

**B.Tech. SEM -II (2007 Course) (All Branches) : WINTER -
2017**

SUBJECT : ENGINEERING MECHANICS

Day : **Wednesday**
Date : **22/11/2017**

Time : **10.00 AM TO 01.00 PM**
Max. Marks : **80**

W-2017-2349

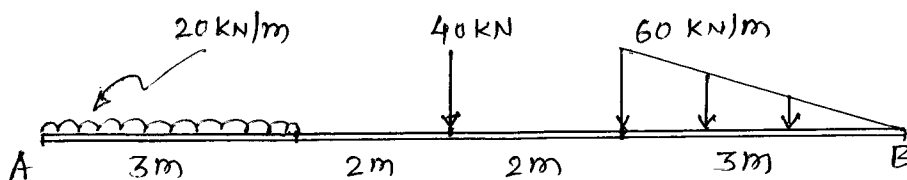
N.B.:

- 1) **Q.No.1 and Q.No.5 are COMPULSORY.** Out of the remaining questions attempt **ANY TWO** questions from each section.
- 2) Answers to both the sections should be written in the **SEPARATE** answer books.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Figures to the right indicate **FULL** marks.
- 5) Assume suitable data if necessary.

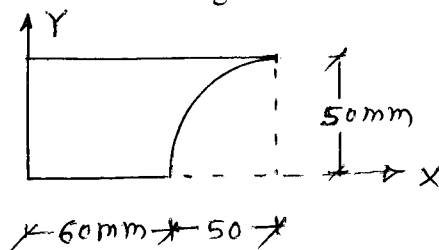
SECTION - I

- Q.1** a) Explain different types of loads and different types of supports. **[04]**
- b) Write formula for moment of inertia for rectangle, triangle and circular area. **[04]**
- c) Write down equilibrium conditions for method of joints and method of section. **[04]**

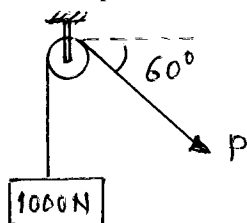
- Q.2** a) Explain Varignon's theorem of moment. **[04]**
- b) Calculate Resultant and its position from 'A' of force system shown in figure. **[10]**



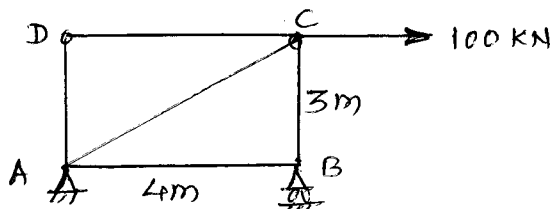
- Q.3** a) Explain parallel axis theorem for moment of Inertia. **[04]**
- b) Calculate centroid of area shown in figure. **[10]**



- Q.4** a) Calculate minimum force 'P' required to lift the block of 1000N as shown in figure. Take $\mu = 0.25$. **[04]**



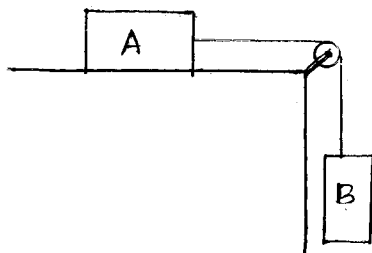
- b) Calculate forces in all members of truss shown in figure. **[10]**



P.T.O.

SECTION – II

- Q.5** a) Write down equations of motions for constant acceleration. [04]
- b) A block of mass 10 kg is accelerating towards right side with acceleration 5m/s^2 . Calculate force required to accelerate using D'Alembert's principle. [04]
- c) Explain concept of ICR and its application. [04]
- Q.6** a) Write down normal and tangential components of acceleration. [04]
- b) The acceleration of particle is given by $a = (-0.6t + 10)$ at $t = 20$ sec its velocity is 16m/s . Calculate initial velocity and distance traveled at $t = 20$ sec. [10]
- Q.7** a) An object is projected with initial velocity 'u' and angle ' α ' with horizontal. [04]
Derive an equation for path of trajectory.
- b) Two blocks 'A' and 'B' of weight 1000N and 1500N are released from rest. [10]
Calculate velocity of block 'A' after it is moved by distance 10m .



- Q.8** a) Explain coefficient of restitution, purely plastic and elastic impact. [04]
- b) A ladder of length 9m is resting as shown in figure. At the instant shown top end 'B' slides down with velocity 4m/s . Calculate velocity of bottom end 'A' at this instant. [10]

