7. A ball weighing 4.5 N is thrown with a velocity of 20 m/s. It first touches the ground and then bumps up. It loses 30 Nm of energy when it touches the ground. What is the velocity after its bump. **14**

Unit IV

8. In the system Fig. 4, the bars are arranged in such a manner that they form four identical rhombuses. Determine the relation between P and F. **14**

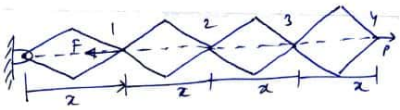

Figure 4

9. Explain the following : **14**

(a) Laws of Dynamic friction

(b) Angle of friction and repose.

Roll No. ..... Exam Code : J-21

Subject Code—7418

B. Tech. (CE) EXAMINATION

(Third Semester) (FT)

(Batch 2018 Onwards)

ENGINEERING MECHANICS

ESC-ME201-T

Time : 3 *Hours* *Maximum Marks :* 70

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory.

1. Explain the following :

(a) Laws of static friction

(b) Coefficient of friction

(c) Free body diagram

(d) Types of frames

(e) Principal axes

(f) Laws of Mechanics

(g) Principle of virtual work.

Unit I

2. Find the magnitude of two forces such that, if they act at right angles, their resultant is 5N whilst when they act at an angle of 60°, their resultant is $\sqrt{37}$ N. **14**

3. What arial forces does the vertical load W = 800 N induce in the tie rod and the jib of crane shown in Fig. 1. Neglect the self weight of the members. **14**

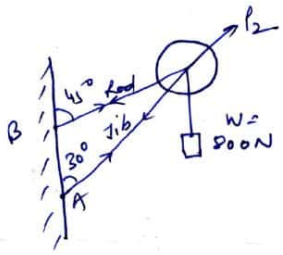

Figure 1

Unit II

4. Find centre of gravity of a solid and their hollow hemisphere. **14**

5. Fig. 2 shows a loaded girder for a 12 m span. The loads marked are in KN. Find the stresses in all the members. **14**

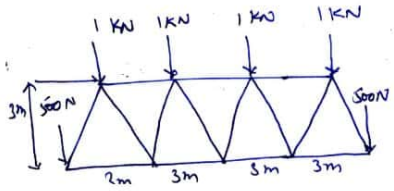

Figure 2

Unit III

6. Find the centroidal MOI of the Shaded Portion Fig. 3 **14**

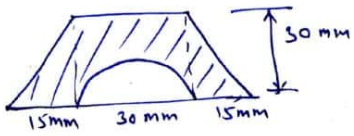

Figure 3