

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

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

**SEMESTER : II
SESSION : SP/19**

SUBJECT: AR153 STATICS & STRENGTH OF MATERIALS

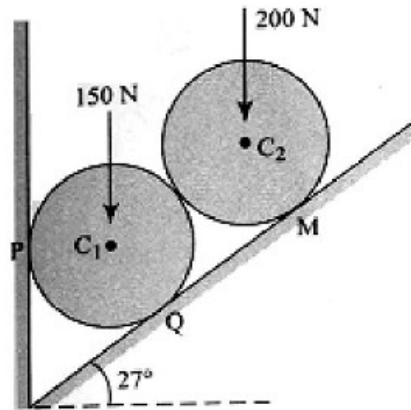
TIME: 3.00 Hrs.

FULL MARKS: 50

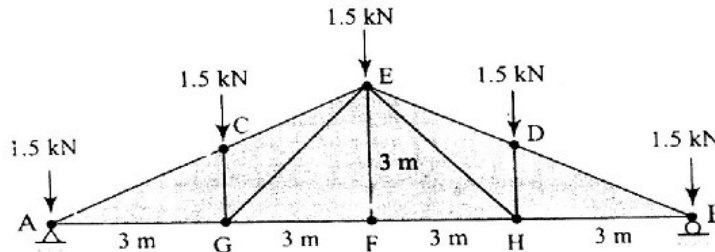
INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

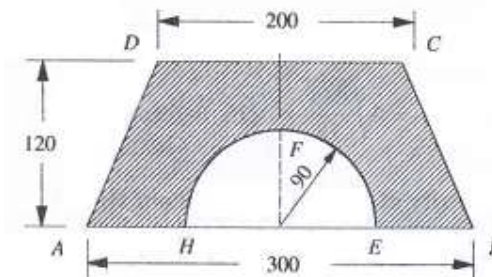
- Q.1(a) Explain coplanar and concurrent system of forces. [5]
 Q.1(b) Two spheres are kept within a conical channel, as shown in Figure 1. All contact surfaces are smooth. Evaluate all contact reactions if size of the spheres is same but have different weights. [5]



- Q.2 Neglecting any horizontal component of force in the supports, evaluate the forces in the members of the Pratt roof truss. [10]



- Q.3(a) Illustrate the term 'Radius of Gyration' with reference to Moment of Inertia. [5]
 Q.3(b) A semi-circle of 90 mm radius is cut out from a trapezium as shown in Figure. Determine the position of the centre of gravity of the figure. [5]



Q.4(a) Evaluate the relationship between Young's modulus and bulk modulus. [5]

Q.4(b) If the tension test bar is found to taper from (D+a) mm diameter to (D-a) mm diameter, prove that [5]

the error involved in using the mean diameter to calculate Young's modulus is $\left(\frac{10a}{D}\right)^2$ percent.

Q.5(a) Illustrate the term 'Point of contraflexure' with reference to Bending Moment Diagram. [5]

Q.5(b) A simply supported beam of length 6 m, carries point load of 3 kN and 6 kN at a distance of 2m and 4 m from the left end. Draw the Shear force and Bending moment diagram. [5]

:::::26/04/2019 M:::::