



CBCS SCHEME

18CIV14/24

First/Second Semester B.E. /B.Tech.Degree Examination, Dec.2025/Jan.2026 Elements of Civil Engineering and Mechanics

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume any missing data.

Module-1

- 1 a. Briefly explain the scope of any four different fields of Civil Engineering. (12 Marks)
- b. Define force and list out the characteristics of force. (04 Marks)
- c. Differentiate between the Rigid body and Deformable body. (04 Marks)

OR

- 2 a. Explain the role played by Civil Engineers in the infrastructure. (06 Marks)
- b. State and prove parallelogram law of forces. (08 Marks)
- c. Enumerate briefly the principle of physical transmissibility of forces. (06 Marks)

Module-2

- 3 a. State and prove Lami's Theorem. (06 Marks)
- b. Two identical rollers each of weighing 400 N are placed in trench as shown in fig.Q. 3.(b). Assuming that all contact surfaces are smooth, determine the reactions at contact point A,B,C & D.

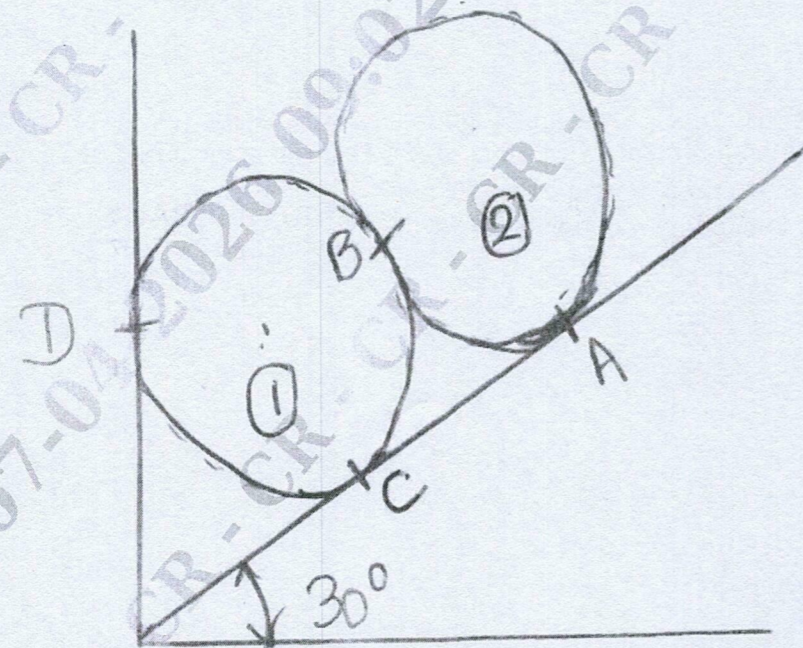


Fig. Q. 3 (b)

(08 Marks)

- c. Define Friction and state the Laws of Friction. (06 Marks)

(06 Marks)

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OR

- 4 a. Define Angle of Friction and Angle of Repose. (04 Marks)
- b. Determine the Angle θ and compute the forces in the system of strings ABCD which is in equilibrium as shown in below figure Q. 4 (b).

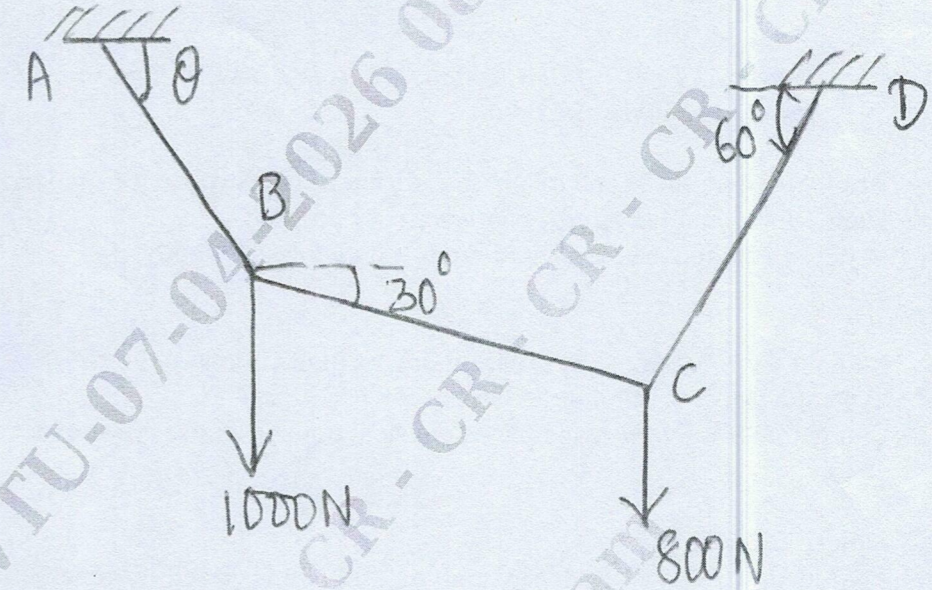


Fig. Q. 4(b)

(08 Marks)

- c. A small block of weight 1000 N as shown in fig. Q.4 (c) is placed on a 30° inclined plane with co-efficient of friction = 0.25. Determine the horizontal force to be applied for :
 - i) Impending motion down the plane
 - ii) Impending motion up the plane.

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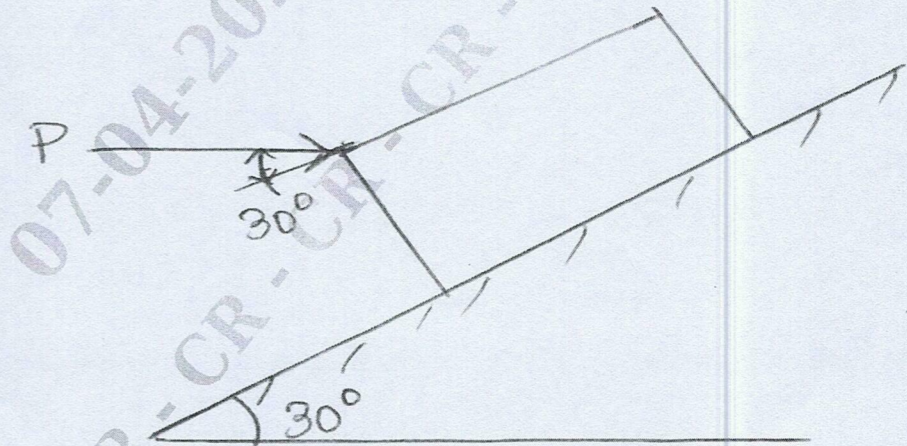


Fig. Q.4 (c)

(08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Explain different types of beams and supports with neat sketches. (08 Marks)
 b. Find the forces acting in all members of the truss shown in fig. Q. 5(b). (12 Marks)

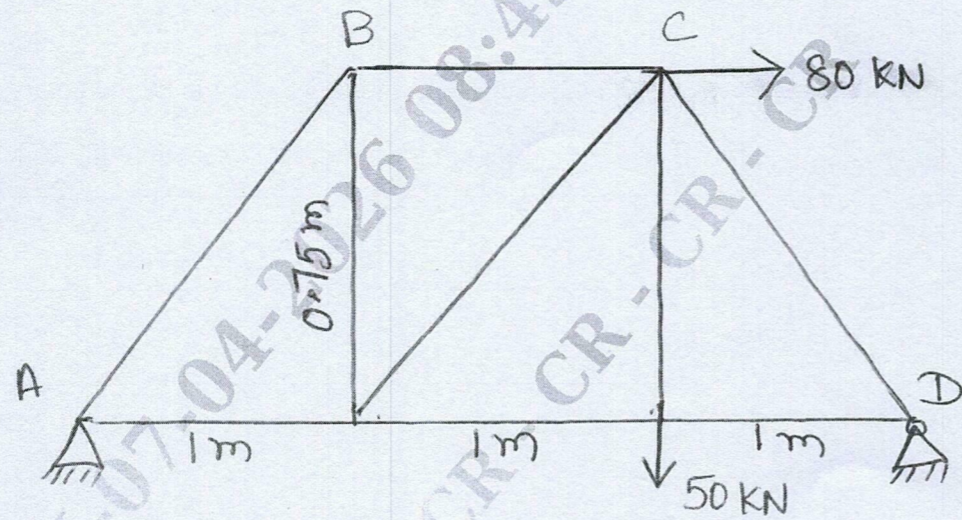


Fig. Q.5 (b) (12 Marks)

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- 6 a. Differentiate between perfect, deficit and redundant trusses. (06 Marks)
 b. A simply supported beam of span 12 m is subjected to loading as shown in fig. Q. 6 (b). Determine the reactions at A and E. (14 Marks)

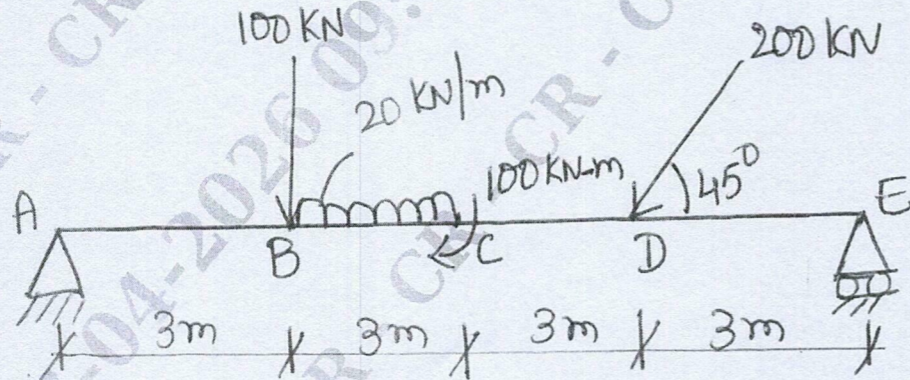


Fig. Q6 (b) (14 Marks)

Module-4

- 7 a. Define Centre of gravity, Centroid and Axis of reference. (08 Marks)
 b. State and prove perpendicular and parallel axis theorem. (12 Marks)

OR

- 8 a. Derive an expression to locate the centroid of a rectangle by method of integration. (06 Marks)
 b. Determine the moment of Inertia of unsymmetrical I section with respect to centroidal axes. (14 Marks)

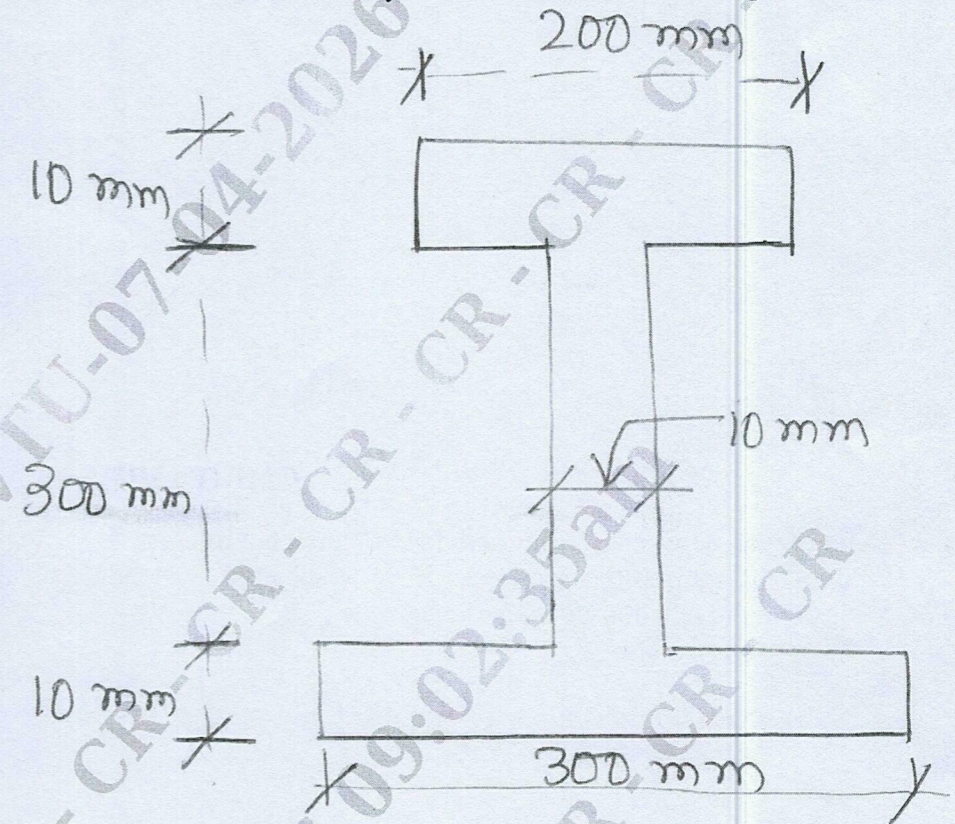


Fig. Q. 8 (b) (14 Marks)

Module-5

- 9 a. Define Displacement, Average velocity speed, Acceleration, Average acceleration and Variable acceleration. (06 Marks)
 b. A motorist starts with initial velocity takes 10 S to cover a distance of 20 m and 15 S to cover a distance of 40 m. Find the uniform acceleration of car and the velocity at the end of 15 S. (14 Marks)

OR

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- 10 a. Define Curvilinear motion, Super Elevation, Projectile motion and Relative motion. (08 Marks)
 b. A stone is released from top of a tower 'h' meter in height, it covers a vertical distance of h/5 meter during its last second of descend. Find the height of tower. (12 Marks)