CV101

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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2016

Course & Branch	**:**	**B.E.- Common to all Branches**	**Semester**	**:**	**I**
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)	List the various branches of Civil Engineering. Explain the scope of – (i) Structural Engineering (ii) Geotechnical Engineering	CO1	(10)
	b)	Write any five desirable properties of each – (i) Timber (ii) Reinforced cement concrete	CO1	(10)
2.	a)	Explain the impact of infrastructural development on the economy and environment of a country.	CO1	(10)
	b)	Write any five desirable properties and uses of Bricks.	CO1	(10)

UNIT – II

3.	a)	Define the following terms. i) Moment of force ii) Couple iii) Resultant iv) Rigid body v) Law of Transmissibility of forces	CO2	(10)
	b)	A 26 kN force is the resultant of two forces, one of which is shown in Fig 3b. Determine the other force.	CO2	(10)

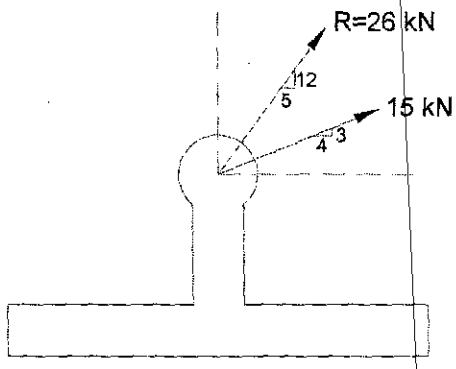

Fig 3b

4.	a)	State and prove varignon's theorem.	CO2	(8)
	b)	Determine the magnitude, direction and position of the resultant of forces with respect to 'O' shown in Fig 4b.	CO2	(12)

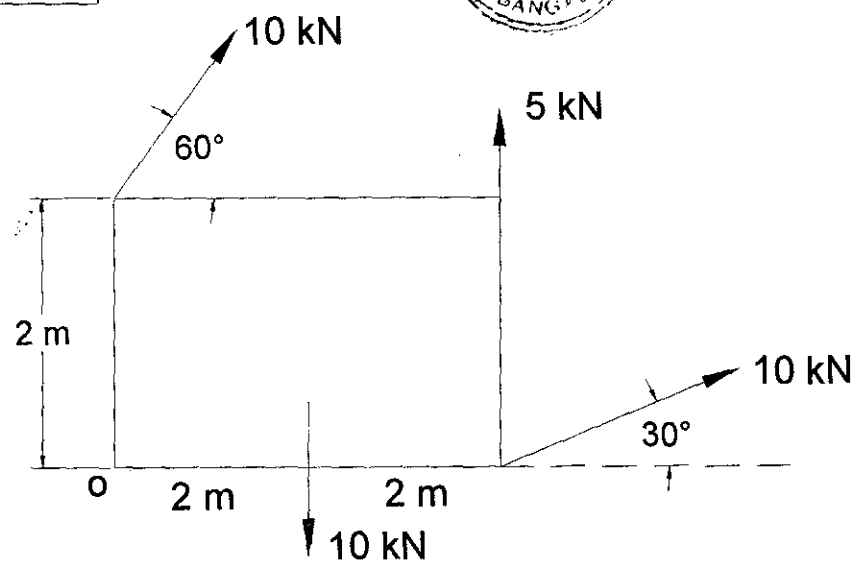

Fig 4b

UNIT – III

5. a) List and Explain the various types of supports with neat sketches. Also indicate the expected direction of reactions. CO3 (10)

   b) Two cylinders A and B rest in a channel shown in Fig 5b. Cylinder A has a diameter of 100 mm and weighs 20 kN, cylinder B has a diameter of 180 mm and weighs 50 kN. The channel is 200 mm wide at bottom with one side vertical and the other side at 60° inclination. Determine the reactions at all the points of contact. CO3 (10)

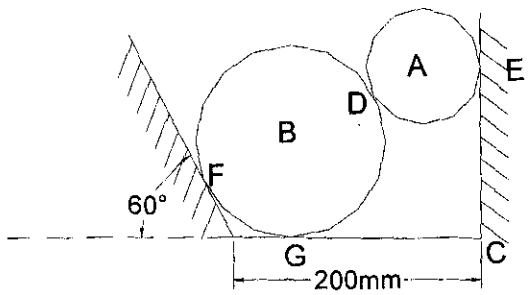

Fig 5b

6. a) Explain various types of loads that may act on beams with neat sketches. CO3 (6)

   b) Determine the distance 'x' such that the reactions R_A and R_B are equal for the beam shown in Fig 6b. CO3 (6)

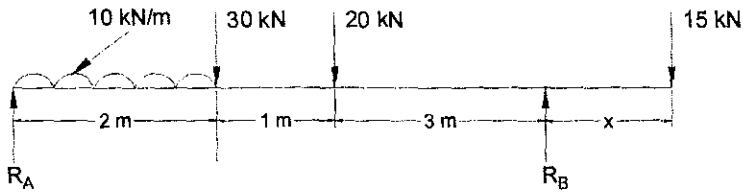

Fig 6b

c) Find the support reactions for the beam loaded as shown in Fig 6c. CO3 (8)

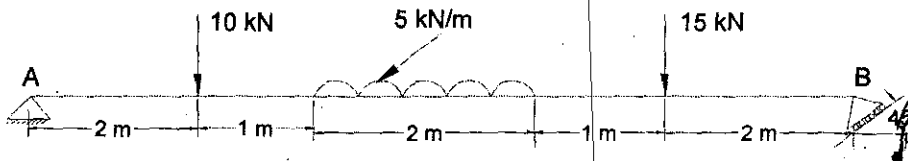

Fig 6c

UNIT – IV

7. a) Differentiate between Centroid and Centre of gravity. CO4 (4)

b) Derive the co-ordinates of Centroid of a semicircle from first principles. CO4 (6)

c) Locate the Centroid of the shaded area with respect to the axes shown in Fig 7c. CO4 (10)

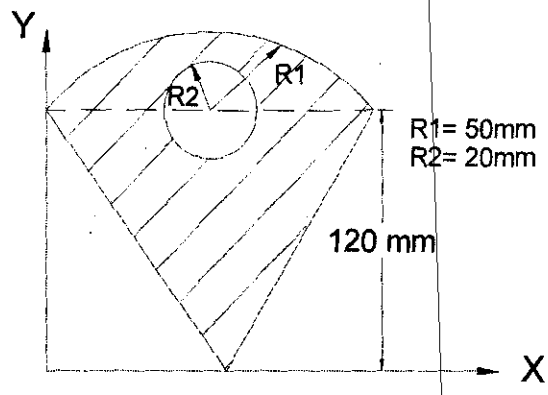

Fig 7c

8. a) State and prove two theorems of moment of inertia. CO4 (10)

b) Calculate the moment of inertia and radius of gyration of the given shaded area shown in Fig 8b about the horizontal centroidal axis. CO4 (10)

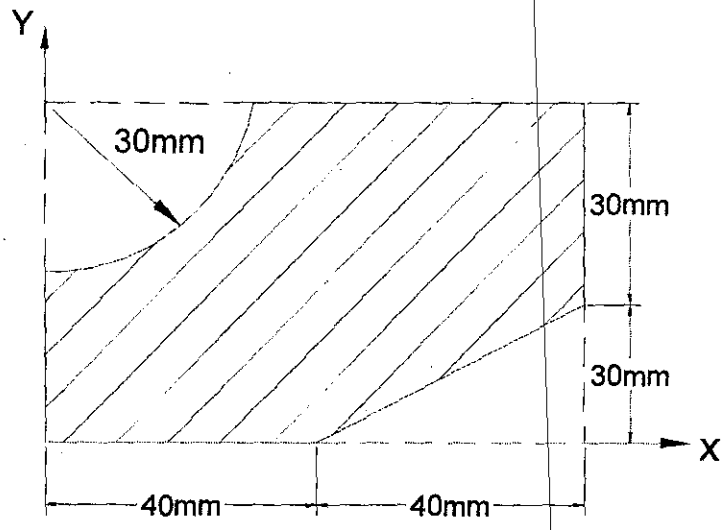

Fig 8b

UNIT – V

9. a) Define the following terms: CO5 (10)
(i)Dry friction (ii) Coefficient of friction (iii) Limiting friction (iv) Angle of friction (v) Cone of friction

b) Determine the value of "θ" for impending motion of the blocks shown in Fig 9b. Take coefficient of friction (μ) for all contact surfaces as 0.25. CO5 (10)

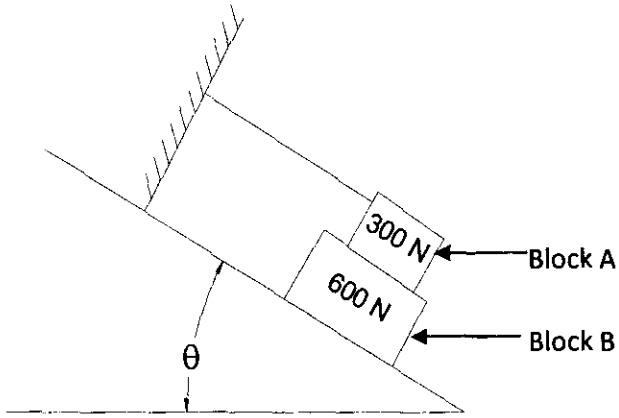

Fig 9b

10. a) Show that the angle of friction is equal to the angle of repose for any two surfaces in contact. CO5 (4)

b) Write the laws of static friction. CO5 (4)

c) Determine the minimum value of P, just required to lift 3000 N block up shown in Fig 10b. The angle of friction between block and the wall is 15° and for other contact surfaces it is 18°. CO5 (12)

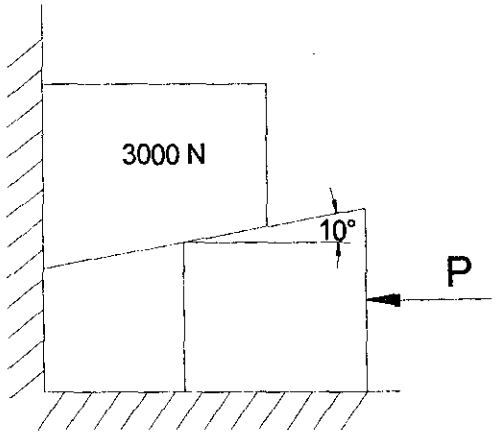

Fig 10b

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