

Enrollment No.

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B.Tech (CE)

II YEAR, III SEMESTER EXAMINATION

MATHEMATICS – III (TRANSFORM & DISCRETE MATHEMATICS)

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE: - ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.

QUESTION NO.-1: ATTEMPT ANY **FOUR** PARTS.

(4×3=12)

a)	Find the Laplace transform of $(e^{-t}\sin t)/t$.
b)	Find the Fourier transform of $F(x) = e^{-a x }$, $a > 0$.
c)	Let $A = \{1, 2, \{3, 4\}, 5\}$. Which of the following statements are incorrect and why? 1. $\{3, 4\} \in A$ 2. $\{1, 2, 5\} \subset A$ 3. $\{1, 2, 3\} \subset A$
d)	Let $f: R \rightarrow R$ such that $f(x) = 2x + 3$ for all x of R . Show that f is one-one and onto.
e)	Define ring, integral domain and field.
f)	In a party of 25 people, each shakes hand with others. How many handshakes took place in the party?

QUESTION NO.-2: ATTEMPT ANY **THREE** PARTS.

(3×4=12)

a)	Find the inverse Laplace transform of $1/(p-a)(p-b)$.
b)	Define relation, identity relation, universal relation and inverse relation on a set.
c)	Prove that the fourth roots of unity $1, -1, i, -i$ form an abelian multiplicative group.
d)	Show that $P \leftrightarrow Q$ and $(P \rightarrow Q) \wedge (Q \rightarrow P)$ are equivalent.

QUESTION NO.-3: ATTEMPT ANY **THREE** PARTS.

(3×6=18)

a)	Use convolution theorem to evaluate: $L^{-1}\{p^2/(p^2+a^2)(p^2+b^2)\}$.
b)	Find the Fourier cosine transform of $F(x) = e^{-2x} + 4e^{-3x}$.
c)	In any lattice $(L, \leq)$, show that: 1. (a) $a \vee a = a$ (b) $a \wedge a = a$ 2. (a) $a \vee b = b \vee a$ (b) $a \wedge b = b \wedge a$
d)	Define Recurrence relation, order and degree of recurrence relation. Solve the recurrence relation $a_r - 6a_{r-1} + 8a_{r-2} = 0$.

QUESTION NO.-4: ATTEMPT ANY **TWO** PARTS.

(2×7=14)

a)	Using Laplace transform, solve the differential equation- $y'' + 4y' + 4y = 6e^{-t}$; $y(0) = -2$ and $y'(0) = 8$.
b)	Find Fourier sine transform of e^{-ax}/x , $a > 0$. Hence find Fourier sine transform of $1/x$.
c)	Prove that the intersection of two equivalence relations on a set is an equivalence relation on the set.

QUESTION NO.-5: ATTEMPT ANY **TWO** PARTS.

(2×7=14)

a)	Let $f: A \rightarrow B$ and $g: B \rightarrow A$ such that $gof = I_A$. Show that f is one-one and g is onto.
b)	Show that the set $R = \{0, 1, 2, 3, 4, 5\}$ is a commutative ring with respect to $+_6$ and $\times_6$ as the two ring compositions.
c)	Show that a tree with n vertices has $n-1$ edges.

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B.Tech (CE)

**II YEAR, III SEMESTER EXAMINATION
ENGINEERING MECHANICS**

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.**Q1.ATTEMPT ANY FOUR OF THE FOLLOWING (3.5X4=14)**

1. Write a short note on Microscopic Thermodynamics.
2. Define the terms Factor of Safety and Poisson's ratio?
3. Explain various types of supports and support reaction in beam.
4. Discuss the second and third Law of Thermodynamics.
5. Define Lateral strain and longitudinal strain with example.

Q2.ATTEMPT ANY TWO OF THE FOLLOWING (7X2=14)

1. Define stress and strain and explain their types.
2. A bar is subjected to a tensile force of 30 kN and the diameter of bar is 20mm, The extension observed is 0.44mm. Find the Young's modulus of bar,
3. A steel bar 300 mm long, 50 mm wide and 40 mm thick is subjected to a pull of 300 kN in the direction of its length. Determine the change in volume Take $E=2 \times 10^5 \text{ N/mm}^2$ and $\mu=0.25$.

Q3.ATTEMPT ANY TWO OF THE FOLLOWING (7X2=14)

1. What is bending moment & bending moment Diagram? Explain with example.
2. What is energy? Explain various type of Energy.
3. Determine the changes in length, breadth and thickness of a steel bar which is 4 m long, 30 mm wide and 20 mm thick and is subjected to axial pull of 30 kN in the direction of its length. Take $E=2 \times 10^5 \text{ N/mm}^2$ and $\mu=0.3$

Q4.ATTEMPT ANY TWO OF THE FOLLOWING (7X2=14)

1. A point load of 'W' kN is acting on free end and UDL of 'W' kN/m on entire length of a cantilever beam of length 'L'. Draw BMD and SFD.
2. A bar of 30mm diameter is subjected to a pull of 60 kN. The measured extension on gauge length of 200 mm is 0.1mm and change in diameter is 0.004 mm, calculate: (i) Young's modulus (ii) Poisson's Ratio and (iii) bulk modulus.
3. On a simply supported beam of length 10m an UDL of 2kN/m is applied on the entire length of the beam. A point load of 8kN is also acting at the mid of the beam. Draw SFD & BMD for beam.

Q5.ATTEMPT ANY TWO OF THE FOLLOWING (7X2=14)

1. Define (i) Poisson's ratio and (ii) Volumetric strain.
2. A metallic rod of 1 cm diameter, when tested under an axial pull of 10 kN was found to reduce its diameter by 0.0003 cm. The modulus of rigidity for the rod is 51 kN/mm^2 . Find the Poisson's ratio, modulus of elasticity and Bulk Modulus.
3. Draw the Stress – Strain diagram for ductile material mild steel under tension and discuss all the salient points.

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B.Tech (CE)

II YEAR, III SEMESTER EXAMINATION

COMPUTER AIDED CIVIL ENGINEERING DRAWING

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.

QUESTION NO.-1: ATTEMPT ANY FOUR PARTS.

(4*3=12)

a)	Discuss the importance of symbols in civil engineering drawing.
b)	Explain the Header Bond with neat sketch
c)	Explain the following terms : (1) Eye Level (2) Station Point (3) Plan
d)	Discuss the difference in between sill & ceiling.
e)	Draw any three plumbing fitting symbols with neat sketches in detail.
f)	Discuss the importance of Auto cad & Engineering drawing in civil engineering.

QUESTION NO.-2: ATTEMPT ANY THREE PARTS.

(3*4=12)

a)	Explain the Stretcher Bond with neat sketch.
b)	Draw any four welding symbols with neat sketches in detail.
c)	Explain the following terms : (1) King closer (2) Header (3) Section (4) Queen closer
d)	Draw any four Electrical fitting symbols with neat sketches in detail.

QUESTION NO.-3: ATTEMPT ANY THREE PARTS.

(3*6=18)

a)	Discuss any six Building material symbols with neat sketches in detail.
b)	Describe the various types of bond connections with neat sketch in detail.
c)	Discuss the two point Perspective & Three point Perspective detail.
d)	What do you understand by bond? Explain the types of bonds used in brick masonry.

QUESTION NO.-4: ATTEMPT ANY TWO PARTS.

(2*7=14)

a)	Differentiate in between English & flemish Bond with neat sketch
b)	Draw one point perspective of the given block whose one face touches the picture plane. Station point is 70mm from any P.P. and eye level is 70 above G.L.
c)	Write any Seven commands used in AutoCAD with their symbol, notation, & use.

QUESTION NO.-5: ATTEMPT ANY ONE PARTS.

(1*14=14)

a)	Draw a double line plan of any residential building with their specifications.
b)	Discuss the classification/types of foundation in detail. Also draw the detailed neat sketch of spread footing.

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B.Tech (CE)

**II YEAR, III SEMESTER EXAMINATION
INTRODUCTION TO CIVIL ENGINEERING**

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.**QUESTION NO.-1 : ATTEMPT ANY FOUR PARTS.**

(4*3=12)

a)	Explain water retaining structures with example.
b)	Convert the following into reduce bearing. (i) $22^{\circ}50'$ (ii) $130^{\circ}12'$ (iii) $290^{\circ}24'$
c)	What is mortar? Explain its various functions
d)	Convert the following into WCB (1) $N 15^{\circ}20'E$ (2) $S56^{\circ}20'E$ (3) $N45^{\circ}30'W$
e)	Explain back bearing, fore bearing and datum, RB and WCB?
f)	What is substructure and superstructure?

QUESTION NO.-2: ATTEMPT ANY THREE PARTS.

(3*4=12)

a)	What is bridge? What are the types of bridges?
b)	What is the importance of building materials in construction?
c)	What are the defects of brick?
d)	Explain three phases of soil?

QUESTION NO.-3: ATTEMPT ANY THREE PARTS.

(3*6=18)

a)	What do you understand by tall buildings and what are the types of tall buildings.
b)	What is brick? List the various types of brick and their use
c)	Define principle of surveying?
d)	What are the modes of transportation?

QUESTION NO.-4: ATTEMPT ANY TWO PARTS.

(2*7=14)

a)	What is stone? What are the characteristics of good stones?
b)	What are the constituents of cements? Explain their functions and limits?
c)	Classify surveying on the basis of instruments used and name all equipment's necessary for the field work involving any one of them.

QUESTION NO.-5: ATTEMPT ANY TWO PARTS.

(2*7=14)

a)	Plot the stress strain diagram of mild steel curve.
b)	What is soil? What are the types of soil?
c)	What is surveying? Explain the importance of surveying in civil engineering.

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B.TECH (CE)
II YEAR, III SEMESTER EXAMINATION
ENERGY SCIENCE & ENGINEERING

[Time : 03:00 Hours]

[Max. Marks : 70]

NOTE:- ATTEMPT ALL THE QUESTIONS AS PER GIVEN INSTRUCTIONS.

Q1. Attempt any Four question

(3.5x4=14)

- Discuss the uses of natural gas.
- What is the economics of energy?
- Write a short note on Paris agreement COP21.
- Write a short note on applications of Hydrogen as an energy source in India.
- Discuss benefits of energy conservation.

Q2. Attempt any Two question

(7x2=14)

- Write a detailed note on types of Energy Sources.
- Define the following terms: (a) Carbon Tax (b) Carbon Pricing (c) Montreal Protocol
- Write a short note on (i) Energy Conservation (ii) Energy Efficiency

Q3. Attempt any Two question

(7x2=14)

- Explain Carbon Footprint. How does it indicate sustainability of any process?
- Write short note on economics of energy.
- As per economics of energy, energy is essential goods. Give Comments.

Q4. Attempt any Two question

(7x2=14)

- Differentiate between convention and non conventional energy recourses.
- Discuss clean energy technology and its importance.
- What is nuclear energy discuss the process of generation.

Q5. Attempt any Two question

(7x2=14)

- What do you mean by LEED ratings? Explain in detail.
- Write a short note on: a. Tidal Energy b. Wind Energy
- What is green building? Discuss its principal and benefits.
