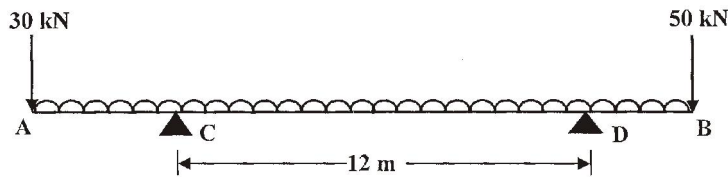


6. A beam AB (figure below), 20 metres long supported on two intermediate supports 12 metres apart carries a uniformly distributed load 6 kN/m together with concentrated loads of 30 kN at the left end A and 50 kN at the right end B. The supports are located such that the reaction is same in each support. Determine the position of supports and draw the shear force and bending moment diagram for the beam. **15**



### Section D

7. What is a conservative force ? Write the impulse moment equation and mention its applications. State the principle of conservation of linear momentum. **15**
8. State the principle of conservation of energy for a rigid body in plane motion. A flywheel of 100 kg mass and 0.8 m radius of gyration is rotating at 180 rev/min. Determine its :  
 (a) Kinetic energy

**Sep-21-00004**

**B.Tech. EXAMINATION, 2021**

Semester I (CBCS)

ENGINEERING MECHANICS

ME-101

Time : 2 Hours

Maximum Marks : 60

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*The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.*

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**Note :** Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D.  
 Q. No. **9** is compulsory.

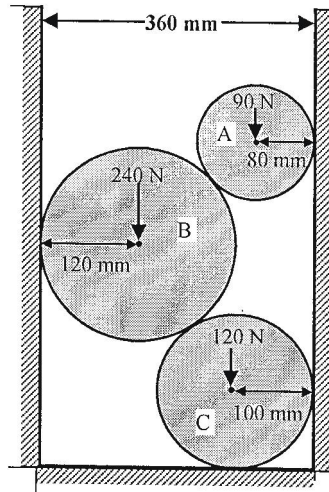
### Section A

1. Three smooth cylinders A, B and C of the same length weighing 90 N, 240 N and 120 N and radii 80 mm, 120 mm and 100 mm are placed in a rectangular

cavity as shown in figure below. Determine :

- (i) Reactions of the walls on the cylinder
- (ii) Reactions between the cylinders
- (iii) Reaction at the floor.

15



2. What is a force polygon ? How a force polygon is drawn to determine the magnitude of the resultant of a concurrent force system ?

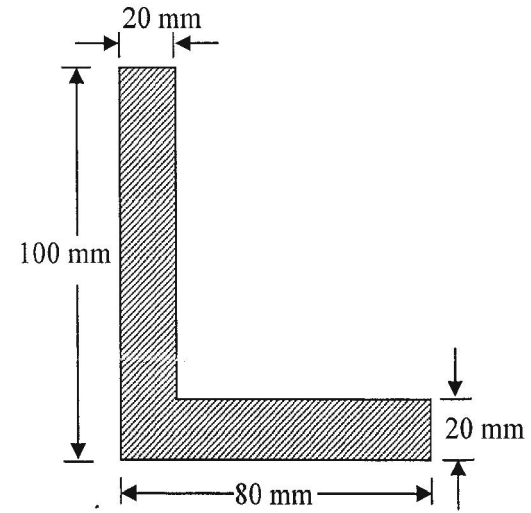
15

**Section B**

3. Derive an expression for the maximum efficiency of a screw jack.

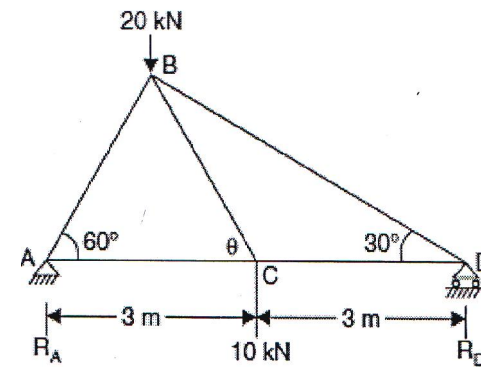
15

4. Calculate the moment of inertia of the section show below about the centroidal  $x-x$  and  $y-y$  axis. 15



**Section C**

5. Determine the forces in all the members of the truss loaded as shown in the figure below and tabulate the results. 15



- (b) Torque and average power required to give the wheel a speed of 180 rev/min in 75 revolutions.

**15**

**(Compulsory Question)**

9. (a) State Lami's theorem of forces.  
(b) State perpendicular axis theorem.  
(c) Differentiate between plane truss and space truss.  
(d) What do you mean by a redundant truss ?  
(e) Define angle of friction.  
(f) Define point of inflexion.  
(g) Differentiate between frame and truss.  
(h) Define statically indeterminate beam.  
(i) State D'Alembert's principle.  
(j) Define cone of friction. **1½×10=15**