C09-M-303

3247

BOARD DIPLOMA EXAMINATION, (C-09)
OCTOBER/NOVEMBER-2018
DME-THIRD SEMESTER EXAMINATION

ENGINEERING MECHANICS

Time : 3 Hours] [Total Marks: 80

PART-A

3X10=30

Instructions : 1. Answer **All** questions.
2. Each question carries THREE marks
3. Answer should be brief and straight to the point

1. State the conditions for simple harmonic motion.
2. State law of conservation of momentum and express it mathematically.
3. A vehicle of mass 100kg acquires a velocity of 20m/s on 10 seconds starting from rest. Find its power.
4. State the laws of dynamic friction.
5. A block weighing 200N rests on inclined plane. If the co-efficient of friction is 0.4, find the angle of repose and greatest force of friction.
6. List out any six simple machines.
7. State the conditions for maximum mechanical advantage and maximum efficiency of a simple machine.
8. Illustrate the Centroid of (a) Rectangle (b) Triangle.
9. The radius of gyration of I-section is 82mm and its area is 5000mm^2 find its moment of inertia.
10. Draw a neat sketch of Watt's Induction Mechanism.

PART-B

10X5=50

Instructions :

1. Answer any **five** questions.
2. Each question carries **ten** marks.
3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. A roller of diameter 500mm and weight 1400N is to be taken up a step 50mm high. Find the magnitude and direction of the minimum effort required to pull up the roller.
12. (a) State the meaning of mechanics in engineering and explain some of its applications to engineering.

    (b) Differentiate between scalar and vector quantities.
13. A load of 3500 N is to be raised by a screw jack, with a screw of 75mm diameter and 12mm pitch. If the coefficient of friction is 0.075, find the efficiency of screw jack.
14. A body resting on a horizontal plane required a pull of 180N inclined at 30 degrees to the plane just to move it. It was also found that a push of 220N inclined at 30 degrees to the plane just moved the body. Determine weight of the body and co-efficient of friction.
15. Draw a neat sketch of a Weston's differential pulley block. Derive an expression for its velocity ratio.
16. State and prove the parallel axis theorem.
17. (a) A body is rotating with an angular velocity of 12rad/sec. after 4 seconds the angular velocity of body becomes 40rad/sec. determine the angular acceleration of body. Also find the angular displacement of the body during this 4secs.

    (b) What is meant by law of machine? The velocity ratio of a simple machine is 10. The effort applied is 150N and the load lifter is 1200N. Determine the efficiency of the machine.
18. (a) An I-section is made up of a top flange-10mmx200mm, web-120mmx30mm, bottom flange-160mx30mm. locate its centroid.

    (b) Draw a neat sketch of four bar chain and explain briefly.

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