DIPLOMA IN CIVIL ENGINEERING (DCLE(G)) / DIPLOMA IN MECHANICAL ENGINEERING (DME) / DCLEVI / DMEVI / DELVI / DECVI / DCSVI / ACCLEVI / ACMEVI / ACELVI / ACECVI / ACCSVI

Term-End Examination, 2019

BET-014 : APPLIED MECHANICS

Time : 2 Hours]   [Maximum Marks : 70

Note : Attempt **any five** questions. All questions carry **equal** marks. Assume suitable data wherever necessary. Use of calculator is allowed.

1.   Forces of $2N, \sqrt{3}N, 5N, \sqrt{3} \ N$ and $2N$ respectively act at one of the angular points of a regular hexagon towards the other five angular points taken in order. Find the magnitude and direction of the resultant force.   [14]

2.   A cantilever AB, 1.8 m long, is fixed at A and carries uniformly distributed load of 20 kN/m over its entire length and a point load of 30 kN at the free end. Determine the reactions at A (Fig. 1) :   [14]
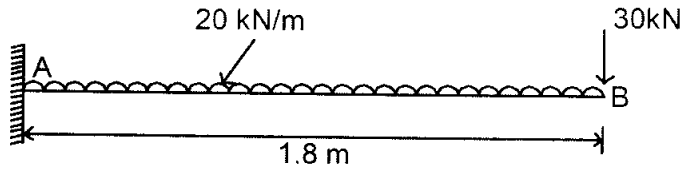
20 kN/m

30kN

A

B

1.8 m

Fig. 1

3. Find the magnitude and nature of forces in each member of the truss as shown in Fig. 2 below : [14]

20kN

40kN

D

E

60^0

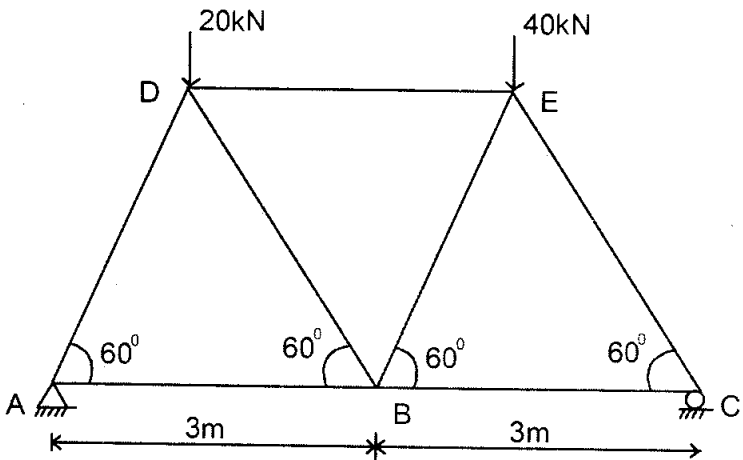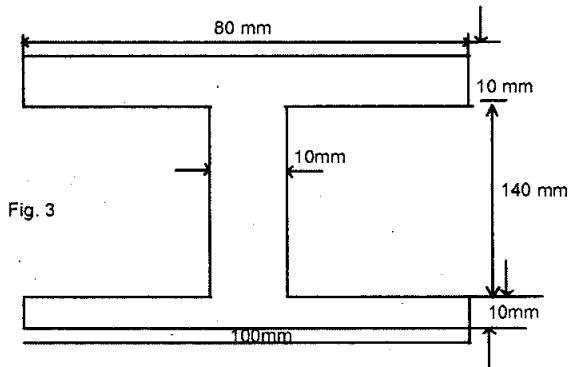60^0

60^0

60^0

A

B

C

3m

3m

Fig. 2

4. Find the moment of inertia of the section, shown in Fig. 3 below, about the horizontal and vertical axes passing through the centre of gravity of the section : [14]

Fig. 3

5. A ladder weighing 60 N rests at a corner as shown in Fig. 4. What is the minimum value of angle α (with the horizontal) possible before the slip occurs ? The coefficient of static friction at A is 0.2 and B is 0.3.

[14]

Fig. 4
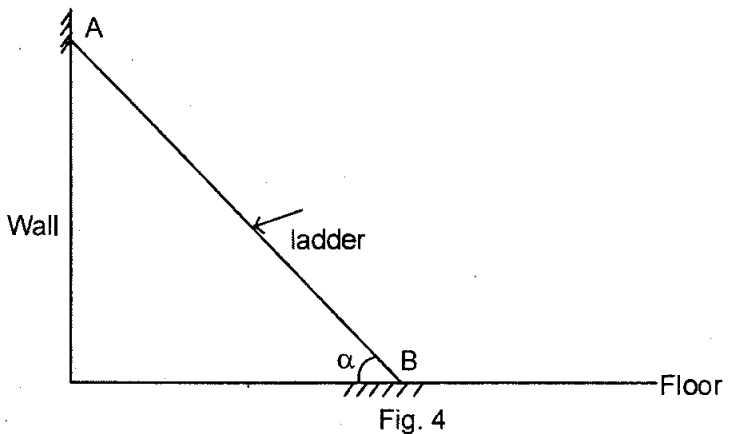
6.   A projectile is fired with a velocity of 500 m/s at an inclination of 30°. Find the velocity and the direction of the projectile after 30 seconds of its firing.   [14]

7.   A gun has a mass of 30 tonnes. It fires a bullet whose mass is 450 kg with a velocity of 300 m/s :   [14]

   (i)   Calculate the initial velocity of gun recoil.

   (ii)   If a resistive force of 6C0 kN is applied on gun on an average, calculate the distance travelled by the gun during re⌣oil.

   (iii)   Also compute the time period of recoil.

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