EX/AM/ME/T/A/2018(S

Bachelor of Civil Engineering

1st year 1st semester Supplementary examination (old), 2018

subject : Engineering Mechanics

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 point O.

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

10+10

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

(c) Refer to Fig D and find out the support reactions at A.

10+10

3. (a) Refer to Fig E and find out the cable tensions on CA and CB. O is a ball and socket joint.

20

4. (a) Refer to Fig F and find out the distance AB where the projectile will hit.

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

10+10

5 (a) Refer to fig G and find out the volume generated by revolving the area through one complete revolution about X axis.

(b) Refer to fig H 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) Laws of dry friction

(b) Impulse momentum principle

(c) Free vector, sliding vector and fixed vector

(d) Two force member and three force member

(e) Area moment of inertia .

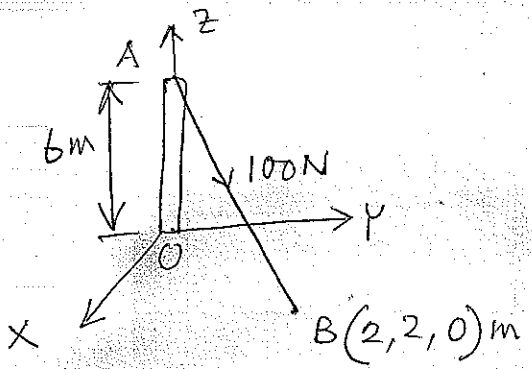


Fig A

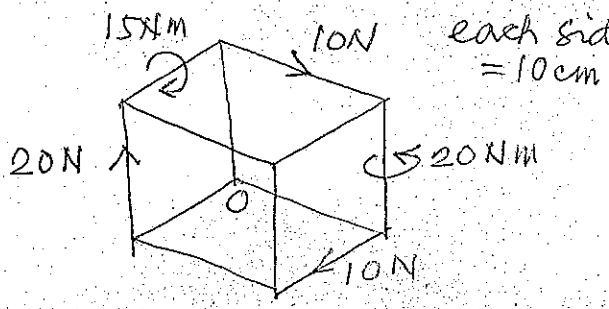


Fig B

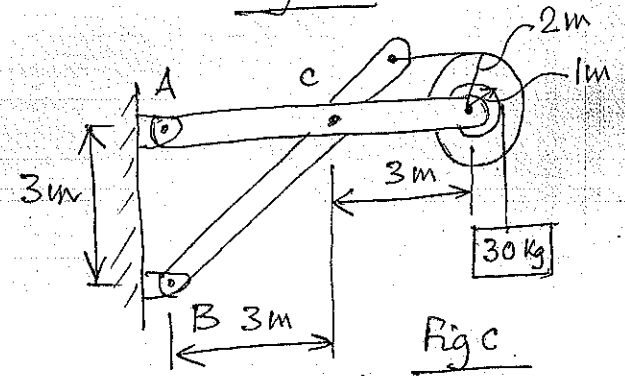


Fig C

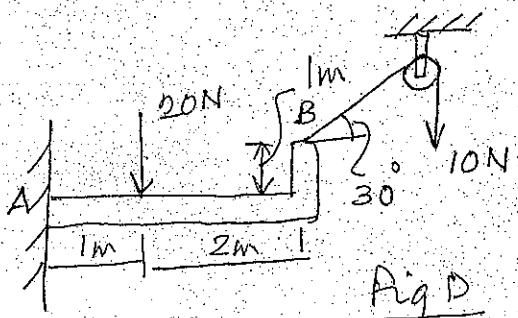
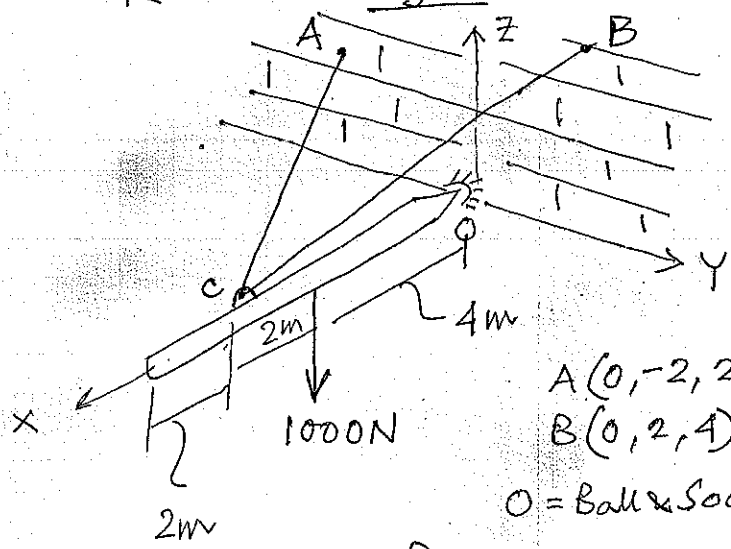
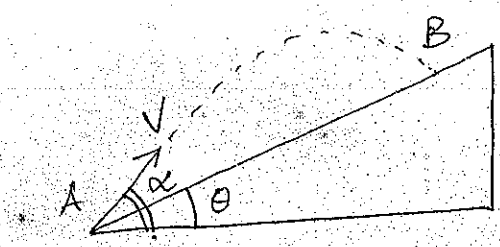


Fig D



A(0,-2,2)m
B(0,2,4)m
O = Ball & Socket jt.

Fig E



$\theta = \tan^{-1} 1/4$

$\alpha = \tan^{-1} 4/3$

$V = 30 m/s$

Fig F

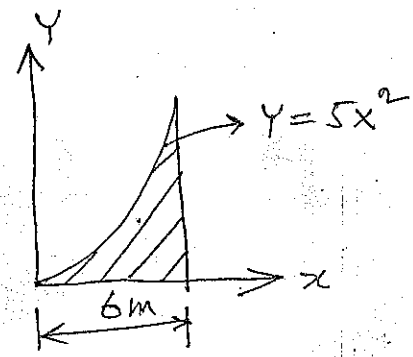
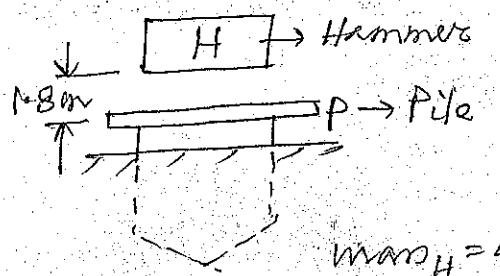


Fig G.



$mass_H = 400 kg$

$mass_P = 1320 kg$

Fig H.