B.E. Power Engg., First Year First Semester Exam. (Old) - 2019

Subject: Engineering Mechanics-I   **Time: 3 Hours**   **Full Marks: 100**

Answer any **five (5)** questions from the followings.

5 x 20 = 100

1. A sphere of weight 100 N and radius 10 cm hangs by a string $AB = 20$ cm and rests against a smooth vertical wall at C as shown in the Fig. 1. Determine the force F in the string AB and normal reaction at C.

2. Referring to Fig. 2, where radius of roller is $r = 12$ cm, $h = 6$ cm and weight of the roller is 5000N. Find the magnitude of P required to start the roller over curb.

3. Find minimum P to hold the system in equilibrium as shown in *Fig.3*. Given: coefficient of friction at floor, $\mu_f = 0.25$, at wall, $\mu_w = 0.30$ and between blocks, $\mu_b = 0.20$

4. Determine the force P required to keep the two rods in equilibrium when the angle = 30° and weight W is 50 lb. The rods are each of length L and of negligible weight. They are prevented from moving out of the plane of the figure by supports not shown (Fig. 4).

5. Determine the centroid of the given section. (Fig. 5)

6. Write a short note on the followings.   5 x 4 = 20
   (a) Laws of friction, (b) Lami's theorem, (c) center of gravity, (d) Pappus-Guldinus theorem, (e) Angle of Repose
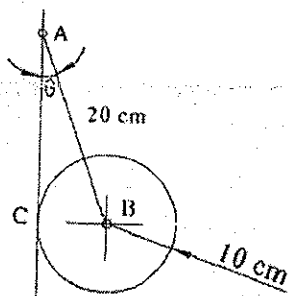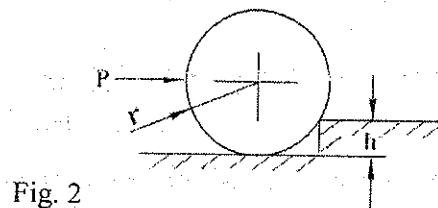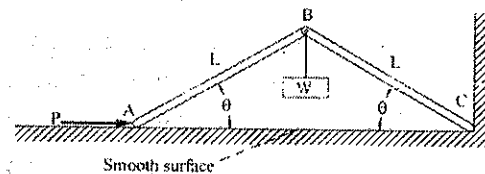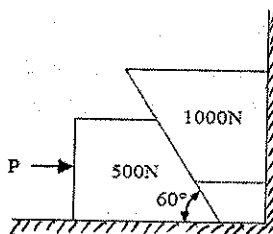

Fig. 1

Fig. 2

Fig. 4

Smooth surface

Fig. 3

Fig. 5