



# INSTITUTE OF TECHNICAL EDUCATION AND RESEARCH

Faculty of Engineering & Technology, ITER

SIKSHA 'O' ANUSANDHAN DEEMED TO BE UNIVERSITY

Jagamohan Nagar, Jagamara, Po: Khandagiri, Bhubaneswar-30

## Preparatory Physics (Mechanics) (1<sup>st</sup> Year B.Tech 2019 Admission Batch)

### Assignments- 7

1. A right circular roller of weight  $W$  rests on a smooth horizontal plane and is held in position by an inclined bar  $AC$  as shown in Fig. F. Find the tension  $S$  in the bar  $AC$  and the vertical reaction  $R_b$  at  $B$  if there is also a horizontal force  $P$  acting at  $C$ .

Ans.  $S = P \sec \alpha$ ;  $R_b = W + P \tan \alpha$ .

2. Two smooth circular cylinders, each of weight  $W = 100$  lb and radius  $r = 6$  in., are connected at their centers by a string  $AB$  of length  $l = 16$  in. and rest upon a horizontal plane, supporting above them a third cylinder of weight  $Q = 200$  lb and radius  $r = 6$  in. (Fig. H). Find the force  $S$  in the string  $AB$  and the pressures produced on the floor at the points of contact  $D$  and  $E$ .

Ans.  $S = 89.4$  lb, tension;  $R_d = R_e = 200$  lb.

3. Two identical rollers, each of weight  $Q = 100$  lb, are supported by an inclined plane and a vertical wall as shown in Fig. I. Assuming surfaces, find the reactions induced at the points of support  $A$ ,  $B$ , and  $C$ .

Ans.  $R_a = 86.6$  lb;  $R_b = 144$  lb;  $R_e = 115$  lb.

4. Referring to Fig. A, calculate the tensions  $S_1$  and  $S_2$  in the two strings  $AB$  and  $AC$  that support the lamp of weight  $Q = 40$  lb. Use the method of projections.

Ans.  $S_1 = 30$  lb;  $S_2 = 50$  lb.

5. A roller of weight  $W = 1000$  lb rests on a smooth inclined plane and is kept from rolling down by a string  $AC$  as shown in Fig. B. Using the method of projections, find the tension  $S$  in the string and the reaction  $R_b$  at the point of contact  $B$ .

Ans.  $S = 733$  lb;  $R_b = 897$  lb.

