

USN

I A T O S E C O 2 0

NEW SCHEME

First / Second Semester B.E. Degree Examination, July 2006
Common to All Branches
Elements of Civil Engineering

Time: 3 hrs.]

[Max. Marks:100

Note: 1. Answer any FIVE questions.

1.
 - a. Discuss briefly the impact of infrastructural development on the economy and environment. (10 Marks)
 - b. Explain briefly the terms planning, scheduling and construction management. (10 Marks)
2.
 - a. State any ten properties of good timber. (10 Marks)
 - b. Give the applications of polymer matrix composites (PMC) in civil engineering. (05 Marks)
 - c. Write an explanatory note on smart materials in civil engineering. (05 Marks)
3.
 - a. Discuss briefly GPS and its applications. (10 Marks)
 - b. Give explanatory notes on remote sensing and GIS. (10 Marks)
4.
 - a. State and prove Varignon's theorem. (05 Marks)
 - b. Explain different types of force system with examples. (05 Marks)
 - c. Determine the magnitude, direction and position of resultant force with reference to point 'A' for the non-coplanar force system shown below in Fig.1(c) (10 Marks)

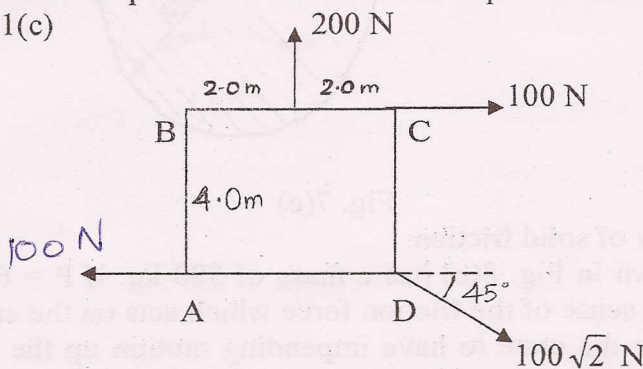


Fig. 4(c)

5.
 - a. State and prove Lamis theorem. (05 Marks)
 - b. Distinguish :
 - i) Hinged support
 - ii) Roller support
 - iii) Fixed support. (05 Marks)
 - c. Find the support reactions at A and B for the beam loaded as shown below in Fig. 5(c) (10 Marks)

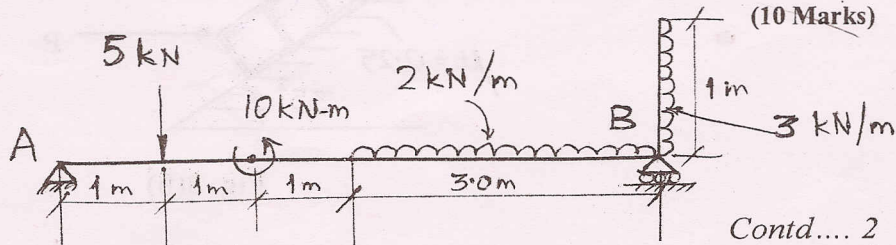


Fig 5(e)

Contd.... 2

- 6 a. Locate the centroid of a parabolic segment having an equation $y = Kx^2$ from first principles. (07 Marks)
- b. State parallel axis theorem. (03 Marks)
- c. Determine centroid of the shaded area with reference apex. (10 Marks)

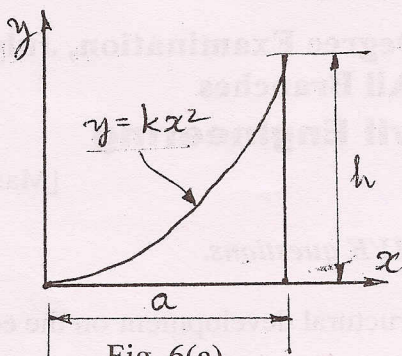


Fig. 6(a)

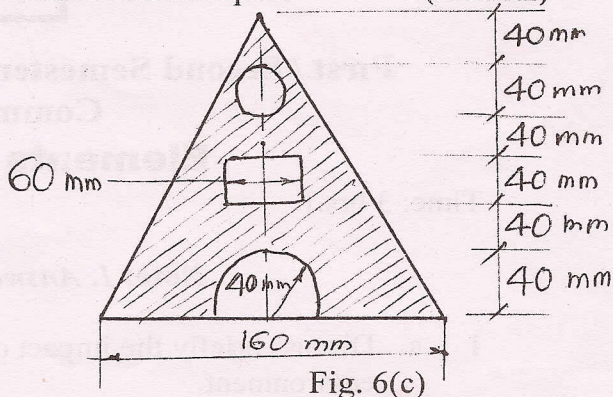


Fig. 6(c)

- 7 a. Determine the moment of inertia of a square lamina of side 'a' about an axis passing through its diagonal. (06 Marks)
- b. Find the centroid of the area enclosed by a right angles triangle from first principle. (04 Marks)
- c. Determine the moment of inertia of the shaded area about the axis A-A. (10 Marks)

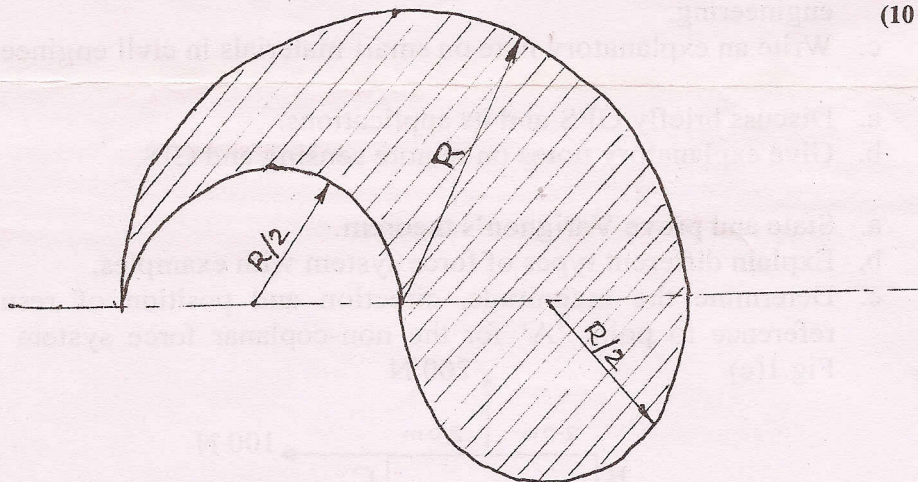


Fig. 7(c)

- 8 a. Give the theory of solid friction. (08 Marks)
- b. The crate shown in Fig. 8(b) has a mass of 580 kg. if $P = 6000$ N, find the magnitude and sense of the friction force which acts on the crate. What value of P will cause the crate to have impending motion up the plane? Find the minimum value of P required to keep the crate from sliding down the plane. For what range of values of P will the crate remain in the equilibrium position shown in Fig. 8(b)? (12 Marks)

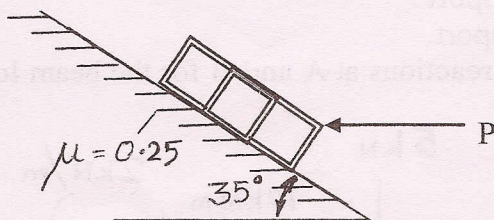


Fig. 8(b)

