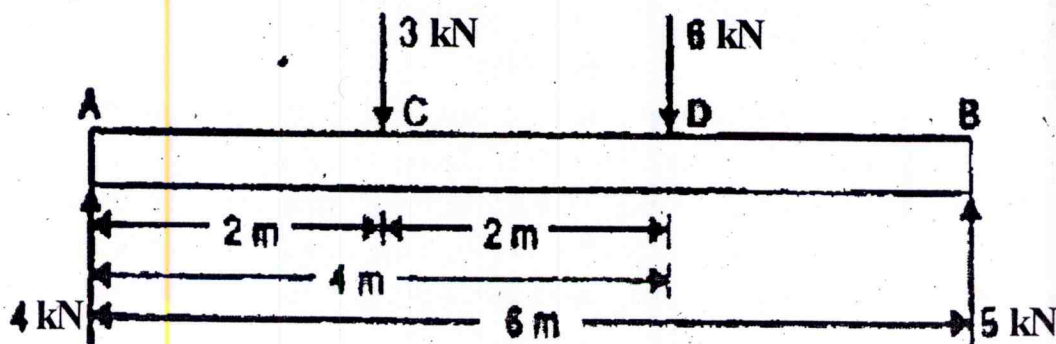
3. a) State Euler's theory and its limitation. (4)
 b) Give different between short column and long column. (6)
 c) What are the assumptions followed in Euler's equation? (6)

(OR)

3. a) What are types of stress in a thin cylindrical and spherical vessel subjected to internal pressure? (6)
 b) A steel rod 5 m long and of 40 mm diameter is used as a column, with one end fixed and the other free. Determine the crippling load by Euler's formula. Take E as 200 GPa. (10)

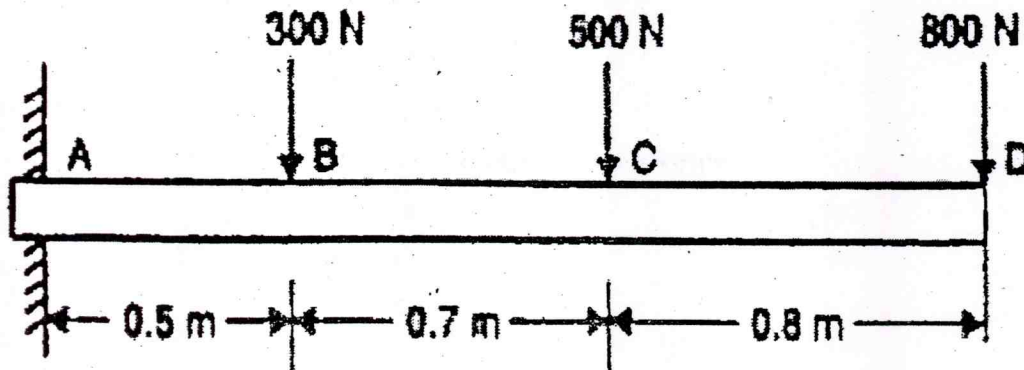
UNIT - IV

4. a) Write about different types of beams based on its support condition with the help of neat diagram. (6)
 b) A simply supported beam of length 6 m carries point load of 3 kN and 6 kN at distances of 2 m and 4 m from the left end. Draw the shear force and bending moment diagrams for the beam. (10)



(OR)

4. a) Derive the relationship between load, shear force and bending moment. (8)
 b) A cantilever beam of length 2 m carries the point loads as shown in Fig. Draw the shear force and B.M. diagrams for the cantilever beam. (8)

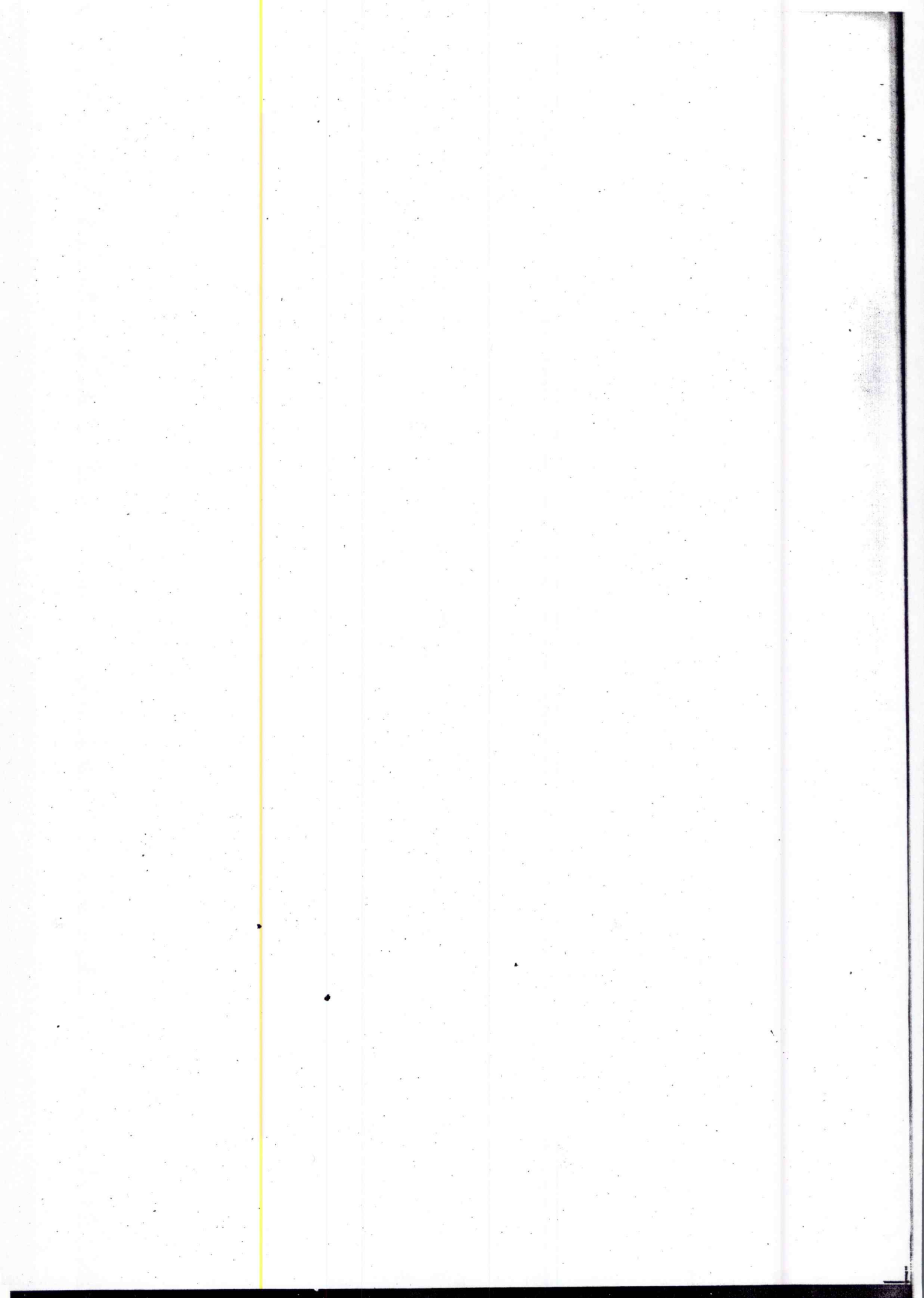


UNIT - V

5. a) Write down assumptions made in simple theory of Bending. (6)
 b) Define ordinary bending and derive Bending Equation. (10)

(OR)

5. a) Show that for a beam of circular cross section, the maximum shear stress is $\frac{4}{3}$ times the average shear stress. (4)
 b) A simply supported beam of rectangular cross section of dimension 150×300 mm is having span of 4.5 m. It is loaded with u.d.l of 8 kN/m compute shear stress developed on a layer 60 mm above the neutral axis of a section located at 1.5 m from the left support. (12)



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<div style="border: 1px solid black; display: inline-block; padding: 5px; margin-bottom: 10px;">3E1622</div> B.Tech. III Sem. (Reback) Examination, April/May - 2022 Civil Engg. 3CE2A Civil Engg. Materials		

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

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)

Unit - I

1. a) What are the qualities of a good building stone? (06)
- b) Describe the various methods of quarrying of stones in detail. (10)

(OR)

1. Describe the various tests on building stones. (16)

Unit - II

2. a) Write the procedure of manufacturing the bricks. (8)
- b) Describe various types of tiles. (8)

(OR)

2. Describe different types of test on bricks. (16)

Unit - III

3. a) Discuss various types of cements? (6)
- b) Describe the initial and final setting time test on cement. (10)

(OR)

3. a) Write the manufacturing process of hydraulic lime. (8)
b) Write down properties and uses of Gypsum and plaster of perris. (8)

Unit - IV

4. a) Discuss the various types of painting in wall (8)
b) Describe various types of paints and varnishes. (8)

(OR)

4. a) Describe various defects in timber. (8)
b) Explain various methods of seasoning. (8)

Unit - V

5. a) Write general properties of plastics. (8)
b) Write down properties and uses of Asbestos and G.I sheets. (8)

(OR)

5. a) Explain the concept of environmental friendly building material. (8)
b) Write a short note on silica fume and rice husk ash. (8)

3E1623	Roll No. _____	[Total No. of Pages : 2]
	3E1623	
	B.Tech. III Sem. (Old Back) Examination, April/May - 2022 Civil Engineering 3CE3A Engg. Geology	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

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)*

Unit - I

1. a) Give an account of internal structure of earth with neat diagram. (8)
- b) Explain the various physical properties of minerals. (8)

(OR)

1. a) Explain the importance of geology for civil engineers in details. (8)
- b) Describe geological work of wind and also explain features formed by wind. (8)

Unit - II

2. a) Describe various texture of igneous rocks. (8)
- b) What is a metamorphic rocks? Explain the various agents of metamorphism. (8)

(OR)

2. a) Explain the process of formation of sedimentary rocks in detail. (8)
- b) Discuss about engineering properties of rocks. (8)

Unit - III

3. a) What is "structural Geology". Describe in brief causes of folding. (8)
- b) Write a brief note about dip and strike in rocks. (8)

(OR)

3. a) Write a brief note about various type of classification of faults. (8)
- b) Describe various types of joints. (8)

Unit - IV

4. Describe Geological studies required for selection of site for Dam tunnel and Bridge. (16)

(OR)

4. Describe the Electrical resistivity and Seismic survey methods and their applications in civil engineering. (16)

Unit - V

5. What do you understand by "Remote Sensing". Mention its application in civil engineering. (16)

(OR)

5. Write a short note on the followings :

- i. G.I.S Application.
- ii. Electromagnetic system.

(2×8=16)

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[Total No. of Pages : 2]

3E1624**3E1624****B.Tech. III Sem. (Reback) Examination, April/May - 2022****Civil Engg.****3CE4A Construction Technology****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****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)

UNIT - I

1. a) Define scaffolding and give name of different type of scaffolding. Describe any two of the scaffolding with neat sketches, which are most commonly used. (8)
- b) What do you understand by Pre - cast structures? What are the advantages and disadvantages of Pre - cast structure? (8)

(OR)

1. a) Enumerate structural component of a building. Describe in brief the basic requirement of building component in design and construction of a building. (8)
- b) Discuss various types of foundation enumerating their significance. (8)

UNIT - II

2. a) Define the general principles to be considered in case of damp proofing. Explain air drain and asphalt tanking methods of damp proofing with diagram. (8)
- b) Differentiate between any **four** of the following : (4×2=8)
 - i. Abutment and Piers.
 - ii. Skewback and Springing Points.
 - iii. Arches and Lintels.
 - iv. Pre cast and Cast in situ lintel.
 - v. Extrados and Intrados.

(OR)

- 185
2. What are the requirements of a staircase in residential and public building? Draw a section through R.C.C. staircase showing tread, rise, bluster, newel post, handrail and landings. (16)

UNIT - III

3. a) Enumerate different types of flooring used for ground floor construction. Discuss the factors affecting the selection of ground floor construction. (8)
- b) Define the following terms used in pitched roof construction and show in diagram :-
- i) Pitch of a roof.
 - ii) Purlin.
 - iii) Battens.
 - iv) Principal Rafter. (4×2=8)

(OR)

3. a) Differentiate between the following :
- i) Gable roof and hip roof.
 - ii) King Post Roof Truss and Queen Post Roof Truss. (2×4=8)
- b) Explain the construction of concrete floor with the help of diagram. (8)

UNIT - IV

4. a) Enumerate the different types of grouting equipment. Explain the jet grouting with neat diagram. (8)
- b) What are the differences between dewatering equipment and pumping equipment. (8)

(OR)

4. a) Differentiate between the following :
- i) Pneumatic type roller and sheep foot roller.
 - ii) Drop Hammer and diesel Hammer.
 - iii) Reciprocating pump and Centrifugal pump. (3×4=12)
- b) Write short notes on various pile driving equipment's. (4)

UNIT - V

5. a) What is preventive maintenance? What are its functions? Explain. (8)
- b) Discuss the factors affecting the selection of equipment in construction project for better and speedy execution. (8)

(OR)

5. What is maintenance management? What are different types of maintenance? Explain. (16)

3E1625

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3E1625

B.Tech. III Sem. (Old Back) Examination, April/May - 2022

Civil Engineering

3CE5A Civil Engineering

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

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)

Unit - I

1. a) Explain following.
 - i. Specific volume and specific gravity.
 - ii. Newtonian and Non - Newtonian Fluids. (8)
- b) An oil of viscosity 5 poise is used for lubrication between a shaft and sleeve. The diameter of the shaft is 0.5 m and it rotates at 200 r.p.m. Calculate the power lost in oil for a sleeve length of 100 mm. The thickness of oil film is 1.0 mm. (8)

(OR)

1. a) Differentiate following.
 - i. Dynamic viscosity and Kinematic viscosity.
 - ii. Surface Tension and Capillarity. (8)
- b) Two horizontal plates are placed 1.25 cm apart, the space between them being filled with oil of viscosity 14 poise. Calculate the shear stress in oil if upper plate is used with a velocity of 2.5 m/s. (8)

Unit - II

2. a) How is the metacentric height of a body determined experimentally? (6)
- b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of sp. gravity 0.8 and having vacuum pressure is flowing. The other end of manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of the fluid in the left from the centre of pipe is 10 m below. (10)

(OR)

2. a) What is the different between U-tube differential manometers and inverted U-tube differential manometers? Where are they used? (6)
- b) A solid cylinder of diameter 5 m has a height of 5 m. Find the metacentric height of the cylinder if the specific gravity of the material of the cylinder is 0.7 and it is floating in water with its axis vertical. State whether the equilibrium is stable or unstable. (10)

Unit - III

3. a) Describe velocity potential function and stream function. (4)
- b) What is a flow net? What are its uses? (4)
- c) State and prove Bernoulli's equation, mentioning the assumptions underlying it. (8)

(OR)

3. a) Differentiate between forced vortex flow and free vortex flow. (4)
- b) A velocity field is given by $u = t^2 - 3y$ and $v = 4t + 5x$. Calculate the acceleration at the point (5,3) at time $t = 2$ units. (8)
- c) Distinguish between :
- Rotational flow and irrotational flow.
 - Streamline and path - line. (4)

Unit - IV

4. a) A venturimeter $30 \text{ cm} \times 10 \text{ cm}$ is provided in a vertical pipeline to measure the flow of oil of relative density 0.85. The difference in elevations of the throat section and entrance section is 40 cm, the direction of flow of oil being vertically upwards. The oil - mercury differential U tube manometer shows a gauge deflection of 20 cm. Calculate the discharge of oil and the pressure difference between the entrance section and throat section. Take the coefficient of discharge as 0.97 and specific gravity of mercury as 13.6. (10)
- b) Define coefficient of velocity, coefficient of contraction and coefficient of discharge. Find out the relation among the three. (6)

(OR)

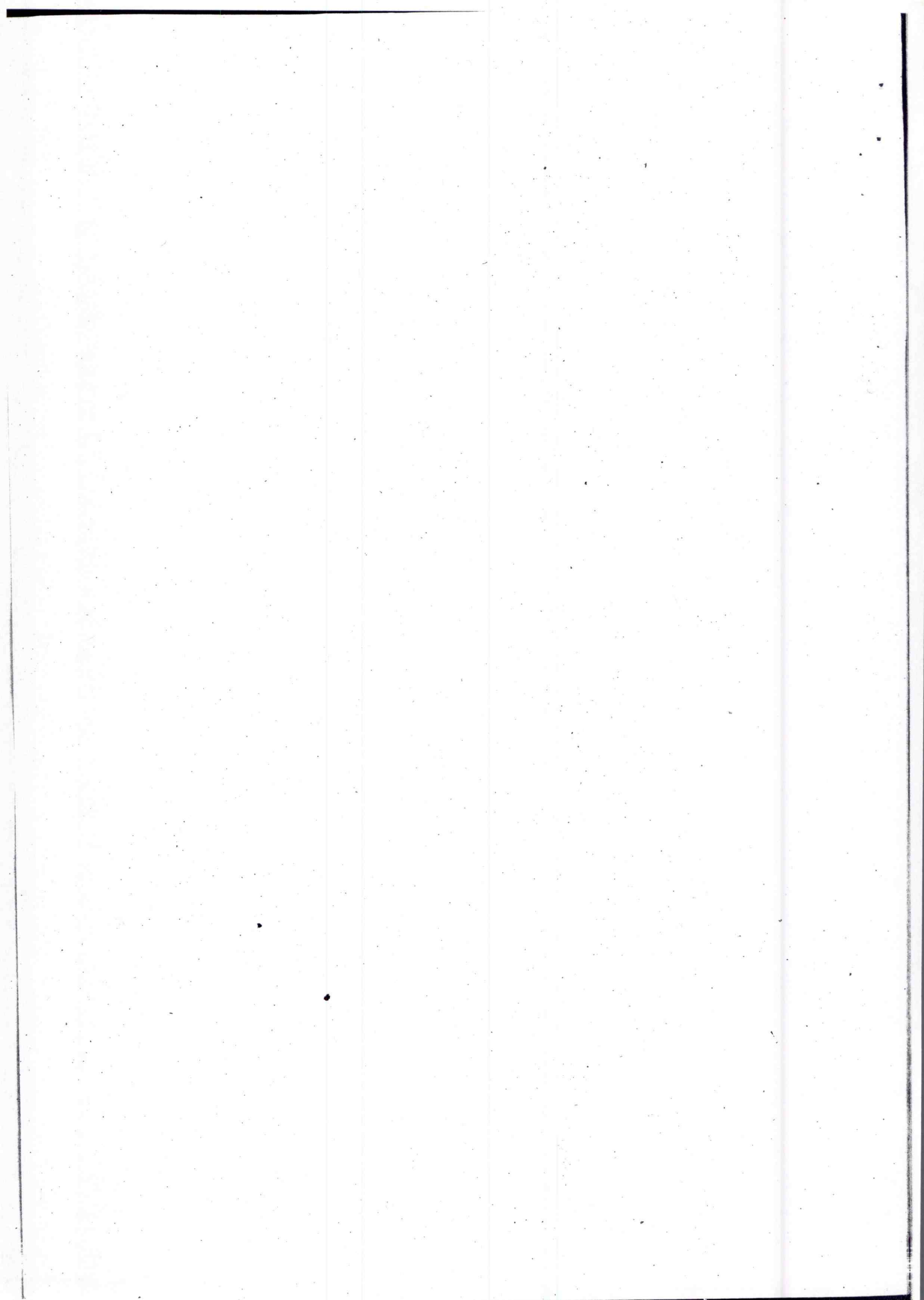
4. a) What is a Cippoletti weir. Show how the effect of end contraction is compensated in a Cippoletti weir. (6)
- b) Water flows over a rectangular weir 2 m wide at a depth of 200 mm and afterwards passes through a triangular right angled weir. Taking C_d for the rectangular and triangular weir as 0.61 and 0.58 respectively, find the depth over the triangular weir. (10)

Unit - V

5. a) Explain water hammer concept. (4)
- b) The difference in water surface levels in two tanks, which are connected by three pipes in series of lengths 300 m, 170 m, and 210 m and of diameters 300 mm, 200 mm and 400 mm respectively is 12 m. Determine the rate of flow of water if co-efficient of friction are 0.005, 0.0052 and 0.0048 respectively. Considering.
- i. minor losses.
- ii. neglecting minor losses. (12)

(OR)

5. a) Explain "Moody's diagram". What is its use in pipe flow? (6)
- b) A 0.3 m diameter pipe 2340 m long is connected with a reservoir whose surface is 72 m above the discharging end of the pipe. If for the last 1170 m, a second pipe of the same diameter is laid beside the first and connected to it, what would be the increase in discharge? Neglect minor losses. Take $f = 0.02$. (10)
-



3E1626

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3E1626

B.Tech. III Sem. (Old Back) Examination, April / May - 2022

Civil Engineering
3CE6A Civil Engineering

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

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)

UNIT - I

1. a) Obtain the Fourier series for the function $f(x) = x^2$, $-\pi < x < \pi$, and reduce from it the relation.

$$\frac{\pi^2}{6} = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots \quad (8)$$

- b) Find the Z - transform of $u_n = 2n + 3 \sin \frac{n\pi}{4} - 5a^4$. (8)

(OR)

1. a) Using harmonic analysis, obtain the first three terms in the Fourier series expansion of y , as given below : (8)

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

- b) Using convolution theorem, evaluate. (8)

$$z^{-1} \left\{ \frac{z^2}{(z-1)(z-3)} \right\}$$

UNIT - II

2. a) Find Laplace transform of $\frac{\sin ax}{x}$. Does the Laplace transform of $\frac{\cos ax}{x}$ exist? (8)

- b) Using convolution theorem, evaluate $L^{-1} \left\{ \frac{s}{(s^2 + a^2)^2} \right\}$. (8)

(OR)

2. a) What is Dirac delta function? Find Laplace transform of Dirac delta function. (8)
 b) Using Laplace transform solve the following equation.

$$y'' + 25y = 10 \cos 5x, y(0) = 2, y'(0) = 0. \quad (8)$$

UNIT - III

3. a) Find the Fourier sine and cosine transforms of the function x^{m-1} . (8)
 b) State and prove convolution theorem for Fourier transform. (8)

(OR)

3. a) Find the Fourier transform of $f(x)$ defined by (8)

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

And hence evaluate $\int_{-\infty}^{\infty} \frac{\sin sa \cos sx}{s} ds$.

- b) Find the function, if Fourier transforms is $e^{-|x|}$. (8)

UNIT - IV

4. a) If $y = a(3)^x + b(-2)^x$ and $h = 1$, then prove that $(\Delta^2 + \Delta - 6)y = 0$. (8)
 b) Use Lagrange's interpolation formula to find a polynomial from the following data, and hence find y at $x = 2$. (8)

x	0	1	3	4
y	-12	0	6	12

(OR)

4. a) Using Newton Gregory forward interpolation formula find the polynomial, which passes through the points (1,-1), (2,-1), (3,1) and (4,5). (8)

- b) Evaluate

$$\int_0^1 \frac{dx}{\sqrt{1+x^3}}$$

by (i) trapezoidal rule and (ii) Simpson's '1/3' rule with $h = 0.1$. (8)

UNIT - V

5. a) Given the differential equation

$$\frac{dy}{dx} = \frac{x^2}{y^2 + 1},$$

with the initial condition $y = 0$ when $x = 0$, use Picard's method to obtain y for $x = 0.25, 0.5$ and 1.0 . (8)

- b) Using Runge - Kutta fourth order method, obtain $y(0.2)$ and $y(0.4)$ from the equation.

$$\frac{dy}{dx} = x + y; y(0) = 1 \quad (8)$$

(OR)

5. a) Using Euler's method, solve numerically the equation $\frac{dy}{dx} = x + \sqrt{y}$, with the initial condition $y(0) = 1$ for $x = 0.4$ using $h = 0.2$. (6)

- b) Using Milne's method find $y(0.8)$ from the differential equation (10)

$$\frac{dy}{dx} - 3x - \frac{1}{2}y = 0,$$

given that $y(0) = 1$ by taking $h = 0.2$.

