

B.Sc.Engg. (ME)1st Sem.

03 October 2023 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Mid Semester Examination

Course No: ME 4103

Course Title: Statics

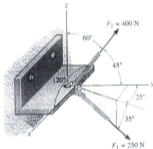
Winter Semester : A.Y. 2022-2023

Time : 1 Hour 30 min

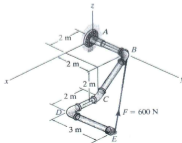
Full Marks : 75

Answer all questions. Each question carries equal marks. The symbols have their usual meanings. Draw the free-body diagram if required. The right column also indicates the course objective (CO) and Program outcome (PO) addressed by each question

Q-01(a). The bracket is subjected to the two forces shown. Express each force in Cartesian vector form and then determine the resultant force F_R . Find the magnitude and coordinate direction angles of the resultant force. **12.5 (CO1) (PO1)**

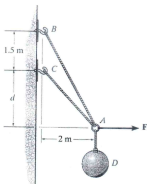


Q-01(b). Determine the magnitudes of the components of $F = 600\text{N}$ acting along and perpendicular to segment DE of the pipe assembly. **12.5 (CO1) (PO2)**



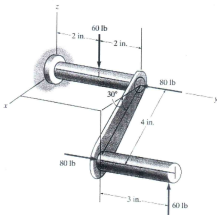
Q-02(a). The ball D has a mass of 20 kg . If a force of $F = 100 \text{ N}$ is applied horizontally to the ring at A , determine the largest dimension d so that the force in cable AC is zero.

12.5
(CO1)
(PO2)



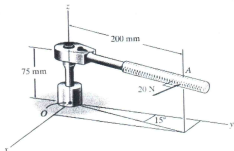
Q-02(b). Determine the resultant couple moment of the two couples that act on the assembly. Specify its magnitude and coordinate direction angles.

12.5
(CO2)
(PO1)



Q-03(a). A 20 N horizontal force is applied perpendicular to the handle of the socket wrench. Determine the magnitude and the coordinate direction angles of the moment created by this force about point O .

12.5
(CO2)
(PO2)



Q-03(b). The man uses the hand truck to move material up the step. If the truck and its contents have a mass of 50 kg with center of gravity at G , determine the normal reaction on both wheels and the magnitude and direction of the minimum force required at the grip B needed to lift the load.

12.5
(CO2)
(PO2)

