3E1200

3E1200
B. Tech. III - Sem. (Main / Back) Exam., February - 2023
Artificial Intelligence & Data Science
Managerial Economics and Financial Accounting
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   Define Managerial Economics.

Q.2   Define National Income.

Q.3   What do you mean by Law of Demand?

Q.4   Define price elasticity of demand.

Q.5   Define Production Function.

Q.6   What is opportunity cost?

Q.7   What do you mean by Monopoly?

Q.8   Define Financial Statement Analysis.

Q.9 What is Pay Back Period?

Q.10 Explain Debtors Turnover Ratio.

PART – B

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

Attempt any five questions

Q.1 Distinguish between deductive and inductive methods in Economics.

Q.2 Discuss the various concepts of national income – Gross National Products, Net National Products, Personal Income and Disposable Income.

Q.3 Explain the various methods of demand forecasting.

Q.4 Distinguish between monopolistic competition and perfect competition.

Q.5 Explain the degrees of price elasticity of demand.

Q.6 The following table gives the total cost schedule of the firm. It is also given that the Average Fixed Cost (AFC) at 4 units of output is ₹ 5.

Quantity (Q)	Total Cost (TC)
1	50
2	65
3	75
4	95
5	130
6	185

Find the Total Variable Cost (TVC) and Total Fixed Cost (TFC) schedules of the firm for the corresponding values of output.

Q.7 Define Balance Sheet. Give two characteristics of balance sheet.

PART – C

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

Attempt any three questions

Q.1 The following is the Balance Sheet of Riddhima Motors -

Balance Sheet as on 31st March, 2022

Liabilities	₹	Assets	₹
Equity Share Capital	2,00,000	Fixed Assets	4,60,000
Preference Share Capital	1,00,000	Investments (Long Term)	15,000
General Reserve	50,000	Stock	50,000
Profit & Loss Account	70,000	Debtors	20,000
Debentures	1,00,000	Cash	15,000
Creditors	30,000		
Bank Overdraft	10,000		
	5,60,000		5,60,000

Calculate the following ratios :

(a) Current Ratio (b) Liquid Ratio/Quick Ratio (c) Debt Equity Ratio (d) Proprietary Ratio

(e) Solvency Ratio

Q.2 Discuss the nature and scope of Managerial Economics.

Q.3 Explain the Law of Variable Proportions. Explain various stages of this law with the help of diagram.

Q.4 How the price and output is determined under perfect competition during short period?

Q.5 A company has to select one of the two alternative projects whose particulars are given below -

	Project A (₹)	Project B (₹)
Initial Investment/Initial Outlay	1,18,720	1,00,670
Net cash inflow at the end of the year :		
1	1,00,000	10,000
2	20,000	10,000
3	10,000	20,000
4	10,000	1,00,000

The company can arrange necessary fund at 10%. Compute Net Present Value (NPV) of each project and comment on the result.

The PV factor of ₹ 1 received at the end of each year at 10% discount rate are as follows -

Year	1	2	3	4
10%	0.909	0.826	0.751	0.683

3E1103

B. Tech. III - Sem. (Back) Exam., February - 2023
HSMC Aeronautical Engineering
3AN1-03 Managerial Economics & Financial Accounting
All branches

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   What do you mean by Economic?

Q.2   Define Law of Supply.

Q.3   Define production function.

Q.4   What you mean by perfect competition?

Q.5   What is capital budgeting?

PART – B

Q.1 Discuss the scope of Managerial Economics.

Q.2 Explain Law of Demand.

Q.3 Explain the relationship between Average Cost (AC) and Marginal Cost (MC).

Q.4 Distinguish between monopoly and perfect competition.

Q.5 Write five merits and demerits of inductive and deductive methods.

Q.6 Explain the significance of ratio analysis.

PART – C

Q.1 Explain the methods of measuring National Income.

Q.2 How the price and output is determined under monopoly during short period?

Q.3 A Ltd. is considering investing in a project requiring a capital outlay of ₹ 1,00,000.

Forecast of annual income after depreciation but before tax is as follows -

Year	1	2	3	4	5
Amount	50,000	50,000	40,000	40,000	20,000

Depreciation may be taken at 20% on original cost and income tax at 50% of net income.

Evaluate the project using pay-back method and Average Rate of Return (ARR).

3E1206

3E1206
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 -

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

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 $f(x) = \begin{Bmatrix} 1 & \text{for } |x| < 1 \\ 0 & \text{for } |x| > 1 \end{Bmatrix}$.

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 -

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

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 $\int\limits_0^1 \frac{dx}{1+x^2}$ 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 $Z\left\{\left(\frac{1}{2}\right)^{|n|}\right\}$.

3E1101

3E1101

B. Tech. III - Sem. (Back) Exam., February - 2023
Aeronautical Engineering
3AN2-01 Advanced Engineering Mathematics-I
AE, AG, AN, CE, CR, 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 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. Use of non-programmable scientific calculator is allowed in this paper   2. NIL

PART – A

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

All questions are compulsory

Q.1 Find the value of $\Delta^3(x^2 - 1)$ if $h = 1$.

Q.2 Write Simpson's one – third rule.

Q.3 Write Adam's predicator – corrector formula.

Q.4 Write the condition for Newton – Raphson method to be convergent.

Q.5 Define function of class A.

Q.6 Find inverse Laplace transform of $\dfrac{pe^{-ap}}{p^2 - w^2}, a > 0$.

Q.7 Define complex Fourier transform.

Q.8 State Convolution Theorem for Fourier transform.

Q.9 Define Z – transform.

Q.10 Find inverse Z – transform of $\frac{z}{z-a}$, $|z| > a$.

PART – B

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

Attempt any five questions

Q.1 Find the value of $\frac{\Delta^2}{E}\sin(x+h) + \frac{\Delta^2\sin(x+h)}{E\sin(x+h)}$.

Q.2 Find first and second derivatives of function $f(x)$ at $x = 7.50$ from given data –

x	7.47	7.48	7.49	7.50	7.51	7.52	7.53
f(x)	0.193	0.195	0.198	0.201	0.203	0.260	0.208

Q.3 Use Euler's modified method find y at $x = 0.1$ by taking $h = 0.05$, given

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

Q.4 Find inverse Laplace transform of $\frac{p^2}{p^4 - 4a^4}$.

Q.5 Solve ordinary differential equation by using Laplace transform $(D^2 + 1) y = t \cos 2t$

Given, $y = 0, \frac{dy}{dt} = 0$ when $t = 0$.

Q.6 Find the Fourier sine and cosine transform of –

$f(t) = \begin{cases} t, & 0 < t < 1 \\ 2 - t, & 1 < t < 2 \\ 0, & t > 2 \end{cases}$

Q.7 Find Z – transform of n^2, $n \geq 0$.

PART – C

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

Attempt any four questions

Q.1 (a) Use Gauss forward interpolation formula to find f(128) from given data.   [7]

x	120	125	130	135	140
f(x)	49225	48316	47236	45926	44306

(b) Find the value of integral $\int_{0.2}^{1.4}(\sin x - \log_e x + e^x)\,dx$ using Simpsons 3/8 rule by dividing range into 6 equal parts.   [8]

Q.2 (a) Find real root of equation $x^3 - 3x - 5 = 0$ corrected upto 4 decimal place using Newton–Raphson method.   [7]

(b) Compute y(1.4), using fourth order Runge–Kutta method with step size h = 0.2 given $\frac{dy}{dt} = \frac{t}{y}$, y(1) = 2.   [8]

Q.3 (a) Evaluate Laplace Transform of function $\sin at - at\cos at + \frac{\sin t}{t}$.   [5]

(b) An infinite long string having one end x = 0 is initially at rest on the x – axis. The end x = 0 undergoes a periodic transverse displacement given by $A_0 \sin \omega t$, t > 0. Find the displacement of any point on the string at any time.   [10]

Q.4 (a) Find the Fourier cosine transform of e^{-t2}.   [7]

(b) Find inverse Fourier sine transform of $\frac{p}{1+p^2}$.   [8]

Q.5 Find inverse Z – transform of $F(z) = \frac{1}{(z-2)(z-3)}$ if region of convergence is –

(a) |z| < 2   [5]

(b) 2 < |z| < 3   [5]

(c) |z| > 3   [5]

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.
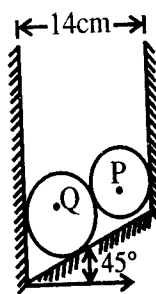

Fig.1

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.
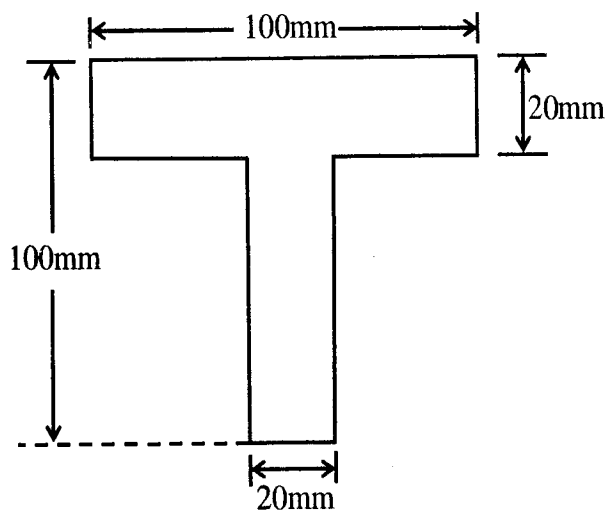

Fig.2

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.
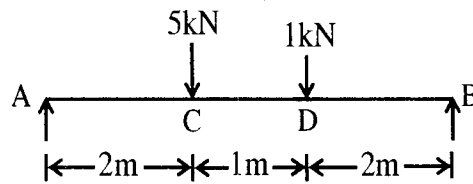

Fig.3

(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.

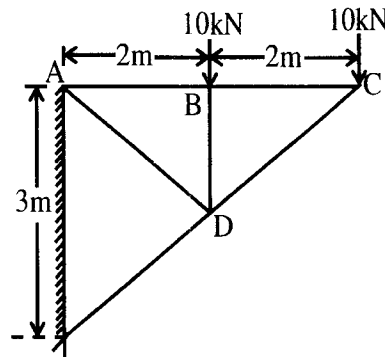

Fig.4

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.

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?

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PART – B

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

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.

3E1214

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 $\Psi=5x-6y$. 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

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 $C_d = 0.64$.

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

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 × 10³ 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

Q.1 Water is drawn from two reservoirs at same water level through pipe 1 & 2 which gain at a common point. D_1 = 0.4m, L_1 = 2000m, f_1 = 0.024, D_2 = 0.35m, L_2 = 1500m, 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.

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

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)

1.   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.