4054

BOARD DIPLOMA EXAMINATION, (C-14)
JUNE-2019
DME - FIRST YEAR EXAMINATION
ENGINEERING MECHANICS

Time: 3 Hours   Max. Marks : 80

PART -A

10X3=30M

Instructions: 1) Answer **all** questions. Each question carries **three** marks.

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

1) State the parallelogram law of forces.

2) State the lami's theorem.

3) State the laws of static friction.

4) Define angle of repose.

5) Define (a) Centroid (b) Centre of gravity.

6) State Newton's third law of motion and give two examples.

7) State law of conservation of momentum.

8) In a first system of pulleys there are four movable pulleys and a weight of 750 N can just be supported by an effort of 50 N.

   Find efficiency of the machine.

9) Define reversible and irreversible machine.

10) Differentiate machine and mechanism.

[Contd....

PART-B

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

11) Four forces of magnitude P, 2P, $3\sqrt{3}$ P and 4P acting at a point 'O'. The angles made by these forces with X-axis are 0^0, 60^0, 150^0 and 300^0 respectively. Find the magnitude and direction of the resultant force.

12) An effort of 1960 N is required just to move a certain body up an inclined plane of angle 15^0, The force acting parallel to the plane. If the angle of inclination of the plane is made 20^0, the effort required is 2254 N applied parallel to the plane. Find the weight of the body and coefficient of friction.

13) Find the moment of inertia of the following planar figure about centroidal axes.
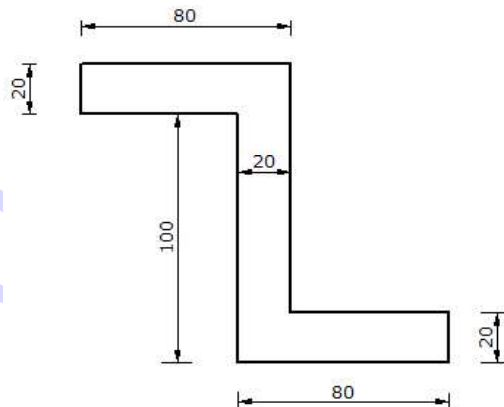
(All dimensions are in mm)

14) A stone is dropped into a well and sound is heard to strike the water after 4 sec. Find the depth of well, if the velocity of sound is 350 m/s.

15) A particle moving with SHM performs 10 complete oscillations per minute and its speed when at a distance of 20 cm from the centre of oscillation, is 3/5 th of the maximum speed. Find the amplitude, the maximum acceleration and speed of the particle when it is 15 cm from the centre of oscillation.

[Contd...

16) In a single purchase crab, length of the handle is 160 mm and the gear ratio is 5. Find the velocity ratio and efficiency of the machine, if a load of 1000N is lifted by an effort of 50N. Diameter of drum is 60mm.

17) (a) Explain (i) Co-planar system of forces

   (ii) Non-coplanar system of forces.

   (b) Explain four bar chain.

18) (a) Determine the centroid of the shaded portion of the shape shown in the figure.   (5M)
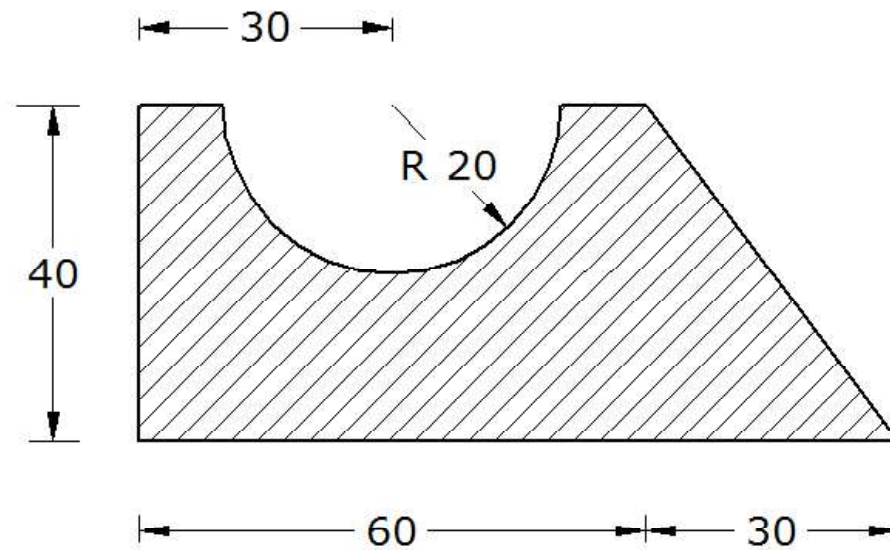
   (b) Explain about law of machine with diagram.   (5M)

* * *