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3E1206

Roll No. _____ [Total No. of Pages : 3

3E1206

B.Tech. III-Sem. (Main/Back) Examination, January - 2025

Automobile Engg.

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 questions 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 the value of $\Delta^n\left(e^x\right)$; if h = 1.

2. Write the trapezoidal rule.

3. Write the formula for Euler's modified method.

4. Find the first approximation to a real root of equation $x^3 - 3x^2 - 2 = 0$ by Regula falsi method between 3 to 4.

5. What are the existence conditions of Laplace transform?

6. Find $L^{-1}\left[\frac{1}{s^2}\right]$

7. Define Fourier sine and cosine transforms.

8. Find the Fourier transform of $f(t)=1, |t|<1$.

9. Find the Z - transform of the sequence $u_n = \{2, -4, 6, -8\}$.

10. Find $Z^{-1}\left[\frac{z}{z-3}\right]$.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Using Lagrange's interpolation formula, find the value of $y=f(x)$ at $x=9.5$ for the following:

x	7	8	9	10
$f(x)$	3	1	1	9

2. Compute the value of $\int_0^6 \frac{dx}{1+x^2}$ by Simpson's "⅓" rule.

3. Using Euler's method, solve the differential equation $\frac{dy}{dx}=x+y$; with initial condition $y(0)=1$ for $x=1$, using $h=0.2$

4. Find Laplace transform of Sin $\sqrt{t}$

5. Find $L^{-1}\left[\frac{4s+5}{(s+2)(s-1)^2}\right]$

6. Find the Fourier Sine and cosine transform of f(x), where $f(x)=\begin{cases}1, & 0<x<a\\ 0, & x>a\end{cases}$

7. Using convolution theorem, evaluate $z^{-1}\left[\frac{z^2}{(z-1)(z-3)}\right]$

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Use Stirling's formula to find y at $x = 12.2$ from the following data:

x:	10	11	12	13	14
y:	23967	28060	31788	35209	38368

2. Calculate y (0.2) using Runge - Kutta fourth order method to solve $\frac{dy}{dx} = x + y^2,\ y(0) = 1,\ h = 0.2$

3. Use Laplace transform to solve $(D^2+25)y=10\cos 5x$, given that $y(0)=2,\ y'(0)=4$.

4. Find the complex fourier transform of $e^{-|x|}$

5. Use Z transform to solve the difference equation. $U_{n+2} + 4U_{n+1} + 3U_n = 3^n$, given that $u_0 = 0, u_1 = 1$.

79

3E1200

Roll No. _____ [Total No. of Pages : 2]

3E1200

B.Tech. III-Sem. (Main/Back) Examination, January - 2025
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 questions 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 Define the term economics.

2. What do you mean by profit and loss statement.

3. Differentiate between monopoly and monopolistic competition.

4. What do you mean by opportunity cost.

5. What does financial accounting mean.

6. Why do economic problems arise.

7. What do you mean by marginal product of an input. How is it calculated.

8. What are the determinants of supply.

9. What does liabilities mean.

10. What does the circular flour model dipicts.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Explain the inductine and deductine methods of economic analysis.
2. Discuss the concept of kinked demand curve under oligopoly.
3. Write short notes on ratio analysis.
4. Explain the concept of demand and elasticity of demand.
5. Discuss the concept of least cost combination of inputs.
6. Discuss various concepts of National Income.
7. Explain the methods of demand forecasting.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Critically examine the methods of evaluating capital budgeting proposals.
2. Discuss the price and output determination under perfect competition.
3. Using suitable diagram, explain the law of variable proportions.
4. Explain with the help of curves, relationship between various cost concepts.
5. What do you mean by balance sheet. Discuss.

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Roll No. _____ [Total No. of Pages : 3

3E1213

3E1213

B.Tech. III-Semester (Main/Back) Examination, January - 2025
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 questions 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 Lami's theorem.
2. What are the conditions for equilibrium of a rigid body?
3. What is a free body diagram?
4. What is the principle of virtual work?
5. Write the formula for the polar moment of inertia.
6. State the perpendicular axis theorem.
7. Define Poisson's ratio.
8. Write the expression for the efficiency of a machine.
9. What is the principle of work and energy?
10. Define stiffness of a spring.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions **(5×4=20)**

1. Calculate the moment of inertia of a rectangular section with base 200 mm and height 400 mm about its base.

2. Determine the reactions at the supports for a simply supported beam of span 5 m carrying a UDL of 2 kN/m.

3. A body of mass 10 kg is moving with a velocity of 5 rn/s. Calculate its kinetic energy.

4. Find the centroid of a **T-section** with flange width 100 mm, flange thickness 20 mm, and web height 80 mm.

5. Derive the relation between elastic constants **E**, **G**, and **K**.

6. A belt drives a pulley with an angle of contact of 120^0. Calculate the maximum tension if $\mu = 0.3$ and $T_2 = 200$ N.

7. Discuss the laws of friction and their applications in mechanical engineering.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions **(3×10=30)**

1. A cantilever beam of length 4 m carries a point load of 2 kN at its free end. Draw the shear force and bending moment diagrams.

2. Derive the expression for the moment of inertia of a circular section about its centroidal axis.

3. A block weighing 500 N is placed on an inclined plane of 30°. Determine the force required to just move it up If $\mu = 0.25$.

4. Explain different types of springs and derive the stiffness formula for springs in series and parallel.

5. A thin cylindrical shell with an internal diameter of 500 mm and thickness 5 mm is subjected to an internal pressure of 1 MPa. Calculate the hoop and longitudinal stresses.

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3E1215

Roll No. _____ [Total No. of Pages : 3

3E1215

B.Tech. III-Sem. (Main/Back) Examination, January- 2025

Civil Engg.

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 questions 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 surveying? Explain its importance in civil engineering.
2. What are the uses of of Theodolite?
3. Define the term "intermediate sight".
4. What do you understand by the term resection and orientation?
5. Describe the different methods of levelling in surveying.
6. Explain the method of Contouring and its applications.
7. What is the function of invar tape?
8. Explain the concept of scale and representative fraction in surveying.
9. What is tacheometer?
10. Explain bearing of a line.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions **(5×4=20)**

1. The distance between two stations was Measured with a 20 metre chain and found to be 1500 metres the same was measured with a 30 metre chain and found to be 1476 metres. If the 20 metre chain was 5 cm too short what was the error in the 30 metre chain.

2. Explain the following terms (a) baseline (b) check line (c) tie line (d) swing offset (e) oblique offset.

3. Find the maximum length of an offset so that the displacement of a point on the paper should not exceed 0.25mm, given that the offset was laid out 3° from its true direction and the scale was 20 m to 1 cm.

4. In a triangulation survey the length of a side is measured to be 200 m. If the angle opposite to this side is 60°, calculate the length of the other two sides.

5. Describe the procedure for conducting a leveling survey.

6. In a closed traverse the following bearings were observed with a compass. Calculate the interior angles.

Line	Fore Bearing
AB	65°00'
BC	125°30'
CD	200°00'
DE	265°15'
EA	330°00'

7. What are different sources of errors in levelling? How are they eliminated?

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions **(3×10=30)**

1. Draw a contour map of a given area and explain its interpretation.

2. (a) Differentiate between permanent and temporary adjustment of level.
   (b) Explain the effects of curvature and refraction in levelling. Find the correction due to each and the combined correction. why are these effects ignored in ordinary levelling?

3. Discuss with sketches, the various methods of orienting the plain table. Also define three-point problem and show how it may be solved by tracing paper method.

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 its application.

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87

3E1214

Roll No. _____ [Total No. of Pages : 3

3E1214

B.Tech. III-Sem. (Main/Back) Examination, January- 2025

Civil Engg.

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 questions 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 Newton's Law of viscosity.
2. Define Compressibility of a fluid.
3. State Pascal's law
4. What is meta centric height
5. What is centre of pressure
6. Define flow net
7. Define "Free and Forced Vortex flow".
8. Write the Bernoulli's equation applied b/w two section.
9. Compare hydraulic gradient line with total energy line.
10. Write the Darcy -Weisbach formula.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. The space between two parallel horizontal plates is kept 5 mm apart. This is filled with crude oil of dynamic viscosity 2.5 kg-s/m^2. If the lower plate is stationary and the upper plate is pulled with velocity of 1.75 m/s, determine the shear stress on the lower plate. **(4)**

2. Explain about different types of manometers in detail. **(4)**

3. A circular plate of 3.0m diameter is immersed in water in such a way that its greatest and least depth below the free surface are 4m and 1.5m respectively. Determine the total pressure on one face of the plate and position of centre of pressure. **(4)**

4. For a two-dimensional flow $\Phi = 3xy$ and $\Psi = (y^2 - x^2)$ 3/2. Determine the velocity components at the points (1,3) and (3,3). Also find the discharge passing between the streamlines passing through the points given above. **(4)**

5. A Venturimeter having a diameter of 75mm at the throat and 150 mm diameter at the enlarged end is installed in a horizontal pipeline 150mm in diameter carrying an oil of specific gravity 0.9. The difference of pressure head between the enlarged end and the throat recorded by U-tube is 175mm of mercury. Determine the discharge through pipe. Assume the coefficient of discharge of the meter as 0.97. **(4)**

6. Describe an orifice meter and find an expression for measuring discharge through a pipe with this device. **(4)**

7. A pipe line, 16 km long, supplies, 40 million liters of water per day to city. The first 5 km length of the pipe is of 1 m diameter and the remaining part is 0.8 m diameter pipe. If the water to the city is to be supplied at a residual head of 15 m of water, calculate the supply head at the inlet end. Neglect minor losses and assume $f = 0.03$ for the entire pipe line. Sketch the hydraulic gradient for the pipe line. **(4)**

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. Through a very narrow gap of height h, a thin plate of large extent is pulled at a velocity V. On one side of the plate is oil of viscosity μ_1 and on the other side of oil of viscosity μ_2. Calculate the position of the plate so that

   a) The shear force on the two sides of the plate is equal;

   b) The pull required to drag the plate is minimum. **(10)**

2. A cone having maximum radius 'R' and height 'H' and density' ρ_s is floating with its apex down in a fluid of density 'ρ'Determine the condition of its stability. **(10)**

3. Derive 3D continuity equation in differential form. **(10)**

4. State Bernoulli's theorem for steady flow of a incompressible third. Derive an expression for Bernoulli's equation from first principle and state the assumption made for such a derivation. **(10)**

5. Derive expression for shear stress for flow between two infinite length parallel plates. **(10)**

217842

90

3E1211

Roll No. _____ [Total No. of Pages : 3

3E1211

B.Tech. III-Sem. (Main / Back) Examination, January - 2025

Civil Engg.

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 questions 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 are the qualities of good building stones?

2. What is the difference between first class and second class Bricks?

3. Define medium-density fiberboard and high density fiberboard.

4. Compare stone and brick masonry.

5. What is the difference between load bearing construction and framed structure?

6. Define a lintel in construction and discuss its primary purpose.

7. What do you understand by scaffolding?

8. What are the requirements of good stair case?

9. Mention the types and uses of lime.

10. Draw the cross section of wall of a building showing all components.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. What is fly ash, bottom ash and pond ash ? How is fly ash harmful?

2. What are the essential structural components of a building ? Discuss the functional requirements of the superstructure to perform their primary objectives satisfactorily.

3. Draw a typical cross-section of a stair. Label and explain the parts in detail. Also write the requirements of a good staircase.

4. State the purpose of using arches in buildings with neat sketches explain its classification on the basis of shape.

5. What are the primary requirements for grouting joints in precast reinforced concrete structure? What are the key factors considered in selecting grouting materials for these structures?

6. What are the basic principles of sound masonry work, and how do they contribute to the durability of brick and stone structures? Also, outline the classification of stone masonry based on different criteria.

7. Prepare a schematic diagram of a raft foundation and give its suitability.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. What are the different types of bonds used in brick masonry, and how do they affect the structural integrity and aesthetics of the Construction? Also, discuss the relative merits and demerits of these bounds.

92

2. Write detailed note on classification of roofs what do you understand with ribbed slab for floors and roofs?

3. What is pointing? How it is carried out? What are its different types?

4. What are the different types of partition wall? Also, discuss its purpose and uses.

5. Write detailed note on: (a) Seasoning of timber. (b) Mildsteel and HYSD steel

   (c) Plaster of paris (d) DPC

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93

3E1212

Roll No. _____ [Total No. of Pages : 3

3E1212

B.Tech. III-Sem. (Main & Back) Examination, January- 2025

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 questions 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 Explain Erosion on by the wind in view of deflation.

2. Describe lustre and cleavage in minerals.

3. Differentiate between breccia and conglomerate.

4. Explain schistosity in metamorphic rocks.

5. Write various parts of fold with appropriate diagram.

6. Describe angular unconformity using diagram.

7. Explain normal fault, reverse fault and thrust fault.

8. What are gravity dams, explain salient features of gravity dam.

9. Enumerate rock bolting and grouting.

10. Describe passive and active remote sensing.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Describe geological work of rivers in various stages. **(4)**

2. Explain diagrammatically. The internal structure of the Earth. **(4)**

3. Describe Texture of igneous rocks. **(4)**

4. Write notes on the following.
   a) Structure of metamorphic rocks. **(2)**

   b) Clastic sedimentary rocks. **(2)**

5. Write explanatory note on classification of faults. **(2+2=4)**

6. Describe Electromagnetic spectrum and its interaction with earth surface. **(4)**

7. Discuss seismic method for subsurface analysis. **(4)**

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. Describe Geological time scale in detail.

2. Describe classification of folds using appropriate diagrams.

3. Discuss classification of igneous rocks with special reference to role of feldspar.

4. Describe geological consideration for site selection of the dam.

5. Enumerate application of remote sensing in civil engineering.

96

3E1131

Roll No. _____ [Total No. of Pages : 2

3E1131

B.Tech. III-Sem. (Back) Examination, January - 2025
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 questions 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 Resultant force?
2. Define Virtual Work.
3. Define friction.
4. What is Angle of repose?
5. Define stresses.

PART - B

(Analytical / Problem Solving Questions)

Attempt any Four questions. **(4×10=40)**

1. Explain free body diagram with example.
2. State and prove Lami's theorem.
3. State laws of friction.
4. Explain Parallel axis and Perpendicular axis theorems.
5. Explain generalized Hooke's law.
6. Classify different system of forces with suitable examples.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Two questions. **(2×15=30)**

1. A body, resting on a rough horizontal plane, required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction.
2. Prove the parallel axis theorem in the determination of moment of inertia of areas with the help of a neat sketch.
3. Explain the procedure to find forces in members of truss by using method of sections.

3E1132

Roll No. _____ [Total No. of Pages : 2

3E1132

B.Tech. III-Sem. (Back) Examination, January - 2025
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 questions 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. Define ranging in surveying. What are the two types of ranging?
2. Differentiate between true bearing and magnetic bearing.
3. Define levelling and its purpose in surveying.
4. State the major sources of errors in levelling.
5. Define a simple curve and a compound curve.
6. What is tangent correction in curve surveying?
7. What are the advantages of tacheometric surveying?
8. What is tilt displacement in aerial photography?
9. What are the common instruments used for setting out buildings?
10. What is a Distomat?

PART - B
(Analytical / Problem Solving Questions)

Attempt any Five questions. **(5×8=40)**

1. Convert the following whole circle bearing to quadrantal bearings:
   i) $22^{\circ}30'$
   ii) $170^{\circ}12'$
   iii) $211^{\circ}54'$
   iv) $327^{\circ}24'$

2. Describe the method of measuring linear distances with a chain or tape.
3. Explain the method of horizontal angle measurement using a theodolite.
4. What are the characteristics and uses of contour lines?
5. Explain the elements of a simple circular curve with the help of neat diagram.
6. Discuss the basic concepts of perspective geometry in aerial photogrammetry.
7. Explain the principle of Electronic Distance Measurement (E.D.M.) and types of E.D.M.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Four questions. **(4×15=60)**

1. The following bearings were observed with a compass. Calculate the interior angles.

Line	Fore Bearing
AB	$60^{o}30'$
BC	122^{o}
CD	46^{o}
DE	$205^{o}30'$
EA	$300^{o}0'$

2. The following staff readings were observed successively with a level the instrument is moved by third sixth and eighth readings.

   2.228 :1.606 :0.988 :2.090 :2.864 :1.262 :0.602 :1.982 :1.044 :2.684 m enter the reading in record book and calculate R.L. if the first reading was taken at a B.M. of 432.383m.
3. Explain the procedure for setting out vertical curves with the help of neat diagram.
4. Explain the process of determination of techeometric constants and the formulae used for inclined sights in tacheometry.
5. Describe the parts of a total station with the help of neat diagram also discuss the advantages of using Total Stations over conventional methods.