

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

**CLASS: B.ARCH
BRANCH: ARCHITECTURE**

**SEMESTER: II
SESSION : SP/2019**

SUBJECT : AR153 STATICS AND STRENGTH OF MATERIALS

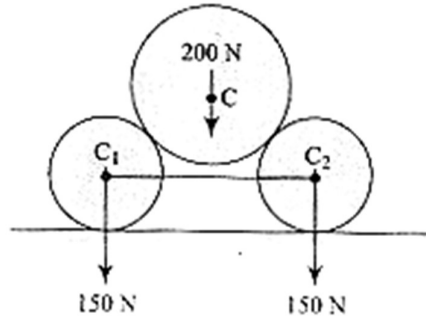
TIME: 2 HOURS

FULL MARKS: 25

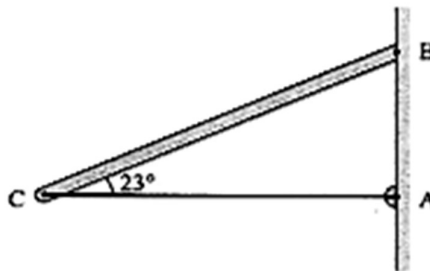
INSTRUCTIONS:

1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

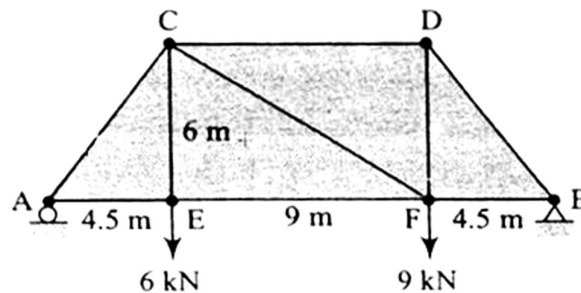
- Q1 (a) Illustrate free body diagram. [2]
 (b) Two identical iron spheres, each of radius 5 cm and weight 150 N are connected with a string of length 16 cm, and rest on a horizontal smooth floor. Another sphere of radius 6 cm and weight 200N rests over them. Calculate the tension in the string and reaction at all contact surfaces. [3]



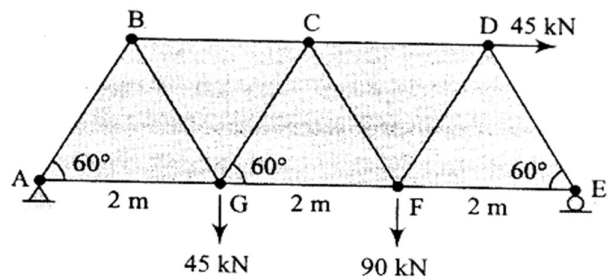
- Q2 (a) Explain Varignon's theorem of moment. [2]
 (b) A prismatic bar of length 11m and mass 21 kg is hinged with vertical wall at B and is tied at the other end with a strut AC. Compute the compressive force induced in the strut and the reaction at hinge. [3]



- Q3 Predict the induced forces in each member of the truss loaded and supported as shown in Figure. [5]



- Q4 Using the method of sections, evaluate forces induced in members CF and GC in the truss shown in Figure. [5]



- Q5 (a) Distinguish between Elasticity and Plasticity. [2]
(b) A hollow cylinder 2 m long has an outside diameter of 50 mm and inside diameter of 30 mm. If the cylinder is carrying a load of 25 kN, Estimate the stress in the cylinder. Also evaluate the deformation of the cylinder, if the value of modulus of elasticity for the cylinder material is 100 GPa. [3]

:::::: 05/03/2019 ::::::::M