AJEENKYA
D Y PATIL UNIVERSITY

End Term Examination (April 2019)

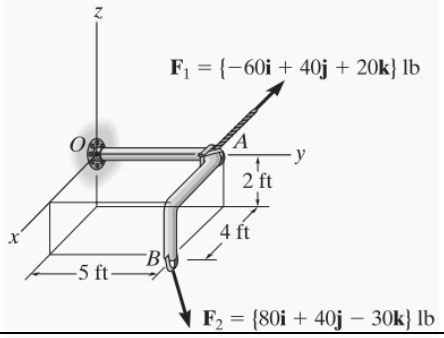
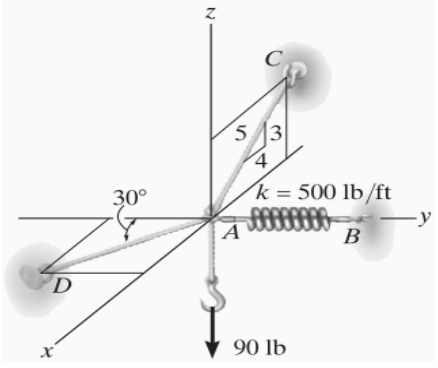
School: School of Engineering **Program:** B.Tech (FY)
Course: Mechanics **Course Code**: ENG107
Semester: II **Max Marks:** 40 **Duration (mins):** 120

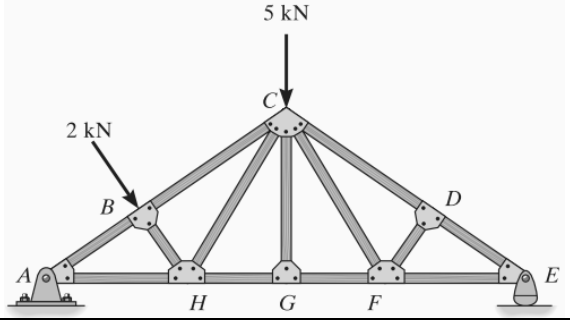
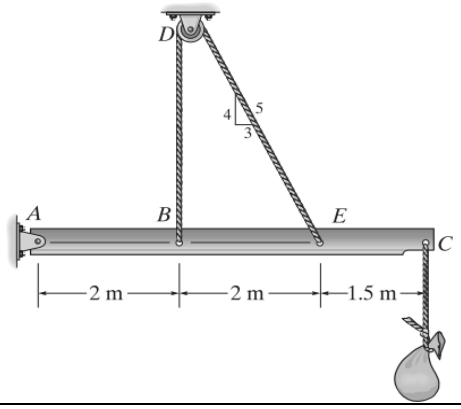
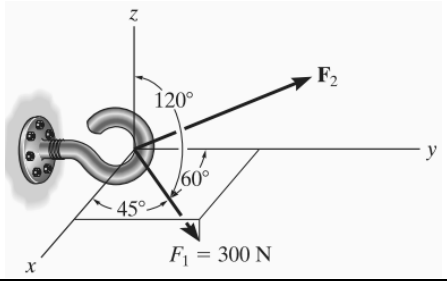
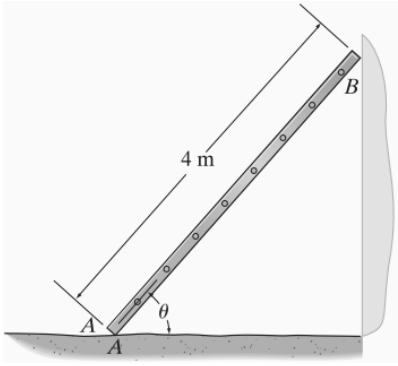
Note : 1. Figures to the right indicates full marks.
2. All questions are compulsory 3. Use of calculator is allowed

Q. No. 1 Write short note on following – (any 3) (9)

a. Characteristics of forces
b. Method of sections
c. Space trusses
d. Lami's theorem
e. Friction and its types

Q. No. 2 Solve the following problems- (any 6) (31)

a.	Two forces act on the rod shown in Fig. Determine the resultant moment they create about the flange at O. Express the result as a Cartesian vector.	
b.	A 90-lb load is suspended from the hook shown in Fig. If the load is supported by two cables and a spring having a stiffness k = 500 lb/ft, determine the force in the cables and the stretch of the spring for equilibrium. Cable AD lies in the x–y plane and cable AC lies in the x–z plane.	

c.	Using the method of joints, determine all the zero-force members of the Fink roof truss shown in Fig. Assume all joints are pin connected.	
d.	Draw the free-body diagram of the beam which supports the 80-kg load and is supported by the pin at A and a cable which wraps around the pulley at D. Explain the significance of each force on the diagram.	
e.	Specify the magnitude of F_2 and its coordinate direction angles of F_2 that the resultant force F_R acts along the positive y axis and has a magnitude of 800 N. Two forces act on the hook shown in figure.	
`f.	The uniform 10-kg ladder in Fig. rests against the smooth wall at B, and the end A rests on the rough horizontal plane for which the coefficient of static friction is μ_s = 0.3 . Determine the angle of inclination θ of the ladder and the normal reaction at B if the ladder is on the verge of slipping.	

g. Draw reactions and write number of unknown forces of following support systems. (6 marks)

1	2	3	4	5	6