Model Question Paper (CBCS) with effect from 2015-16

USN | | | | | | | | | | |

15CIV13/23

First/Second Semester B.E. Degree(CBCS)Examination

Elements of Civil Engineering and Engineering Mechanics

Time: 3 hrs. Max. Marks: 80

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

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-1

1 a. Explain briefly the role of Civil Engineers in the infrastructure development of a country. **(06 Marks)**

b. Draw typical cross section of a road and explain its components. **(06 Marks)**

c. Define Couple. Explain its characteristics. **(04 Marks)**

OR

2 a. Explain briefly the scope of the following Civil Engineering fields.
i) Structural Engineering ii) Geotechnical Engineering. **(04 Marks)**

b. Distinguish between gravity dams and arch dams, with neat sketches. **(05 Marks)**

c. Replace the force and couple system by an equivalent force and moment at 'A' shown in fig.Q2(c) **(07 Marks)**

Module-2

3 a. Two locomotives moving on opposite banks of a canal can pull a vessel parallel to the banks by means of two ropes. The force in the ropes are 20kN and 24kN, while the total angle between them is 60^0. Find the resultant pull on the vessel and the angles α and β. **(08 Marks)**

b. State and prove parallelogram law of forces. **(08 Marks)**

OR

4 a. State and prove Lami's theorem. **(04 Marks)**

b. Explain with sketches i) Cone of friction ii) Angle of repose. **(04 Marks)**

c. Find the magnitude, direction and position of the resultant with respect to the point 'A' for the force system shown in the fig.Q4(c). **(08 Marks)**

Module-3

5 a. State and prove Varigon's theorem. **(05 Marks)**

b. Explain the different types of loads in the analysis of beams. **(03 Marks)**

c. Determine the support reactions in the simply supported beam shown in the fig.Q5(c). **(08 Marks)**

OR

6 a. Calculate the support reactions at A, for the beam shown in fig. Q6(a). The beam is hinged at point A and supported by cable CD. Self – weight of the beam is 2kN/m (udl) as indicated. **(08 Marks)**

b. Determine the reactions at the contact points in the fig.Q6(b). **(08 Marks)**

Module-4

7 a. State and prove parallel axis theorem. **(08 Marks)**

b. Determine the centroid of the lamina shown in fig. Q7(b). **(08 Marks)**

OR

8 a. Determine the moment of inertia of the shaded area shown in fig. Q8(a) about the x-x axis. **(08 Marks)**

b. Derive the expressions of centroid of a semi – circle by method of integration. **(08 Marks)**

Module-5

9 a. Define i) Displacement ii) Velocity iii) Speed iv) Acceleration. **(04 Marks)**

b. What is Super elevation and what is its necessity? **(04 Marks)**

c. A projectile is fired from the top of a cliff 150m height with an initial velocity of 180m/sec at an upward angle of 30^0 to horizontal. Neglecting air resistance determine the horizontal distance from the gun point to the point where the projectile strikes the ground. **(08 Marks)**

OR

10 a. Two objects A and B are projected vertically at 130m above the ground level. A is projected up with a velocity of 30m/sec and B is projected downwards with the same velocity. Find the time taken by each object to reach the ground. **(08 Marks)**

b. A pulley 300mm in diameter is wounded round by a rope with one of the ends of rope fixed to pulley and the other end is fixed to a weight freely hanging as shown in fig.Q10(b). The weight moves down by 8m after starting from rest in 4 seconds. Find the angular velocity of the pulley. Find also the total distance moved by the weight to make the pulley to rotate 400 revolutions. **(08 Marks)**

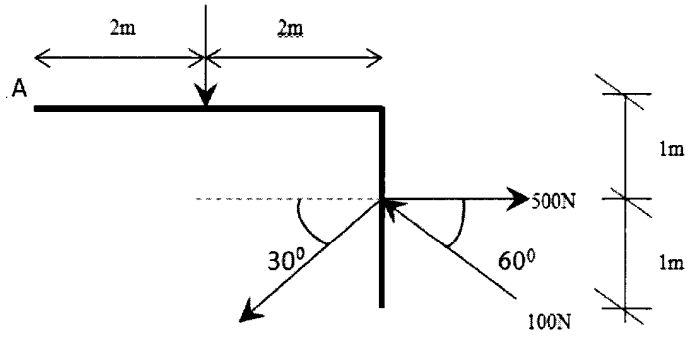

Fig 2(c)

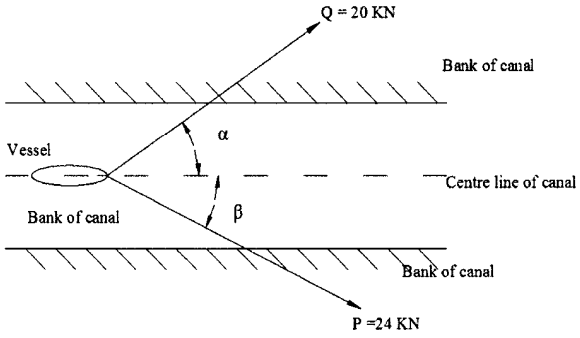

Fig 3(a)

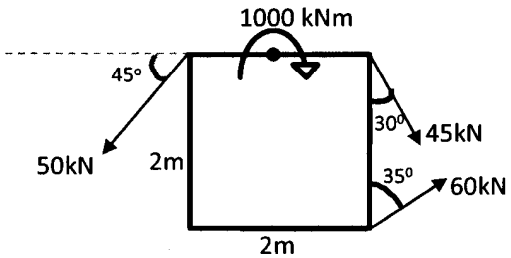

Fig 4(c)

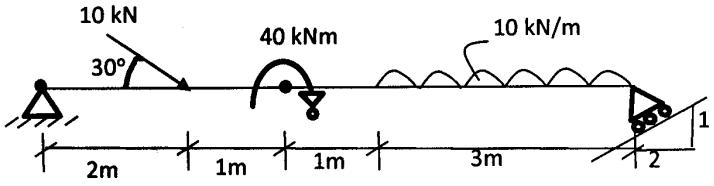

Fig 5(c)

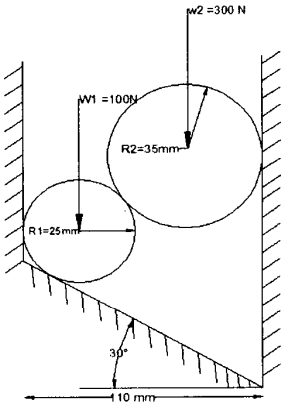

Fig 6(b)

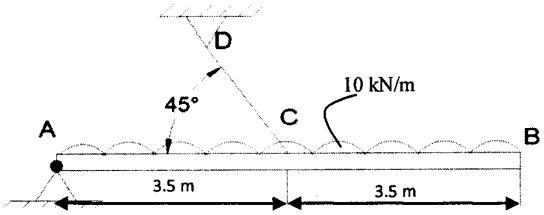

Fig 6(a)

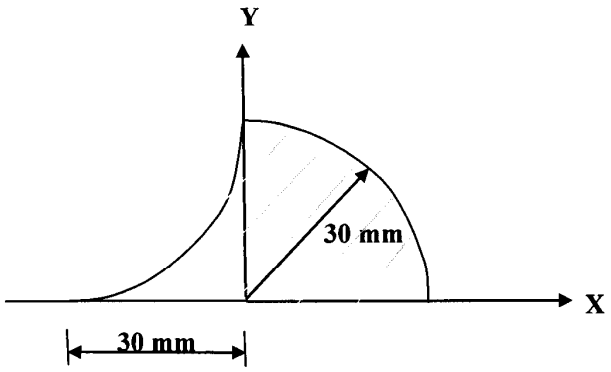

Fig 7(b)

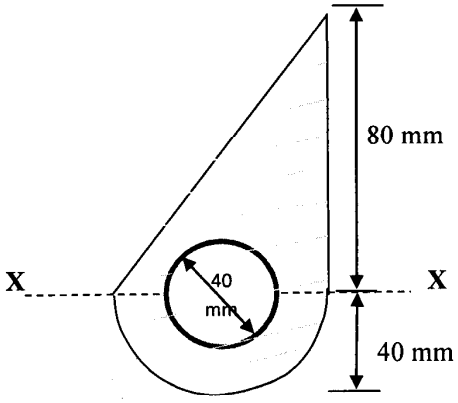

Fig 8(a)

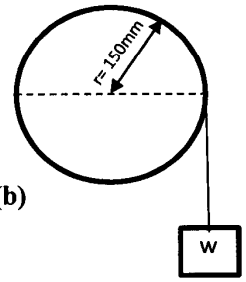

Fig 10(b)

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