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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – DEC 2013 / JAN 2014

Course & Branch	:	**B.E.- Common to all branches**	**Semester**	:	**I**
Subject	:	**Basic Civil Engineering & Mechanics**	**Max. Marks**	:	**100**
Subject Code	:	**CV101/201**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.
- Any missing data can be suitably assumed

UNIT – I

1. a) Explain any four fields of Civil Engineering in detail. (10)
   b) Explain the properties and uses of Tiles and Timber. (10)

2. a) Explain the impact of infrastructural development on the social-economy of a country. (10)
   b) Explain the properties and uses of Steel and PSC. (10)

UNIT-II

3. a) Explain any five classifications of Force systems in detail. (10)
   b) Five forces are acting from the vertex 'A' of a regular hexagon ABCDEF as shown in Fig (1). Determine the magnitude and direction of Resultant force. (10)

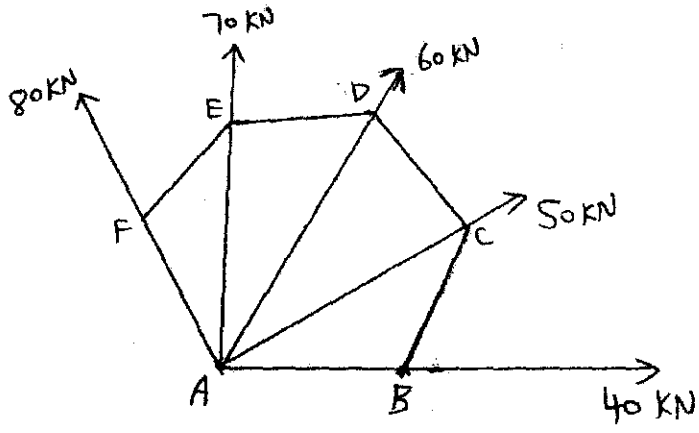


Fig (1)

4. a) State and prove Varignon's Theorem (08)

b) A coplanar non-concurrent force system is acting on a lamina as shown in Fig (2). Determine the resultant and its position with respect to pt A. (12)

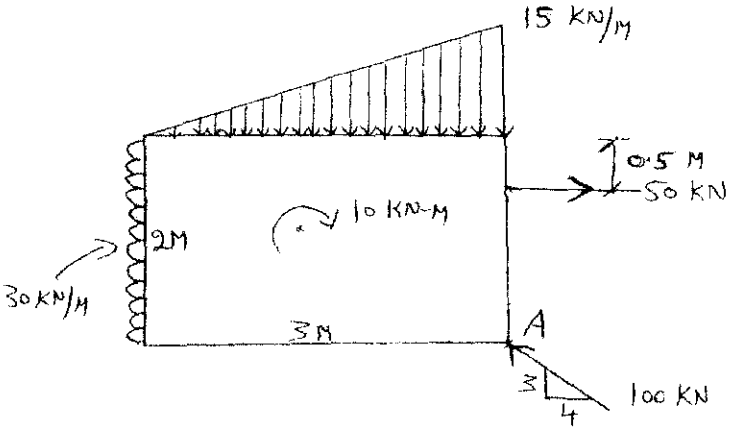


Fig (2)

UNIT-III

5 a) What is FBD? Explain with examples. (06)

b) Three spheres are piled as shown in Fig (3). Neglecting friction, determine the reaction between sphere A and the vertical wall. The weights of spheres A, B and C are 100 N, 225 N and 125 N respectively. The radii of spheres A, B and C are 100 mm, 150 mm and 125 mm respectively. (14)

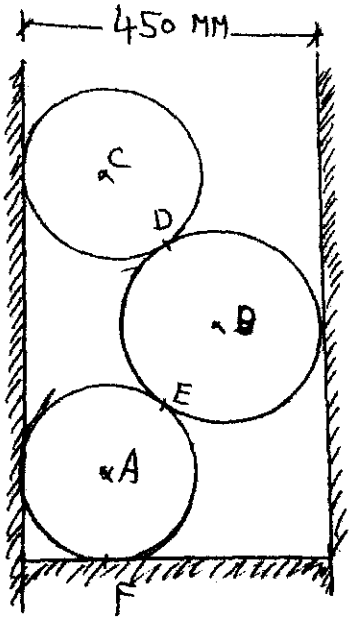


Fig (3)

6. a) Differenciate between Statically Determinate beams and Statically Indeterminate beams with examples. (08)

b) Determine the reactions at supports for the double-beam shown in Fig (4). (12)

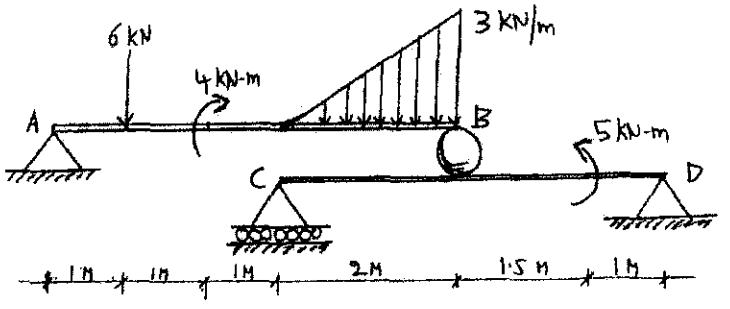


Fig (4)

UNIT-IV

7. a) Derive an expression for the Centroid of a Quadrant of a circle with 'R' as its radius about its diametrical x and y-axes using Method of Integration. (08)

b) Determine the position of the centroid of the shaded area with respect to pt 'A' as shown in Fig (5). (12)

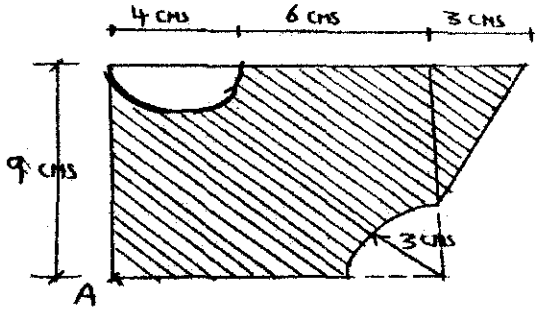
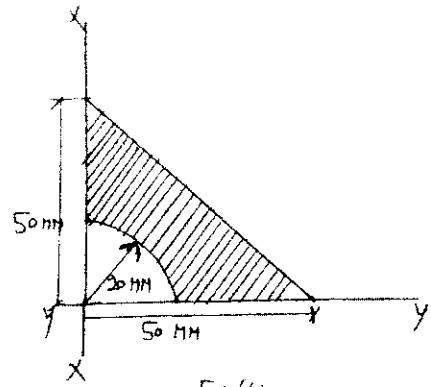


Fig (5)

8. a) Derive an expression for the Moment of Inertia of a Triangle about its base using Method of Integration. (08)

b) Find the Moment of Inertia of the shaded area about the x-x and y-y axes as shown in Fig (6). Also determine polar moment of inertia and radii of gyration. (12)

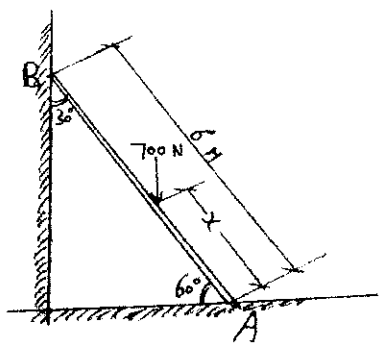


Fig(6)

UNIT - V

9. a) Explain (i) Static friction (ii) Limiting friction (iii) Dynamic friction (iv) Co-efficient of friction. (08)

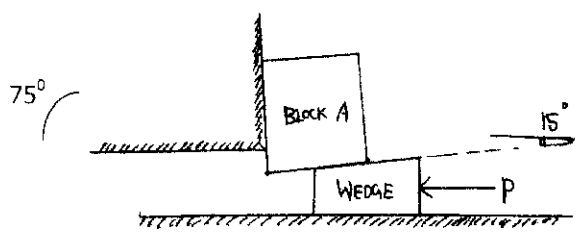
b) A ladder 6 m long and weighing 430 N is placed against a vertical wall in a position where its inclination to the wall is 30^0 as shown in Fig (7). What should be the position of 700 N man on the ladder which will cause the ladder to slip? Consider co-efficient of friction between the contact surfaces as 0.25. (12)



Fig(7)

10. a) Prove that angle of limiting friction is equal to angle of repose. (08)

b) Determine the minimum force 'P' required to lift 200 N block 'A' up the plane shown in Fig (8). The co-efficient of friction between all the contact surfaces is 0.2. (12)



Fig(8)

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