

**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

0583

Time : 2 Hours

Maximum Marks : 70

Note : Question no.1 is compulsory. Attempt any four questions from the remaining ones. Assume suitable data wherever necessary. Use of scientific calculator is permitted. All questions carry equal marks.

1. Choose the correct answer from the given four alternatives : [7×2=14]

(a) Mechanics is the branch of science which deals with the study of :

(i) Action of forces on bodies

(ii) Action of gravity on bodies



(iii) Action of weight on bodies

(iv) Action and reaction

(b) Unit of weight in S.I. is :

(i) kg-wt

(ii) Poundal

(iii) Newton

(iv) Kgm

(c) The magnitude of resultant of two forces of 10N and 5N acting at 90° is :

(i) 13N

(ii) 15N

(iii) 12.67N

(iv) 11.2N

(d) The moment of force W about a point A (Fig.1)



(i) WL clockwise

(ii) WL anticlockwise

(iii) $\frac{WL}{4}$ clockwise

(iv) $\frac{WL}{4}$ anticlockwise

(e) A body slides over another body by an external force. The opposing force acting on the body is called :

(i) Rolling friction

(ii) Sliding friction

(iii) Static friction

(iv) Dynamic friction

(f) The M.I. of a square, about X X axis as shown in Fig.2 is :

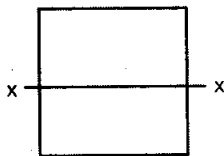


Fig.2

(i) $\frac{d^4}{12}$

(ii) $\frac{d^3}{12}$

(iii) $\frac{d^4}{24}$

(iv) $\frac{d^3}{6}$

(g) A machine is said to be ideal if its efficiency is :

(i) 100%

(ii) 75%

(iii) 50%

(iv) zero

2. (a) Define parallelogram law of forces. [4]

(b) The resultant of two concurrent forces is perpendicular to the smaller force and the angle between the forces is 120° . If the bigger force is 60N, find the smaller force. [10]

3. (a) State the principle of moment. [4]

(b) Four forces 2N, 3N, 6N and 5N act along the sides AB, CB, CD and DA respectively of a square

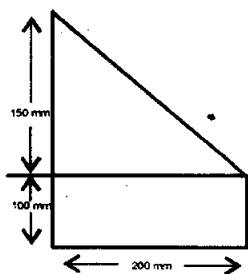
ABCD of side 0.5m. Find the sum of their moments about : [10]

- (i) the centre of the square
- (ii) point A

4. (a) State the laws of static friction. [7]

(b) A box weighing 100N is resting on a horizontal plane, the coefficient of friction being 0.4. Find the least force acting horizontally which would move the box. [7]

5. Find the position of the centroid of the plane area as shown in Fig.3. [14]



6. (a) Define the terms Mechanical advantage, velocity ratio and efficiency of a machine. [7]

- (b) A man of mass 90 kg dives into a swimming pool from a tower of height 20m. He was found to go down into water by 2.5m and then started rising. Find the average resistance of water. Neglect the resistance of air. Take $g=9.8\text{m/s}^2$. [7]
7. (a) Explain parallel axis theorem of determining moment of inertia. [7]
- (b) Describe Newton's laws of motion briefly. [7]

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