Ex/CE/AM/ME/T/A/115/2018(S)

(OLD)

Bachelor of Civil Engineering

1st year 1st semester Supplementary examination, 2018

subject : Engineering Mechanics (Old Syllabus)

Time 3 hrs **Full Marks : 100**

Answer any five questions :

1. (a) Refer to Fig A and find out the moment of the force about axis ac.

(b) Refer to Fig B and replace the system of forces and moments acting on different sides of the cube (each side 10 cm) with a single force and moment to be applied at A.

10+10

2. (a) Refer to Fig C and draw free body diagrams of individual members and also of the overall structure.

(c) Refer to Fig D and find out the support reactions. 10+10

3. (a) Refer to Fig E and find out the force needed to cause the upward motion of the upper block. Coefficient of friction for all surfaces is 0.2.

(b) Refer to Fig F and find out the x and y coordinates of the centroid of the shaded area.

10+10

4. (a) Refer to Fig G and find out the initial speed of the projectile, just sufficient to cross the valley.

(b) Deduce the expressions for radial and transverse components of acceleration in case of motion along a curved path.

10+10

5 (a) Find out the distance travelled by the block in 3 seconds, starting from rest, if a force 100 N is applied to the cable (Fig H).

(b) Refer to fig I and find out the velocities of the hammer and the pile immediately after impact. The hammer is released from a height of 1.8 m and its rebound after impact is 0.15 m.

10+10

6. write short notes on any four : 4 X 5=20

(a) Pappus Guldinus Theorem

(b) D'Alembert's principle

(c) Free vector and fixed vector

(d) Two force member and three force member

(e) Work energy principle.

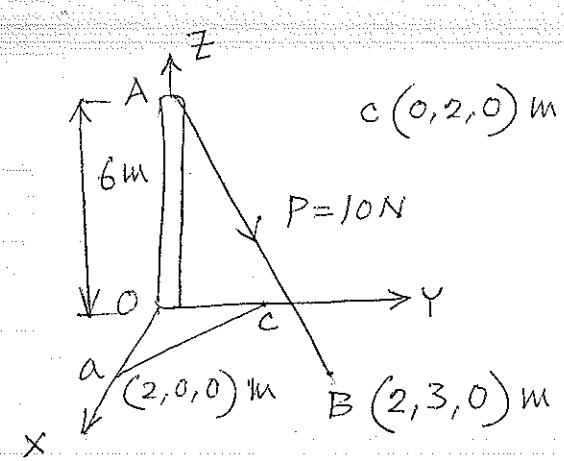


Fig A

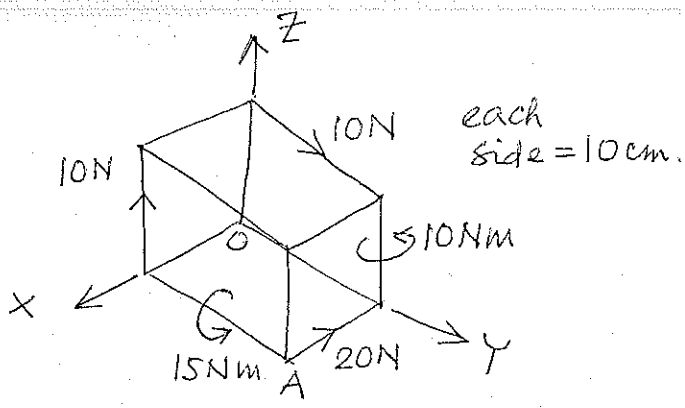


Fig B

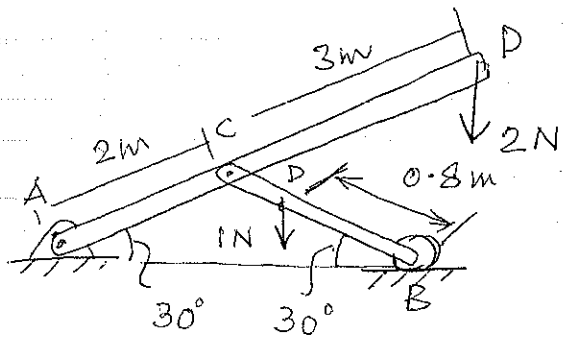


Fig C

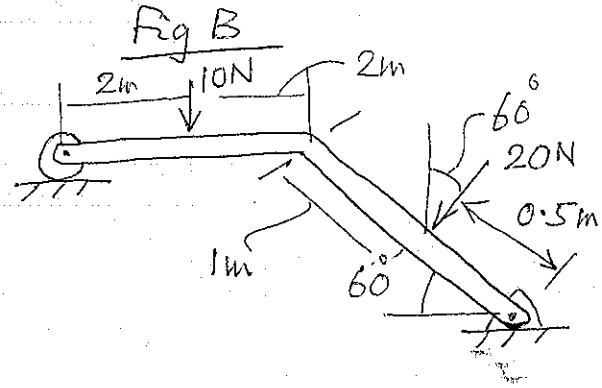


Fig D

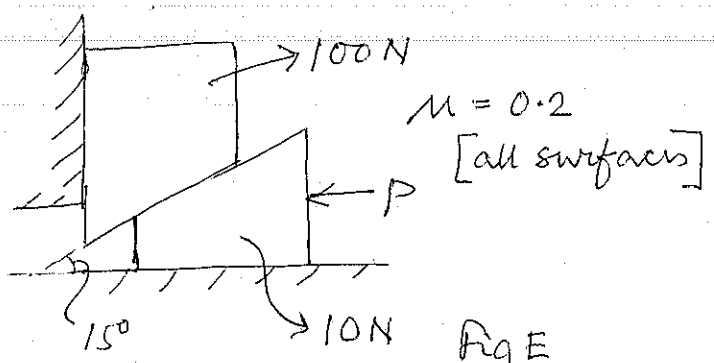


Fig E

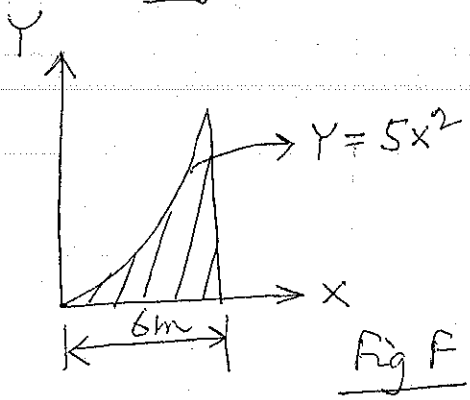


Fig F

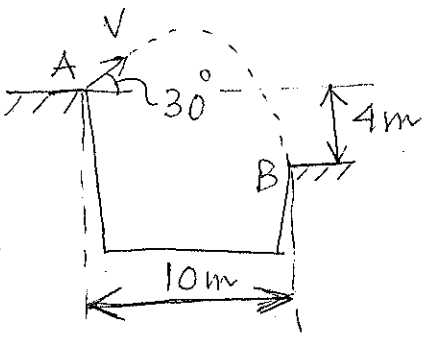


Fig G.

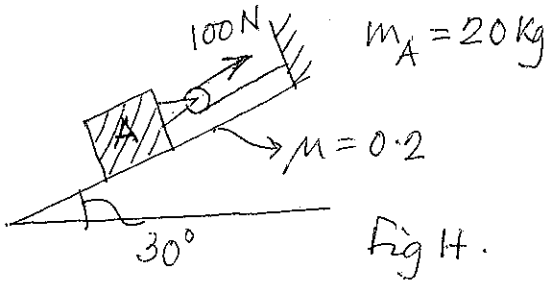
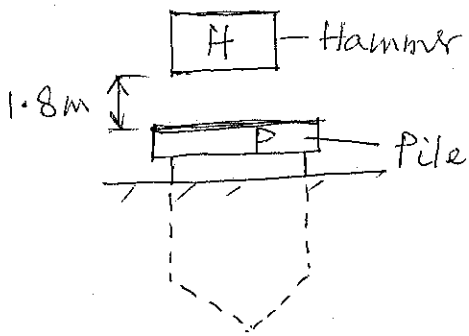


Fig H.



mass$_H$ = 400 kg

mass$_P$ = 1320 kg

rebound of hammer = 0·15m

Fig I.