Answer five questions only:

Q1: - a) The forces F1, F2, and F3 all of which act on point A of the bracket. Determine the x and y scalar Components of each of the three forces. (12 marks)

b) Determine the Resultant R of the two forces, and one couple acting on the I-beam. Also find locate the R to the right of the fixed end. (8 marks)

Q2: - Determine the wrench resultant of the three forces acting on the bracket. Calculate the coordinates of the point P in the x-y plane through which the resultant force of the wrench acts. also find the magnitude of couple M of the wrench. (20 marks)

Q3: - The vertical mast supports the 4-kN force and is constrained by the two fixed cable BC and BD and by a ball-and-socket connection at A. Calculate the tension T1 in BD and the tension T2 in Be. by using equations equilibrium. (20 marks)

Q4: - a) Determine the coordinate x-axis of the centroid of the shaded area as shown. (10 marks)
b) The acceleration of a particle is given by \( a = 4t - 30 \). Where the \( a \) is in meter per seconds squared and \( t \) is in seconds. Determine the velocity and displacement as function of time. when the \( V_0 = 3 \text{ m/s} \) and the \( X_0 = -5 \text{ m} \) at \( t = 0 \).

Q5: a) Determine the coordinates of the centroid of the trapezoidal area shown.

Q5: b) Calculate the minimum possible magnitude \( U \) of the muzzle velocity which a projectile must have when fired from point A to reach a target B on the same horizontal plane 12 km away.

Q6: a) Determine the moment of inertia of the shaded area about the x-axis.

Q6: b) A car is climbing the hill of slope \( \Theta_1 \) at a constant speed \( V \) if the slope decreases to \( \Theta_2 \) at point A. Determine the acceleration \( a \) of the car just after passing point A if the driver dose not change the throttle Setting into a different gear.

................................GOOD LUCK.......................