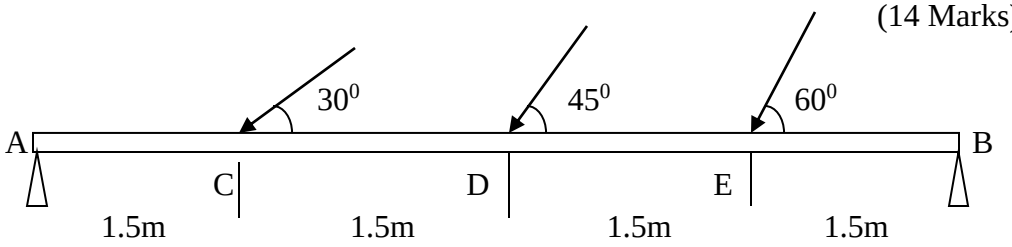
MECHANICAL TECHNOLOGY-TEP YEAR 2 (MARCH/APRIL 2016)

Answer **ALL** Questions

SECTION A- STRENGTH OF MATERIALS

1. A horizontal beam AB of length 6m is hinged at A and supported on rollers at B. The beam carries inclined loads of 150 N, 200N and 400 N inclined at 30^0, 45^0 and 60^0 to the horizontal as shown. Draw the S.F, B.M and thrust diagrams for the beam.

(14 Marks)



2. A hollow shaft having an inside diameter 65% of its outer diameter is to replace a solid shaft transmitting the same power at the same speed. Calculate the percentage saving in material if the material to be used is also the same.

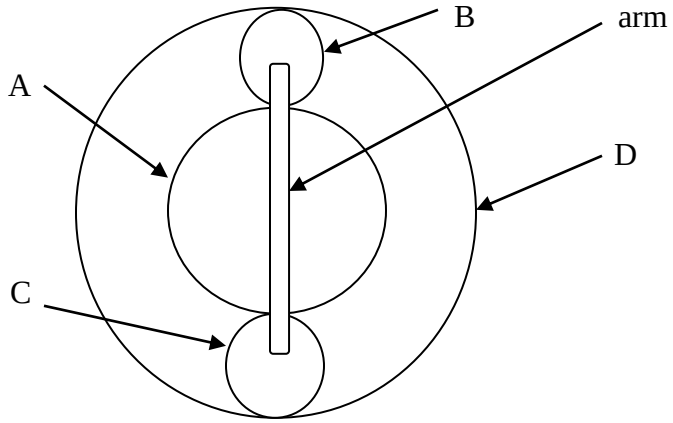
(14 Marks)

3. Two circular beams where one is solid of diameter D and the other is hollow of outer diameter D_0 and inner diameter D_i are of the same length, same material and of the same weight. Find the ratio of section modulus of these circular beams.

(14 Marks)

SECTION B-MECHANICS OF MACHINES

4. An epicyclic train of gears is arranged as shown. How many revolutions does the arm to which the pinions B and C are attached make:



a). When A makes 1 revolution clockwise and D makes half a revolution anticlockwise

b). When A makes 1 revolution clockwise and D is stationary.

(14 Marks)

5. Two pulleys one 450mm diameter and the other 200mm diameter are on parallel shafts 1.95m apart and are connected by a crossed belt. Find the length of the belt required and the angle of contact between the belt and each pulley. What power can be transmitted by the belt when the larger pulley rotates at 200 rpm, if the maximum permissible tension in the belt is 1kN, and the coefficient of friction between the belt and pulley is 0.25.

(14 Marks)