8. Derive a relation for the velocity and direction of motion of a projectile : (a) after a given interval of time t from the instant of projection, (b) at a given height h above the point of projection.

15

9. A beam AB 6 m long rests on two supports 4 m apart, the right hand end is overhanging by 2 m. The beam carries a uniformly distributed load of 10 kN/m over the entire length of the beam. Draw shear force and bending moment diagrams.

15

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Roll No. ————————

3073

B. Tech. (ME) 3rd Semester
Examination – February, 2022

ENGINEERING MECHANICS

Paper : ESC-ME-209-G

Time : Three Hours]   [Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after examination.

Note : Attempt *five* questions in all selecting *one* from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Answer the following questions :   2.5 × 6 = 15

   (a) State clearly the law of moments.

   (b) State triangle law of forces and polygon law of forces.

   (c) State and prove Lami's Theorem.

(d) Define the terms : velocity of projection and angle of projection.

(e) Perpendicular axis theorem.

(f) Perfect truss.

UNIT – I

2. How would you find out the equilibrium of non-coplanar forces ? Explain the conditions of equilibrium. Discuss the various types of equilibrium. **15**

3. Two equal heavy spheres of 50 mm radius are in equilibrium within a smooth cup of 150 mm radius. Show that the reaction between the cup of one sphere is double than that between the two spheres. **15**

UNIT – II

4. A frustum of a solid right circular cone has an axial hole of 50 cm diameter as shown in Figure. Determine the centre of gravity of the body. **15**
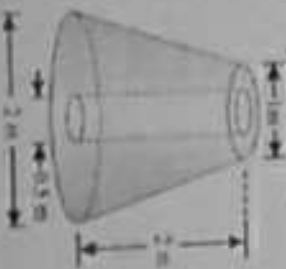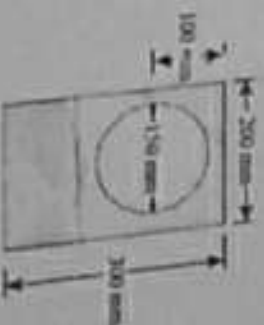

3073-1950-(P-4)(Q-9)(22)   (2)

5. Calculate the force in each member of loaded truss. **15**

UNIT – III

6. Find the moment of inertia of a hollow section shown in Figure about an axis passing through its centre of gravity or parallel X–X axis. **15**

7. Explain the concept of rigid body. Derive the equations of motion for translation and rotation for a rigid body. **15**

3073-1950-(P-4)(Q-9)(22)   (3)   P. T. O.