C16-C-**105**

5016

BOARD DIPLOMA SUPPLEMENTARY (INSTANT) EXAMINATION, (C-16)

JUNE - 2019

DCE - FIRST YEAR EXAMINATION

ENGINEERING MECHANICS

Time : **3** Hours]   [Total Marks : **80**

PART - A   **2×15=30**

Instructions :   (1)   *Answer any **15** questions.*
                                    (2)   *Each question carries **2** marks.*
                                    (3)   *Answer should be brief and straight to the point and shall not exceed five simple sentences.*

1   Define the terms :

   (a)   dynamics

   (b)   statics

2   State any two applications of engineering mechanics.

3   Define the term Force and state the SI units.

4   Define coplanar and non-coplanar forces.

5   State the triangle law of force.

6   Write any two characteristics of couple.

7   State Lami's theorem.

8   State the parallelogram law of Forces.

9   Define scalar quantity and vector quantity.

10   Two forces 100N and 80N act at a point making an angle of 60 degrees between them determine their resultant.

11   Sketch a cantilever beam with a point load at midpoint.

12 List any four types of beams.

13 Define centroid.

14 Locate the positions of centroids of rectangle and semi circle with a neat sketches.

15 Show the position of centroid for trapezium.

16 Determine the centroid of an right angled triangle of base 150 mm and height 300 mm from the base.

17 Find the centroid of a rectangle of size 300 mm wide and 600 mm deep.

18 Locate the coordinates of centroid of a triangle.

19 Define centre of gravity.

20 Write the need of finding centre of gravity for engineering applications.

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**PART - B**   10×5=50

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Instructions :   *(1) Answer any **FIVE** questions.*

*(2) Each question carries **TEN** marks.*

(3) Answer should be comprehensive and criterion for valuation is the content but not the length of the answer.

21 Two coplanar forces act at a point with an angle of 60° between them if the resultant is 120 N and one of the force is 60 N. Calculate the other force.

22 Forces 100 N, 200 N, 300 N and 400 N acting at a point in the East, North-East, North-West and South-West directions respectively. Find the magnitude of resultant and its direction.

23 Calculate the forces in the members AB and AC of the frame as shown in figure.
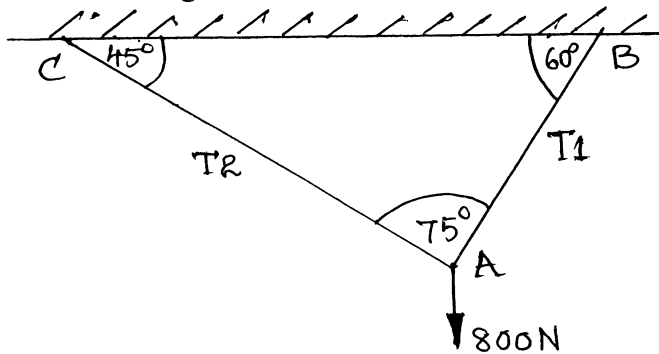
24 Find the resultant and its distance from A for the parallel system of forces shown in figure.
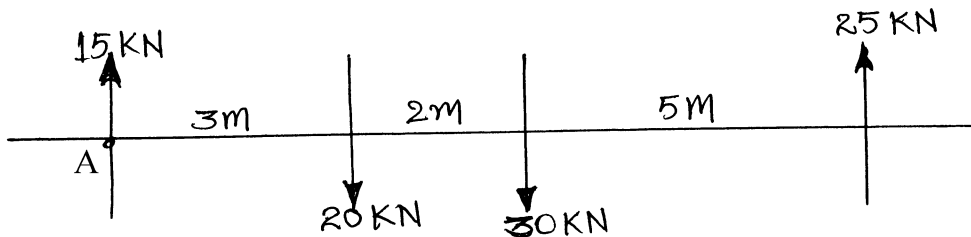
25 A simply supported beam of span 4 m carries a UDL of 10 kN/m over the entire span and a point load of 10 kN acting at a distance of 1 m from left end. Find the reactions at supports.

26 Find the centroid of an I-section with top flange 60×20 mm, web 20×100 mm, bottom flange 100×20 mm.

27 Determine the position of centroid from the base for a trapezoidal section having a slope on one side with top width of 6 m, bottom width 9 m and height is 12 m.

28 Determine the position of the centroid of an I-section ISLB 1000 has a cross sectional area 1021 mm^2 with a cover plate of 100 mm wide and 40 mm thickness welded to the top flange.

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