

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:
- Linear strain to lateral strain
 - Lateral strain to linear strain
 - Stress to strain
 - Volumetric strain to linear strain

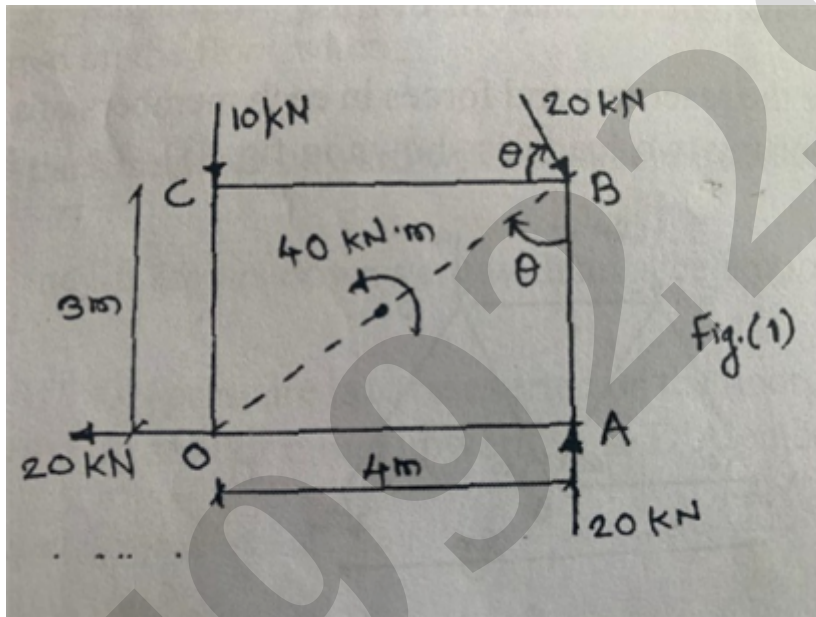
Q2) Answer the following questions

[18]

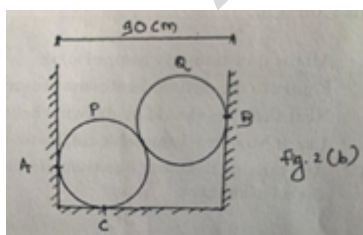
a. State and explain Varignon's theorem

[6]

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



c. Two smooth spheres P and Q each of radius 25cm and weighing 500N, [6]
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?



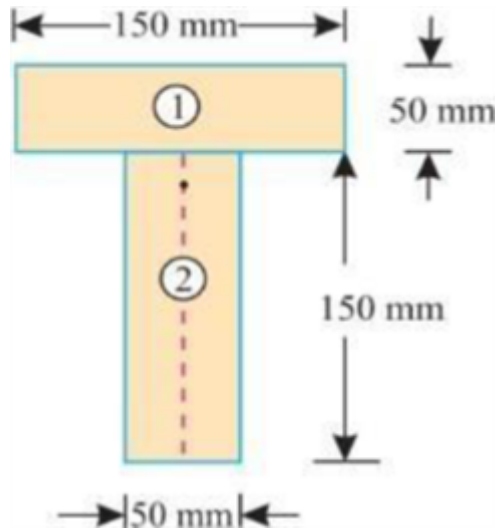
Q3) Answer the following questions

[18]

a. State and explain parallel axis theorem

[6]

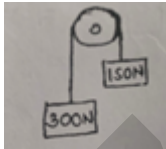
b. Find the Moment of inertia of T section shown on figure along centroidal [6]
horizontal axis



- c. A body starts from rest with a constant acceleration of 0.5 m/s^2 . 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 300 N and 150 N 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 300 mm long 50 mm wide & 40 mm thick is subjected to a pull of 300 kN in the direction of its length. Determine the change in volume $E=2 \times 10^5 \text{ N/mm}^2$ and Poisson's 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.

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