

Practice Question Paper for revision  
FE, Subject : Engg. Mechanics.

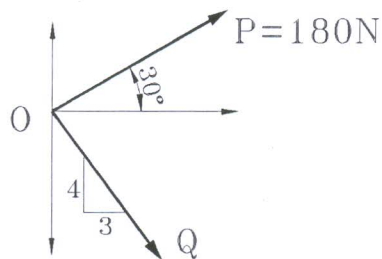
N.B.1. Question No. 1 is Compulsory.

Max marks 80 (3 hrs)

2. Answer any Three more questions out of the remaining Five questions.
3. Assume any suitable data wherever required but justify the same.
4. Figures to the right indicate full mark
5. Take  $g = 9.81 \text{ m/s}^2$

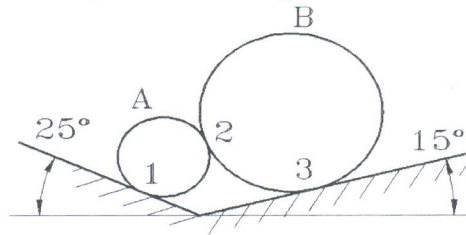
Q1a) Three concurrent forces  $P=150\text{N}$ ,  $Q=250\text{N}$  and  $S=300\text{N}$  are acting at  $120^\circ$  with each other. Determine their resultant force magnitude and direction with respect to  $P$ . What is their equilibrant? [4]

b) Two concurrent forces  $P$  and  $Q$  act at  $O$  such that their resultant acts along x-axis. Determine the magnitude of  $Q$  and hence the resultant. [4]

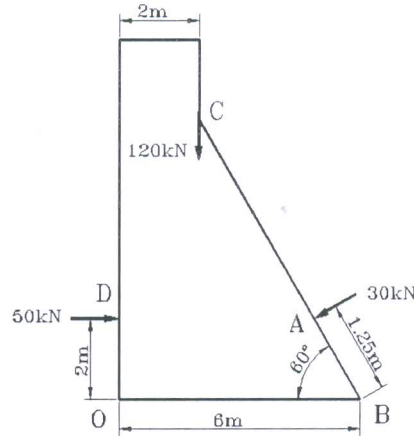


- c) Explain the terms i) Coefficient of Static Friction ii) Coefficient of Kinetic Friction  
iii) Angle of Friction iv) Angle of Repose [4]
- d) A particle travels on a circular path, whose distance travelled is defined by  $S = (0.5t^3 + 5t^2 + 3t) \text{ m}$ . If the total acceleration is  $10 \text{ m/s}^2$ , at  $t = 2 \text{ sec}$ , find the radius of curvature. [4]
- e) A train weighing  $500\text{KN}$ , runs at a speed of  $36\text{kmph}$ . If the frictional resistance is  $100\text{N}/\text{KN}$  weight of the train, find the distance it travels before coming to rest. [4]

Q2 a) Determine the reactions at point of contacts 1, 2 and 3. Assume smooth surfaces.  
 Mass of cylinder A= 2 kg, mass of cylinder B= 8 kg, radius of A= 1 m, radius of B= 4 m. [8]



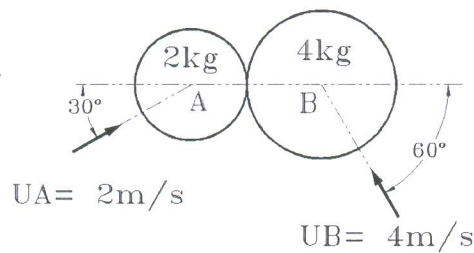
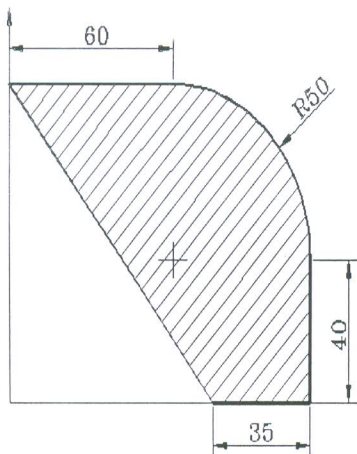
b) The forces acting on 1 m length of a dam are shown in figure. Determine the resultant force acting on the dam. Calculate the point of intersection of the resultant with the base. [6]



c) Two smooth spheres A and B having a mass of 2 kg and 4 kg respectively collide with initial velocities as shown in the figure. If the coefficient of restitution for the sphere is  $e = 0.8$ , determine the velocities of spheres after collision. [6]

Q3.a) Determine the Centroid of the shaded area.

[8]



b) A force of 1200N acts along PQ, P(4,5,-2) and Q(-3,1,6)m. Calculate its moment about a line joining A(3,2,0) to B(2,2,1)m

[6]

c) A cylinder has mass 20 kg and is released from rest when  $h = 0$ , determine the speed when  $h = 3$  m. The spring each have unstretched length of 2 m. Spring constant  $K = 40$  N/m. [6]

