Code No: **R201203** **R20** **SET - 1**

I B. Tech II Semester Supplementary Examinations, January/February - 2023
ENGINEERING MECHANICS
(Civil Engineering)

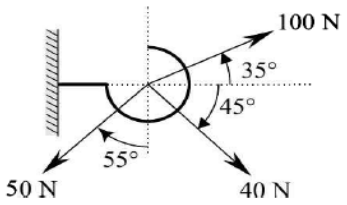
Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

~~~~~~

UNIT – I

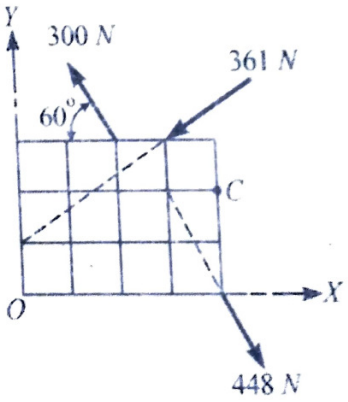
1 Find the resultant of the following set of forces applied at the end of hook. [14M]



(OR)

2 a) State and explain varignon's theorem. [7M]

b) A flat plate is subjected to the coplanar system of forces shown in Fig. The inscribed grid with each square having a length of 1 m locates each force and its slope. Determine the resultant. [7M]



UNIT-II

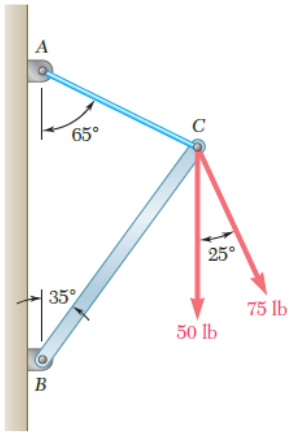
3 a) What are the three basic conditions for the equilibrium to sustain? [7M]

b) Write short notes on the following [7M]
i) Lami's Theorem
ii) D'Alembertz Principle

(OR)

|''|'||||''|''|||'|
~~~~~~

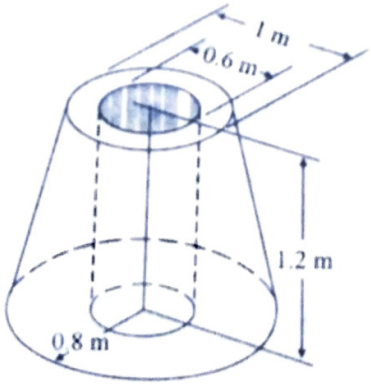
4 Determine the required tension in cable AC, knowing that the resultant of three forces exerted at point C of boom BC must be directed along BC and the corresponding magnitude of the resultant. [14M]



UNIT-III

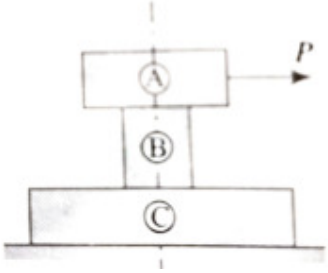
5 a) State and explain Pappu's Guldinus theorem I & theorem II. [7M]

b) Determine the volume and surface area of the solid as shown in figure. [7M]



(OR)

6 Determine the least horizontal force P to start motion of any part of the system as shown in Figure. Given, W_a-3 kN,W_b-1 kN,W_c-2 kN, μ_{ab}-0.3, μ_{bc}-0.2, μ_c-0.1. [14M]



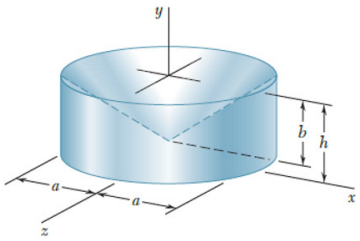
Code No: **R201203** **R20** **SET - 1**

UNIT- IV

7 Derive the moment of inertia of a circular lamina and semicircular lamina about its diameter. [14M]

(OR)

8 The machine part shown is formed by machining a conical surface into a circular cylinder. For b= ½ h, determine the mass moment of inertia and the radius of gyration of the machine part with respect to the y axis. [14M]

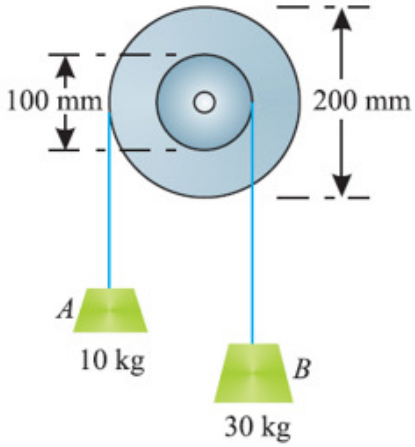


UNIT-V

9 A ball is thrown vertically upwards with an initial velocity of 20 m/s from the top of a building of 30 m height. Determine i) the maximum height reached by the ball, ii) the time taken to reach the maximum height, iii) the velocity of the ball as it crosses the top of the building during its downward journey, iv) the time taken to hit the ground and the corresponding velocity. [14M]

(OR)

10 Two bodies A & B of masses 30 kg and 10 kg are tied to the two ends of a light string passing over a composite pulley of radius of gyration as 70 mm and mass 4 kg as shown in figure. [14M]



*****