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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)
BANGALORE – 560 054
SEMESTER END EXAMINATIONS – JANUARY 2015

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Course & Branch	: B.E: Common to All Branches	Semester	: 1
Subject	: Basic Civil Engineering and Mechanics	Max. Marks	: 100
Subject Code	: CV101	Duration	: 3 Hrs

Instructions to the Candidates:
- Answer one full question from each unit.

UNIT – I

1. a) Explain the impact of infrastructural development on the economy and environment of a country. (10)
    b) Write the uses of the following materials. (10)
       i) Composite materials ii) R.C.C

2   a) List the major fields of Civil engineering and explain the scope of any four of them. (10)
    b) Write the desirable properties of the following building materials (10)
       i) Timber ii) Tiles
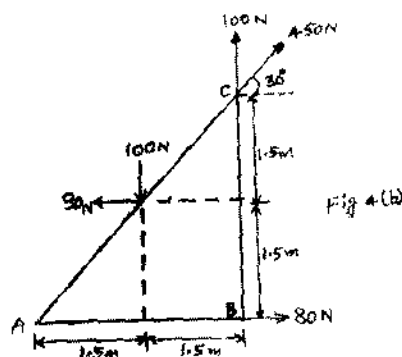
UNIT – II

3. a) Define the following terms. (10)
       i) Moment of a force   ii) Couple   iii) Resultant   iv) Rigid body
       v) Law of transmissibility of forces

    b) The moment of a certain force is 240 Nm counterclockwise about 'O' shown in Fig.3 (b) and 320 Nm clockwise about B. If the moment of the force about A is zero, determine the magnitude and direction of force. (10)


Fig 3(b)
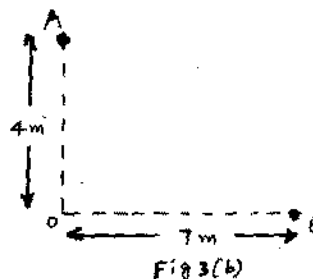
4. a) State and prove varignon's theorem (08)

b) Determine the magnitude, direction and position of the resultant of forces with respect to 'A' shown in Fig 4(b). (12)


Fig 4(b)

UNIT – III

5. a) List and Explain the various types of supports with neat sketches. (10)
   b) Cylinder 'A' of diameter 200 mm and cylinder B of diameter 300 mm placed in a trough shown in Fig. 5(b). If cylinder A weighs 800 N and cylinder B weighs 1200 N, determine the reactions at contact surfaces P,Q,R and S. Assume all contact surfaces are smooth. (10)

Fig 5(b)
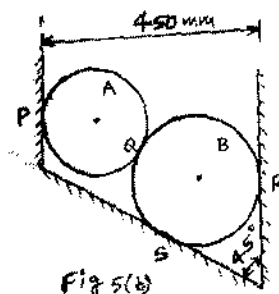
6. a) Explain any two types of loading on beams. (04)
   b) State the conditions of static equilibrium for coplanar concurrent and non-concurrent system of forces. (05)
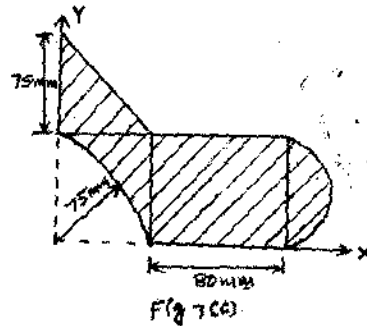   c) Determine the reactions at A and B for a beam loaded as shown in fig 6(c). (11)

Fig 6(c)
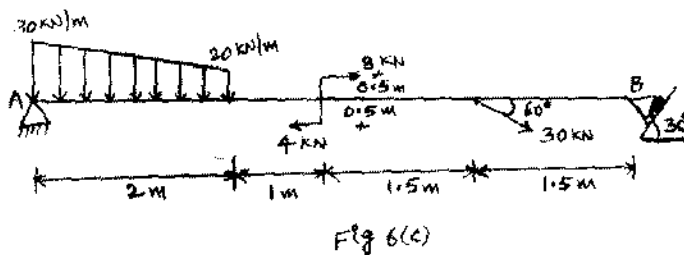
UNIT – IV

7. a) Define the following terms. (04)
   i) Centroid ii) Centre of gravity

   b) Locate the Centroid of a right angle triangle from first principles. (06)

c) Locate the Centroid of the shaded area with respect to the axes shown in Fig 7 (10) (c).

Fig 7(c)

8. a) Derive an equation for the moment of inertia of a semi circle about diameter as base. (08)
   b) Calculate the moment of inertia and radius of gyration of the given shaded area shown in Fig 8(b) about the horizontal centroidal axis. (12)

Fig 8 (b)
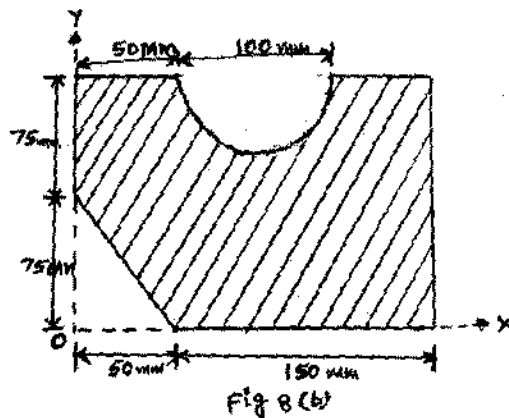
UNIT –V

9. a) Define different types of friction. (10)

   b) What is the value of P in the system shown in Fig 9(b) to cause the motion to impend? Assume that pulley is smooth and the coefficient of friction between the other contact surfaces is 0.2. (10)

Fig 9(b)
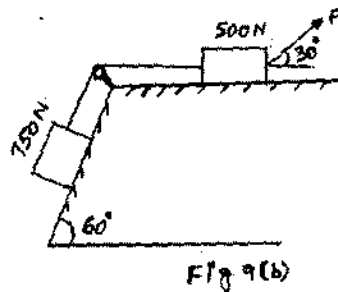
10. a) Show that the angle of friction is equal to the angle of repose for any two (04) surfaces in contact.

b) Write the laws of static friction. (06)

c) A block of weight 50 kN is kept in equilibrium, by a wedge as shown in Fig 10 (10) (c). If the coefficient of friction is 0.2 for all the surfaces and the wedge has a weight of 5 kN, determine the force P necessary to cause a tendency in the block to move up.
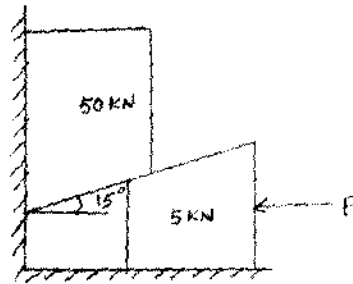

Fig 10 (c)

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