

5281

BOARD DIPLOMA SUPPLEMENTARY EXAMINATION, (C-16S)

JUNE / JULY - 2020

**DME - II SEMESTER EXAMINATION
ENGINEERING MECHANICS - II**

Time : 2 Hours]

[Total Marks : 80

PART - A

3×10=30

- Instructions :*
- (1) Answer any **TEN** questions.
 - (2) Each question carries **THREE** marks.
 - (3) Answer should be brief and straight to the point and shall not exceed five simple sentences.
 - (4) Each Answer should not exceed more than 1:2 Page.

- 1 What is meant by radius of gyration?
- 2 State the parallel axis theorem.
- 3 Define polar moment of inertia.
- 4 Find the moment of inertia of a rectangular section 50 mm wide and 100 mm deep about its centroidal axes.
- 5 Mention any four types of motions.
- 6 Define the term "kinetics"
- 7 Define : (a) velocity (b) acceleration
- 8 A body starting from rest moves with an acceleration of 2 m/s^2 . Find the velocity at the end of 20 seconds.
- 9 State the Newton's first law of motion.
- 10 Define the terms (a) angle of projection (b) trajectory.
- 11 State the D' Alembert's principle.

5281 |

1

[Contd...

- 12 State the law of conservation of energy.
- 13 A mass of 50 kg is raised vertically through a distance of 20 m in 40 seconds. Find the work done.
- 14 Define the terms (a) work (b) power.
- 15 Define the term "angular acceleration" and give its unit.
- 16 Write two differences between centripetal force and centrifugal force.
- 17 List out the types of levers and give one example each.
- 18 Define (a) velocity ratio (b) mechanical advantage.
- 19 Write the difference between reversible machine and self locking machine.
- 20 Define the following terms with respect to simple machines :
(a) Ideal machine (b) Efficiency.

PART - B

10×5=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.
 - (4) Each Answer should not exceed more than **TWO** Pages.

- 21 Determine the moment of inertia of I section about its centroidal axes (i.e. I_{xx} and I_{yy}) with top flange = 120 mm × 20 mm
web = 20 mm × 150 mm
Bottom flange = 200 mm × 20 mm

5281 |

2

[Contd...

http://www.sbtetonline.com

http://www.sbtetonline.com

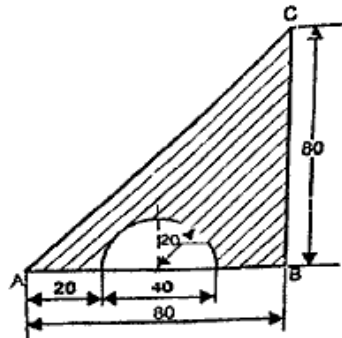
http://www.sbtetonline.com

http://www.sbtetonline.com

C-16S-M-205

C-16S-M-205

- 22 (a) Find the polar moment of inertia of hollow circular section 3 of outer diameter 50 mm, inner diameter 30 mm.
- (b) Find the moment of inertia of the area shaded shown in fig 7 about the axis AB. The dimensions are in mm.



- 23 (a) A particle starts from rest and covers a distance of 75 m. 4
Find the acceleration if the final velocity is 60 m/s.
- (b) A body start with a velocity of 5 m/s travels with an 6
acceleration of 16 ms². Find (a) distance travelled in 8
seconds (b) distance travelled in 8th second.
- 24 A ball is projected in air with a velocity of 100 m/s and at an
angle of 30° with the horizontal ground. Find the
 - (a) horizontal range <http://www.sbtetonline.com>
 - (b) maximum height reached by a ball
 - (c) time of flight of the ball.
- 25 (a) State the law of conservation of momentum. 3
- (b) A sphere of mass 50 kg moving at 10 m/s and collides 7
with another sphere of mass 30 kg moving at 5 m/s in the
same direction. Find the common velocity after impact, if
they move together after impact.

- 26 The bullet of a gun is of mass 0.03 kg is fired with a velocity
of 500 m/s.
 - (a) What is the kinetic energy of the bullet?
 - (b) If the bullet penetrates into a block of wood 300mm deep,
what is the resistance offered by wood to the bullet ?
 - (c) what is the exit velocity, if the same bullet is fired into a
150 mm thick wood?
- 27 A simple screw jack has threads of pitch 5 mm. The effort is
applied at the end of a lever 500 mm long. What effort will be
required to lift a load of 10 kN, if efficiency at this load is 40
percent?
- 28 (a) Derive an expression for the velocity ratio in simple 4
wheel and axle.
- (b) In a simple machine an effort of 200 N is applied to lift 6
a load of 1500N. The velocity ratio of machine is 10. Find
(a) The effort lost in friction (b) Efficiency at this load.

http://www.sbtetonline.com

http://www.sbtetonline.com

http://www.sbtetonline.com

http://www.sbtetonline.com