PADRE CONCEIÇÃO COLLEGE OF ENGINEERING
Verna – Goa
Department of Mechanical Engineering

Assignment

Semester: F.E., Comp., Sem. I (RC 19 – 20)
Course: FE 140 Basics of Mechanical Engineering
Course Instructor: Pushparaj Pingulkar

Distributed on: 08/11/2021
Due on: 16/11/2021
Max. Marks: 50

Assignment No. 1: Resultant & Equilibrium of Coplanar Concurrent Force System

		Marks	CO	CL
Q. 1	Find the magnitude and direction of the resultant of four concurrent forces acting as shown in Fig. Q. 1 (a) analytically, (b) graphically.	**[10]**	**FE 140.1**	**3**

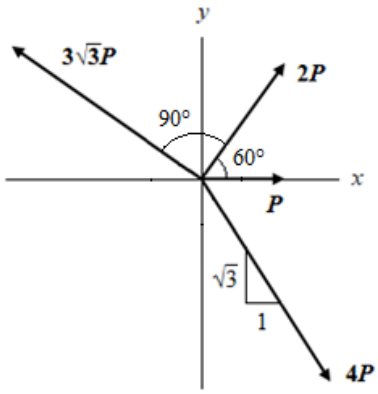

Fig. Q. 1

Q. 2	Two cylinders *A* and *B* rest in a horizontal channel as shown in Fig. Q. 2. The cylinder *A* has a weight of 1000 N and radius of 9 cm. The cylinder *B* has a weight of 400 N and a radius of 5 cm. The channel is 18 cm wide at the bottom with one side vertical. The other side is inclined at an angle of 60° with the horizontal. Find the reactions at points *L*, *N* and *P*.	**[10]**	**FE 140.1**	**3**

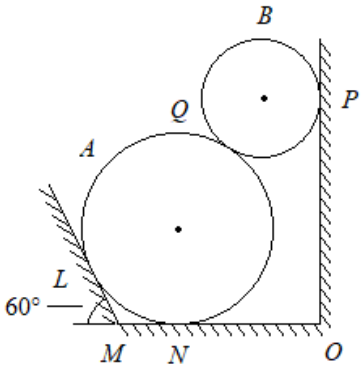

Fig. Q. 2

Q. 3 A wire is fixed at *A* and *D* as shown in Fig. Q. 3. Weights 20 kN and 25 kN are supported at *B* and *C* respectively. When equilibrium is reached, it is found that inclination of *AB* is 30° and that of *CD* is 60° to the vertical. Determine the tension in the segments *AB*, *BC* and *CD* of the rope and also the inclination of *BC* to the vertical. **[10]** **FE 140.1** **3**

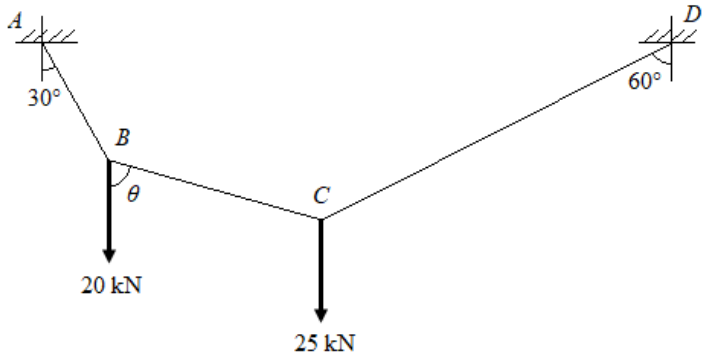

Fig. Q. 3

Q. 4 Two rollers of weights *P* and *Q* are connected by a flexible string *AB*. The rollers rest on two mutually perpendicular planes *DE* and *EF* as shown in Fig. Q. 4. Find the tension in the string and the angle θ it makes with the horizontal when the system is in equilibrium. P = 50 N, Q = 100 N and α = 30°. **[10]** **FE 140.1** **3**

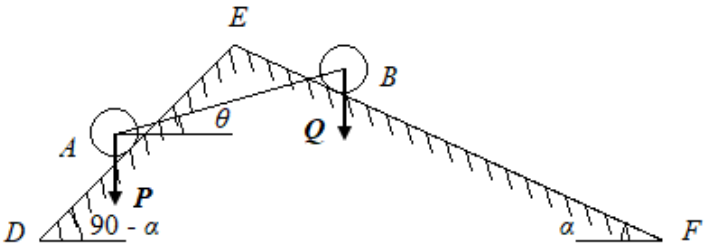

Fig. Q. 4

Q. 5 Three identical cylinders *A*, *B* and *C*, each of weight *W*, are arranged on smooth inclined surfaces as shown in Fig. Q. 5. Determine the least value of angle θ that will prevent the arrangement from collapsing. **[10]** **FE 140.1** **3**

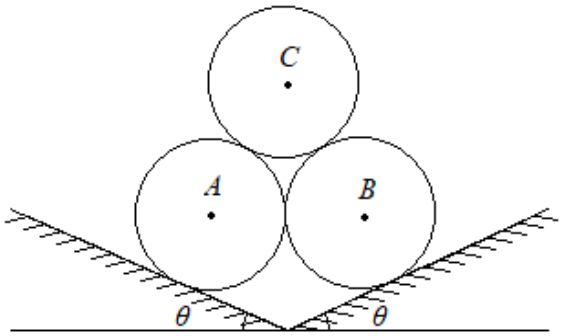

Fig. Q. 5

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