BET-014

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

Term-End Examination

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December, 2018

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 scientific calculator is permitted.*

1. Four coplanar forces of magnitude 40 N, 30 N, 20 N and 50 N act at various directions as shown in Figure 1 below. Find the magnitude and direction of the resultant force.   *14*
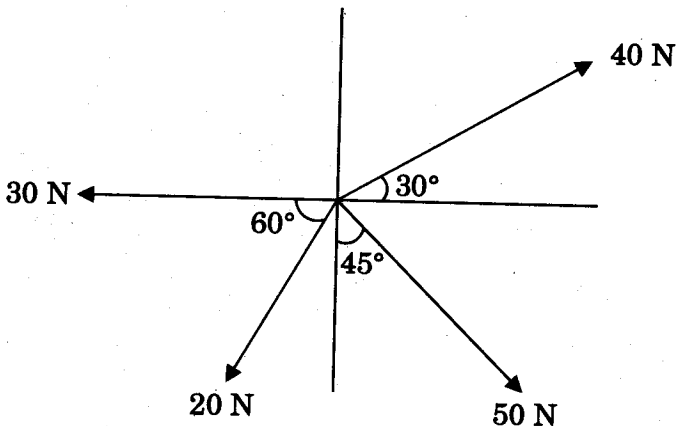

Figure 1

2. A smooth sphere weighing 200 N is resting against smooth walls as shown in Figure 2 below. Determine the reactions at the supports. *14*
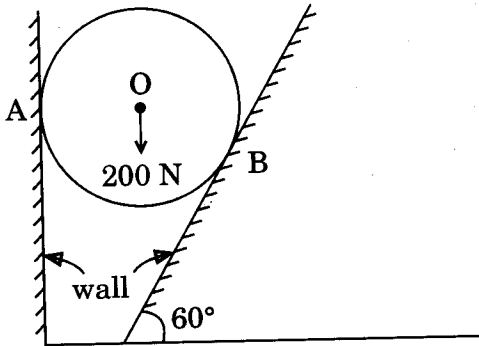

Figure 2

3. A beam AB is hinged at A and is supported at C. It is loaded as shown in Figure 3 below. Find out the reactions at A and C. *14*
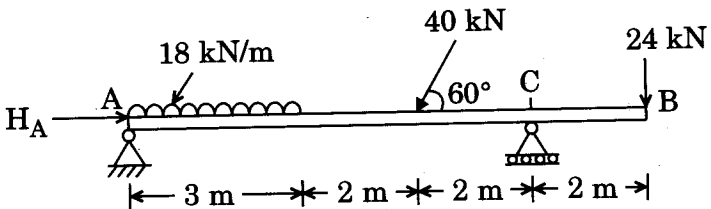

Figure 3

4. Find the position of C.G. of a wall section shown in Figure 4.   *14*

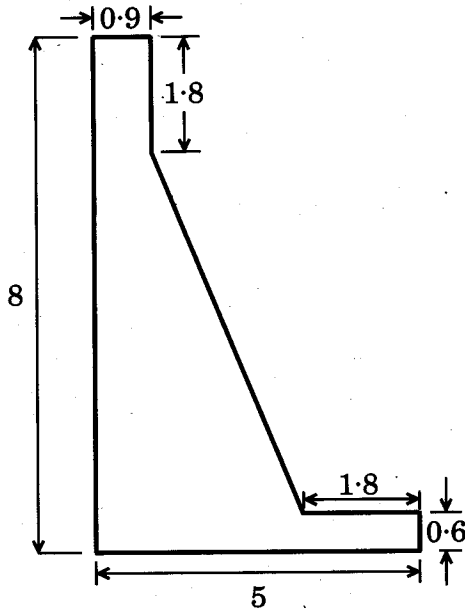*Figure 4*

All dimensions are in metres.

5. A body weighing 500 N is resting on an inclined plane making an angle of 30° with the horizontal. The coefficient of friction is 0·3. A force P is applied parallel to and up the inclined plane. Determine the least value of P when the body is just on the point of movement

(a) Case 1, moving down

(b) Case 2, moving up   *14*

6. A cage of self-mass of 1000 kg is carrying a shift load of six passengers of average mass 65 kg. If the cage is moving with

(a) a uniform acceleration of 2 m/sec^2 upwards

(b) a uniform acceleration of 2 m/sec^2 downwards

(c) a uniform velocity of 5 m/s downwards,

find

(i) the tension in the wire supporting the cage, and

(ii) the reaction of the cage on the crew and of the crew on the cage. *14*

Assume g = 10 m/sec^2.

7. When a motorcyclist is riding west at 40 km/h, he finds the rain meeting him at an angle of 45° with the vertical. When he rides at 24 km/h, he finds the rain at an angle of 30° with the vertical. What is the actual velocity (magnitude and direction) of the rain ? *14*

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