BACHELOR OF ARCHITECTURE EXAMINATION, 2017

(1st Year, 1st Semester)

STRUCTURAL MECHANICS-I

Time: Three Hours

Full Marks 100

[Assume reasonable values of any data not given but required]

No. of questions	Answer any fiveof the questions.	Marks (5X20=100)
1(a)	Define the followings with example Coplanar force, Collinear force, Concurrent force, Coplanar non-concurrent force.	8
(b)	What is moment of a force? Explain graphical representation of moment.	5
(c)	Write the basic diff rences among center of mass, center of gravity and centroid. Explain how center of gravity is determined of a body.	3+4
2 (a)	State and define parallelogram law of forces.	5
(b)	The following forces act at a point i) 20 N inclined at 30° towards Northeast ii)40 N towards North iii) 50 N towards North West iv) 40 N inclined at 50° towards southwest Find the magnitude and direction of the resultant forces. a) By analytically b) By graphically	6+9
3) (a)	State and proof theorem of parallel axis.	10
(b)	Derive the Moment of inertia of a circular hollow section of internal diameter 'd' and external diameter 'D'.	10
4) a)	An oil drum of 500 mm diameter and 1.5 m long is to be rolled across a footstep of 100 mm high. Find the minimum push required at the top of the drum. Take the density of the oil as 1 kg/litre. Neglect weight of the drum.	10
b)	Define theory of perpendicular axis?	4
c)	Describe different type of levers	6

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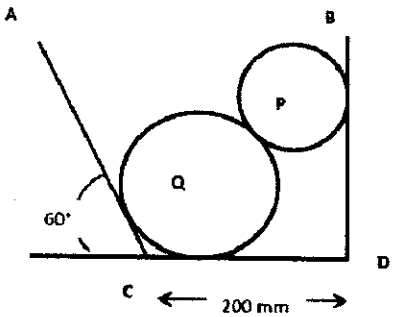
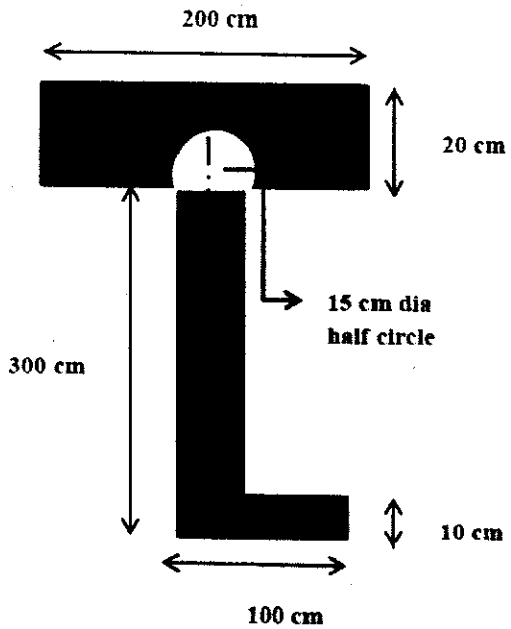
5) (a)	State and proof Lami's Theorem	8
(b)	Two cylinder P and Q rest in a channel as shown in following figure. The cylinder P has a diameter 100 mm and weighs 30 kg, whereas the cylinder Q has diameter 200 mm and weighs 50 kg. If the bottom width of the box is 200 mm, with one side vertical and the other inclined at 60°, determine the pressure at all the four points of contact. 	12
6) a)	Write a short note on different kinds of truss.	8
b)	Find the moment of inertia of the following section (about C.G.). 	12

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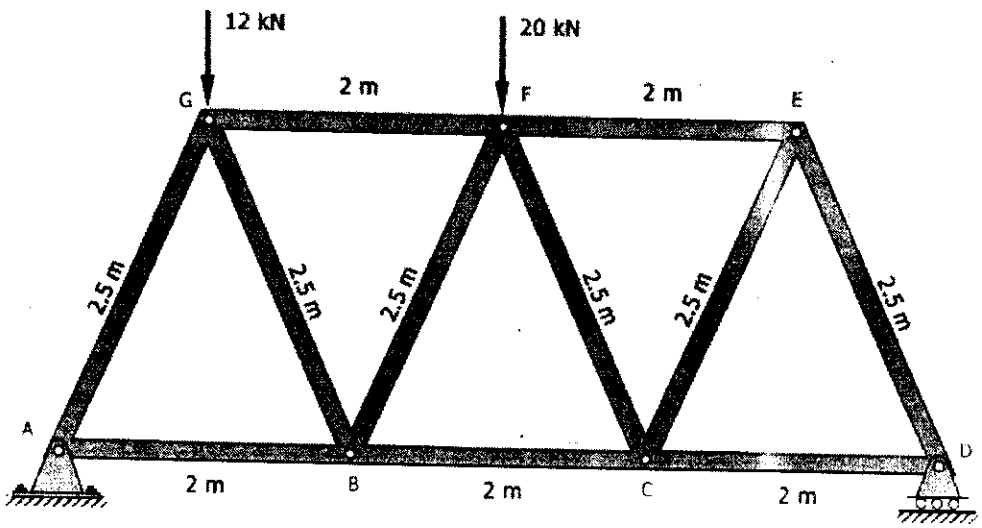
7)	Solve the following truss by any one method. 	20