Question Bank (G scheme)

Name of subject: ENGINEERING MECHANICS **Unit Test :II**

Subject code: 17204 **Course :CH/ME**

Semester: II

Chapter-4 Equilibrium

Q-1 What is the relation between resultant and equilibrant? **(3 Marks)**

Q-2 Write the analytical conditions of equilibrium for coplanar concurrent force system. **(3 Marks)**

Q-3 Define the free body and free body diagram. **(3 Marks)**

Q-4 What is lami's theorem? State it's limitations. **(3 Marks**)

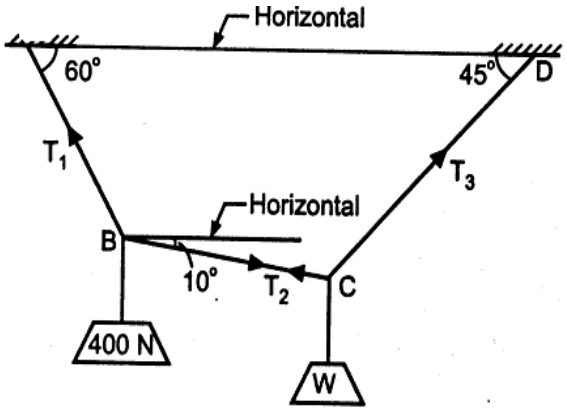
Q-5 A sphere of weight 400N rests in a groove of smooth inclined surfaces which are making 60^0 and 30^0 inclination to horizontal. Find the reactions at contact surfaces analytically**. (4 Marks)**

Q-6 A beam ABC is hinged at A and roller supported at B. Span AB is 5m and overhang BC is 2m. Beam carries UDL of 20 KN/m over a span BC along with point load of 50 KN at 2.5m from support A. Calculate support reactions graphically. **(4 Marks)**

Q-7 A truck weighing 150KN while crossing a bridge AB, 20m span assumed simply supported stopped due to breakdown at a distance of 4m from B. Find the upward force that should be exerted by end supports if the self weight of bridge is 5KN/m**. (4 Marks)**

Q-8 A weight of 100 N is suspended by a knot from two strings, attached to a horizontal beam. These strings make angles of 45^0 and 30^0 with horizontal. Find the tensions in strings graphically**. (4 Marks)**

Q-9 **)** A string ABCD is fixed at A & D. Two weights 400 N & 'W' N are attached at B & C. The strings AB, BC & CD are making angles of 600, 100 & 450 with horizontal respectively.



Find the weight W & tensions in the strings.

Chapter-5 Friction

Q-1 Define the terms i) Angle of friction ii) Angle of repose iii) Coefficient of friction. **(3 Marks)**

Q-2 State the advantages of Friction. **(3 Marks)**

Q-3 Why lubricating oil is used in machines**. (3 Marks)**

Q-4 Why static friction is greater than dynamic friction**. (3 Marks)**

Q-5 A force of 20N is required to pull a body of 50N resting on horizontal plane. What will be the coefficient of friction. **(3 Marks)**

Q-6 A body of weight 300N is placed on plane inclined at an angle of 17^0 with horizontal. If the coefficient of friction is 0.3, Find the value of the force to be applied parallel to the plane just to move the body up the plane. **(4 Marks)**

Q-7 A body weighing 1500N is resting on a rough horizontal plane. A pull of 300N applied at 30^0 with horizontal just moves the body. Find the coefficient of friction. **(4 Marks)**

Q-8 a body resting on a horizontal plane required a pull of 80N inclined at 30^0 to horizontal just to move it. It was also found that a push of 100N inclined at 30^0 to the horizontal just moved the body. Find the weight of body and coefficient of friction. **(4 Marks)**

Q-9 A body of 400N weight rests in a limiting equilibrium on 30^0 rough inclined plane. If the angle of the plane is raised to 45^0 Find the force along the plane required to keep the body in equilibrium**. (4 Marks)**

Q-10 Write the laws of static Friction**. (4 Marks)**

Chapter-6 Centroid & Centre of Gravity

Q-1 Define the terms centroid and centre of Gravity. **(3 Marks)**

Q-2 Show in sketch the C.G. of a hemisphere of diameter 200mm. **(3 Marks)**

Q-3 Calculate the centroid of semicircle of radius 100mm. **(3 Marks)**

Q-4 Locate the centroid of angle section having flange 100 X 10mm and web 10 X 80mm**. (4 Marks)**

Q-5 A retaining wall of height 5.2m has one side vertical. The top width is 1.2m and bottom width is 3.6m. find centroid. **(4 Marks)**

Q-6 Find the centroid of channel section 30cm x 12cm x 2cm from back of web**. (4 Marks)**

Q-7 A hemisphere of diameter 100mm is placed on top of a cylinder whose diameter is also 100mm. Find C.G. of composite solid from the base of cylinder if its height is 120mm. **(4 Marks)**

Q-8 A solid cone of 500mm height and 200mm base diameter. If portion above half of its height is removed, determine the point at which the remaining body can be balanced**. (4 Marks)**

Q-9 A solid cone of base diameter 120mm and height 320mm is placed on a horizontal plane with its apex at the top. Find the maximum angle of tilt from which it can come back to the original position. **(4 Marks)**