Seat No.

OCT-NOV 2025 WINTER EXAMINATION

12609 Bachelor of Technology (NEP-2.1)

Sub. Name: Engineering Mechanics

Sub. Code: 114855

Day and Date: Saturday ,31-01-2026 **Total Marks: 60**

Time: 10:30 AM To 12:30 PM

Instructions: **1. Assume suitable data wherever necessary and mention it boldly**
2. Figures to the right indicate full marks

Special Inst.: **Question No. 1 is Compulsory**
Candidate has to attempt Any Three Questions from Question No. 2 to 5

Q1) Choose the correct alternative and rewrite the sentence **[6]**

i. Free Body Diagram shows
- A. Active forces only
- B. Reactive forces only
- C. Dimensions of the body
- D. Both Active and Reactive forces.

ii. A beam fixed at one end and free at the other is called:
- A. Simply supported beam
- B. Cantilever beam
- C. Continuous beam
- D. Overhanging beam

iii. Larger the radius of gyration, the __ the moment of inertia.
- A. Smaller
- B. Zero
- C. Greater
- D. Independent

iv. When a body is projected vertically upward, its velocity at the highest point is:
- A. Maximum
- B. Zero
- C. Equal to g
- D. Infinite

v. D'Alembert's principle converts a dynamic problem into a:
- A. Kinematic problem
- B. Static problem
- C. Energy problem
- D. Graphical problem

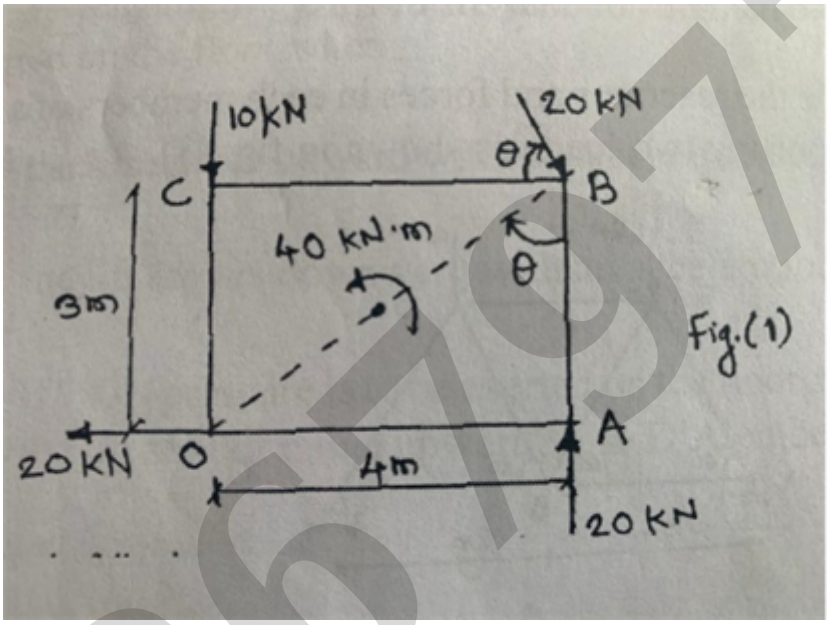
vi. Poisson's ratio is the ratio of:

A. Linear strain to lateral strain
B. Lateral strain to linear strain
C. Stress to strain
D. Volumetric strain to linear strain

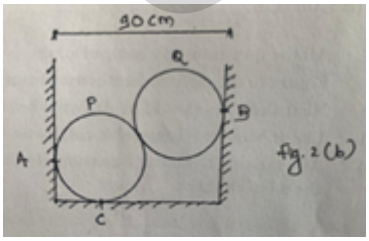
Q2) Answer the following questions **[18]**

a. State and explain Varignon's theorem **[6]**

b. For the Force system acting on body OABC as shown in Fig. 1 Calculate magnitude of resultant Force? **[6]**



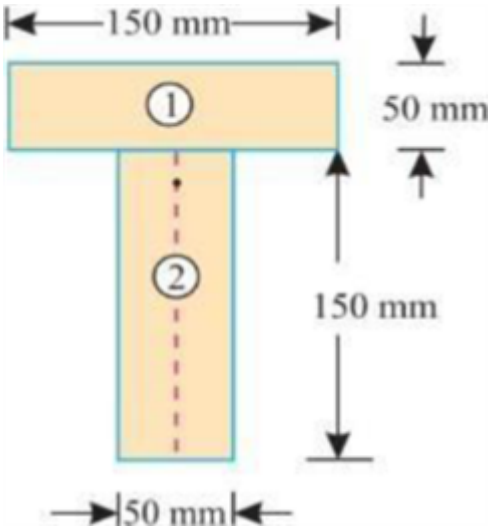
c. Two smooth spheres P and Q each of radius 25cm and weighing 500N, rest in a horizontal channel having vertical walls in fig. 2(b). If the distance between the walls is 90cm, calculate the reaction at point B? **[6]**



Q3) Answer the following questions **[18]**

a. State and explain parallel axis theorem **[6]**

b. Find the Moment of inertia of T section shown on figure along centroidal horizontal axis **[6]**

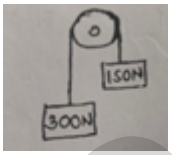


c. A body starts from rest with a constant acceleration of 0.5 m/s2. After what time its velocity be 2.5 m/s and how much distance it will travel during this time. **[6]**

Q4) **[18]**

a. State the three elastic constants and write the relation between them. **[6]**

b. Two ends of a weightless and inextensible string are attached with weight of 300N and 150N respectively as shown in figure. The string is hung over an frictionless and weightless pulley. Find tension in the string? **[6]**



c. A steel bar 300mm long 50mm wide & 40mm thick is subjected to a pull of 300KN in the direction of its length. Determine the change in volume E=2x105 N/mm2 and poisons ratio=0.25? **[6]**

Q5) Answer the following questions **[18]**

a. Define the term virtual work and explain Principle of virtual work **[6]**

b. Define with neat sketch velocity of projectile, Angle of projectile, Horizontal Range, Trajectory, Time of Flight **[6]**

c. Draw and explain Stress Strain curve for ductile material **[6]**

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.

सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (12609) Bachelor of Technology (NEP-2.1) (114855) Engineering Mechanics Part 1 SEM 1