

CBCS SCHEME

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21CIV14/24

First/Second Semester B.E./B.Tech. Degree Examination, June/July 2025 Elements of Civil Engineering and Mechanics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly explain the scope of following fields of civil engineering.
i) Earthquake engineering ii) Transportation engineering. (10 Marks)
- b. Write the requirements of good building stones. Explain the factors causing deterioration of stone work. (10 Marks)

OR

- 2 a. Explain the role of civil engineers in the development of country. (10 Marks)
- b. Explain briefly the field test conducted on bricks. (10 Marks)

Module-2

- 3 a. List and explain concepts of idealization in engineering mechanics and explain the characteristics of force. (10 Marks)
- b. Explain: i) Angle of friction ii) Cone of friction. (04 Marks)
- c. Find the moment of force 300 N about A and B as shown in Fig.Q3(c).

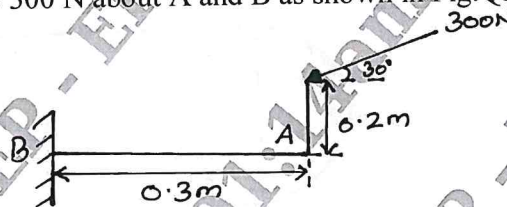


Fig.Q3(c)

(06 Marks)

OR

- 4 a. State and prove Parallelogram law of forces. (05 Marks)
- b. Determine the resultant force acting on the structure at point O both in magnitude and direction in Fig.Q4(b).

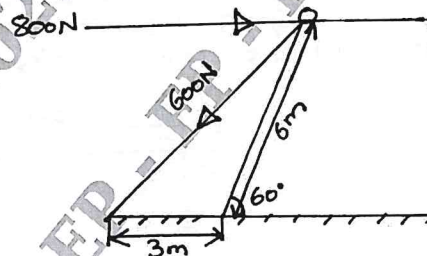


Fig.Q4(b)

(10 Marks)

- c. A block shown in Fig.Q4(c) is just moved by a force of 200N. The Weight of the block is 60N. Determine the co-efficient of static friction between the block and the floor. (05 Marks)

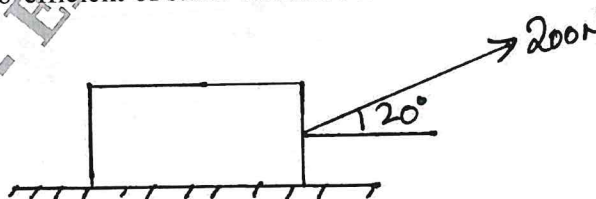


Fig.Q4(c)

Module-3

- 5 a. Derive an expression for centroid of a right angled triangle from top from first principles. (10 Marks)
 b. Find the moment of inertia along the horizontal axis and vertical axis passing through the centroid of section shown in Fig.Q5(b).

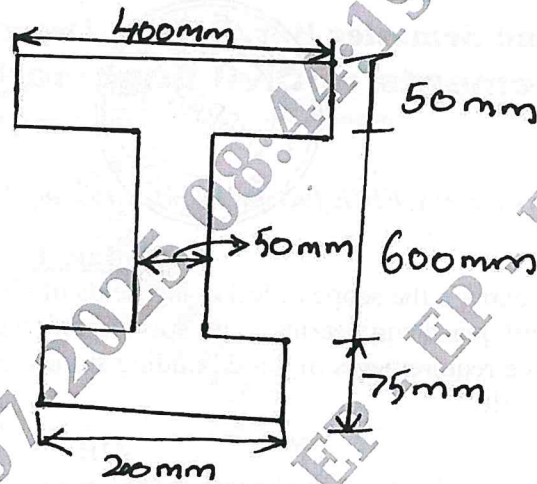


Fig.Q5(b)

(10 Marks)

OR

- 6 a. State and prove parallel axis theorem.
 b. Calculate the centroid for Fig.Q6(b).

(08 Marks)

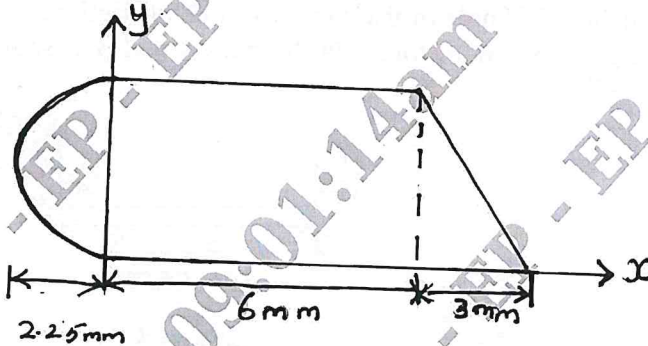


Fig.Q6(b)

(12 Marks)

Module-4

- 7 a. Explain different types of support system for beams with neat sketch. (08 Marks)
 b. Determine the internal forces in each of the members for the truss shown in Fig.Q7(b).

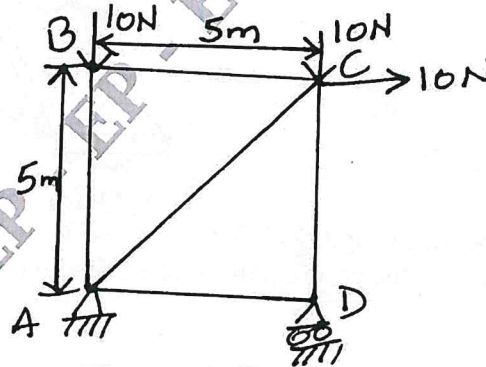


Fig.Q7(b)

(12 Marks)

OR

- 8 a. Determine the support reaction at A and E for the beam shown in Fig.Q8(a).

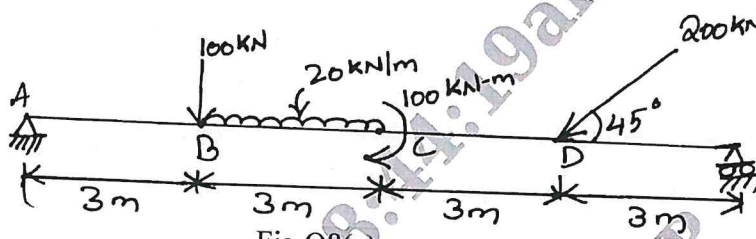


Fig.Q8(a)

(12 Marks)

- b. Explain the procedure for solving a truss by method of joints.

(08 Marks)

Module-5

- 9 a. State and explain D'Alembert's principle of forces. (08 Marks)
 b. A police officer observes a car approaching at the unlawful speed of 60 kmph. He gets on his motorcycle and starts chasing the car, just as it passes in front of him. After accelerating for 10 sec at a constant rate, the officer reaches his top speed of 75 kmph. How long does it take the officer to overtake the car from the time he started? (12 Marks)

OR

- 10 a. Explain :
 i) Displacement
 ii) Average velocity
 iii) Instantaneous velocity
 iv) Speed
 v) Acceleration.
 b. A stone is dropped from the top of the tower 50 m high. At the same time another stone is thrown up from the foot of the tower with a velocity of 25 m/s. At what distance from the top and after how much time the 2 stones cross each other. (10 Marks)

(10 Marks)
