

CBCS Scheme

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15CIV13

First Semester B.E. Degree Examination, Dec.2015/Jan.2016

Elements of Civil Engineering & Engineering Mechanics

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Briefly explain the scope of any four fields of civil engineering. (08 Marks)
b. Draw typical cross section of road and explain its components. (08 Marks)

OR

- 2 a. Write short notes on: i) Shoulders ii) Kerbs iii) Traffic separators. (06 Marks)
b. Resolve 300 N force acting on a block as shown in Fig. Q2 (b):
i) Into horizontal and vertical components.
ii) Along the inclined plane and right angles to the plane. (10 Marks)

Module-2

- 3 a. State and prove Lami's theorem. (06 Marks)
b. Determine the resultant of forces which are acting as shown in the Fig. Q3 (b). (10 Marks)

OR

- 4 a. State and prove Parallelogram law of forces. (10 Marks)
b. Explain with sketches : i) Cone of friction ii) Angle of repose. (06 Marks)

Module-3

- 5 a. State and prove Varignon's theorem. (06 Marks)
b. Find the magnitude, direction and position of the resultant with respect to the point A for the force system shown in Fig. Q5 (b). (10 Marks)

OR

- 6 a. Explain the different types of supports in the analysis of beams. (06 Marks)
b. Determine the support reaction at A and B for the beam shown in Fig. Q6 (b). (10 Marks)

Module-4

- 7 a. State and prove parallel axis theorem. (08 Marks)
b. Determine Centroid of the area shown in Fig. Q7 (b). (08 Marks)

OR

- 8 a. Determine the moment of inertia and radii of gyration of the area shown in Fig. Q8 (a) about the base AB and centroidal axis parallel to AB. (08 Marks)
b. Determine the moment of inertia of triangle of base width 'b' and height 'h' about the base. (08 Marks)

Module-5

- 9 a. Define : i) Displacement ii) Speed iii) Velocity iv) Acceleration. (06 Marks)
b. A cricket ball thrown from a height of 1.8 m above ground level at an angle of 30° with the horizontal with velocity of 12 m/s and is caught by fielder at a height of 0.6 m above the ground. Determine the distance between the two players. (10 Marks)

OR

- 10 a. A stone is dropped into a well and a sound of splash is heard after 4 s. Find the depth of well. (08 Marks)
b. Determine the position at which the ball is thrown up the plane will strike the inclined plane as shown in Fig. Q10 (b). The initial velocity is 30 m/s and angle of projection is $\tan^{-1}\left(\frac{4}{3}\right)$ with horizontal. (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, will be treated as malpractice.

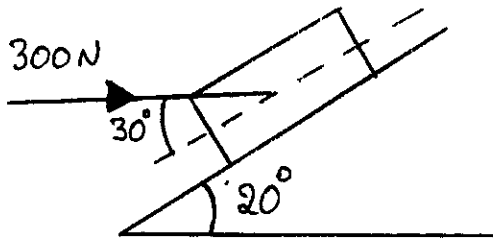


Fig. Q2 (b)

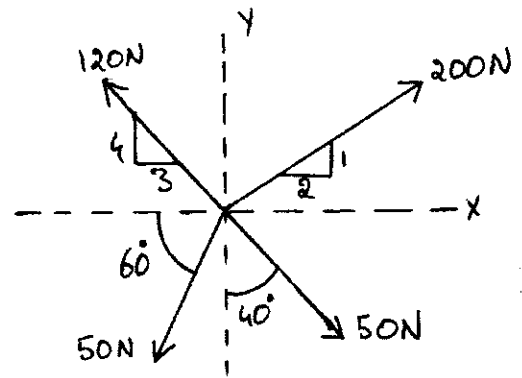


Fig. Q3 (b)

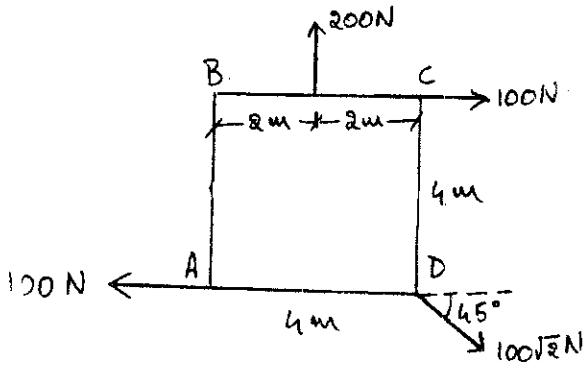


Fig. Q5 (b)

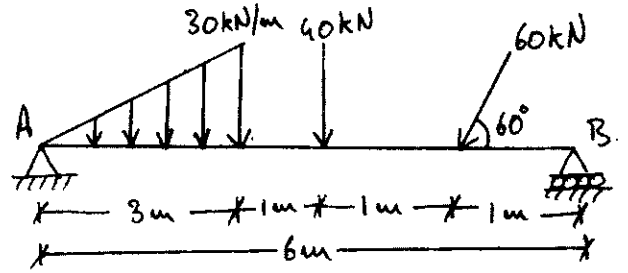


Fig. Q6 (b)

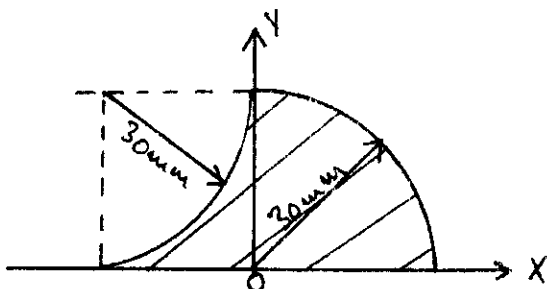


Fig. Q7 (b)

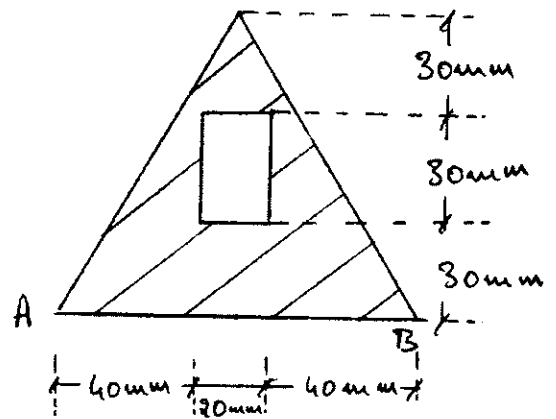


Fig. Q8 (a)

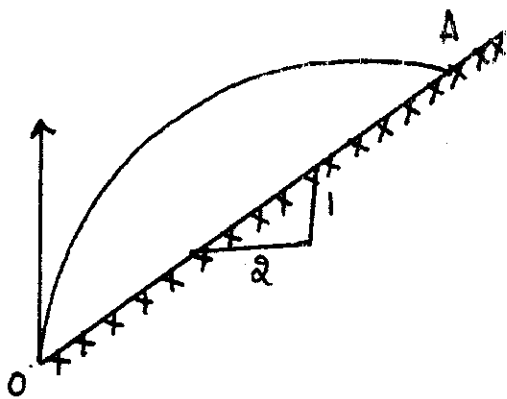


Fig. Q10 (b)
