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C20-M-105

7053

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DME – FIRST YEAR EXAMINATION

ENGINEERING MECHANICS

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer all questions.

(2) Each question carries three marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. State Lami's theorem.

2. What are the applications of Friction?

3. What horizontal force is required to pull a body of weight 200 N along the horizontal surface? Take the co-efficient of Friction is 0.2.

4. Define (a) centroid and (b) centre of gravity.

5. A hollow circular section has an external diameter of 8 cm and internal diameter of 6 cm. Find its MI.

6. Define (a) speed, (b) velocity and (c) acceleration.

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7. A body moving* with a velocity of 12 m/sec and attains a velocity of 85 m/sec in 10 seconds. Find the acceleration and distance travelled.
8. Define (a) ideal machine and (b) ideal effort.
9. What is Simple Machine? List out any three simple machines?
10. List out any three names of Inversions of Four Bar Chain.

PART—B

Instructions : (1) Answer all questions.

(2) Each question carries eight marks.

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

11. (a) Find the magnitude and direction of resultant force for the following forces acting at a point (i) 30 kN due N-E, (ii) 40 kN at 60° East of South, (iii) 60 kN at 60° south of west and (iv) 20 kN at 60° West of North.

(OR)

- (b) Two unequal forces inclined to one another at an angle of 120° have a resultant of 12 N which makes an angle of 40° with one of the forces. Find the magnitude of two forces.

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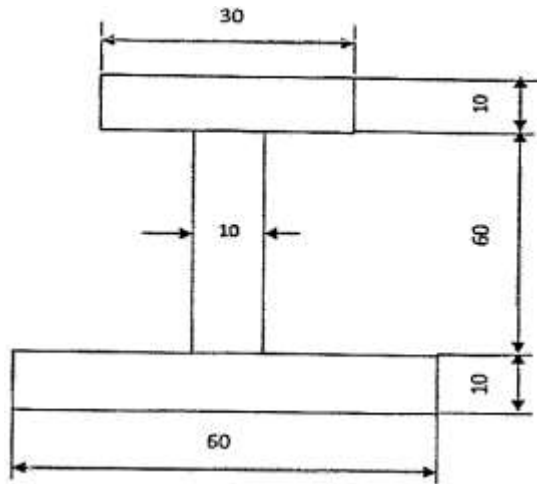
12. (a) A weight of 200 N is dragged up on an inclined plane by a force of 180 N inclined at 30° with the inclined plane. The angle of inclined plane is 40°. Calculate the co-efficient of friction.

(OR)

- (b) Explain (i) friction, (ii) angle of friction and (iii) angle of repose with help of diagrams.

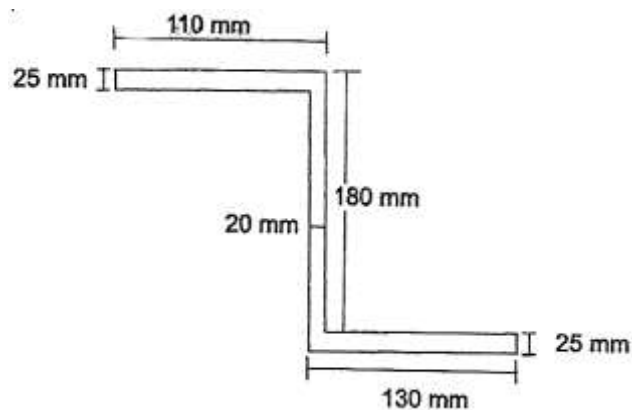
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13. (a) Calculate* MI about the centroid axis of the following :



(OR)

- (b) Find the centroid of the given section.



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14. (a) A mass of 50 kg is raised vertically through a lift of 15 m in 40 seconds. (i) Calculate gain in potential energy and (ii) Power required. 5+5=10

(OR)

- (b) Find the amplitude and time period of a particle with SHM, which has a velocity of 9 m/sec and 4 m/sec at the distance of 2 m and 3 m respectively from the centre.

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15. (a) In a differential pulley block radii of concentric pulleys are 200 mm and 150 mm. An effort of 200 N is required to lift a load of 100 N. Calculate the efficiency of the machine.

(OR)

- (b) Define (i) reversible machine, (ii) self locking machine and (iii) frictional effort.

PART—C

10×1=10

Instructions : (1) Answer the following question.
(2) It carries ten marks.

16. Explain Whitworth Quick return Mechanism with a neat sketch.

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