

**B.TECH. SEM -II (CHEMICAL/ CIVIL/ ELECTRICAL/  
MECHANICAL/ PRODUCTION/ COMPUTER/ INFO. TECH./  
ELECTRONICS / BIO MEDICAL / E & TC) 2014 COURSE (C.B.C.S.)  
SUBJECT: ENGINEERING MECHANICS**

Day: **Tuesday**  
Date: **21/11/2017**

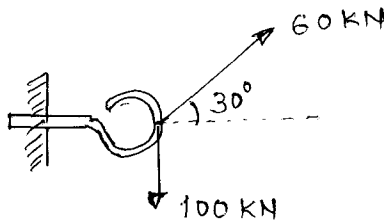
**W-2017-2006**

Time: **10.00 AM TO 01.00 PM**  
Max. Marks: 60

**N.B.:**

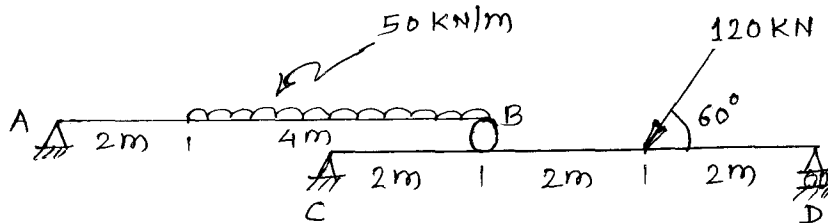
- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat labeled diagrams **WHEREVER** necessary.
- 4) Assume suitable data if necessary.

- Q.1 a)** What is difference between moment of force and moment of couple? **(05)**  
**b)** A hook is subjected to two forces as shown in figure. Calculate resultant force **(05)**  
 acting on the hook.

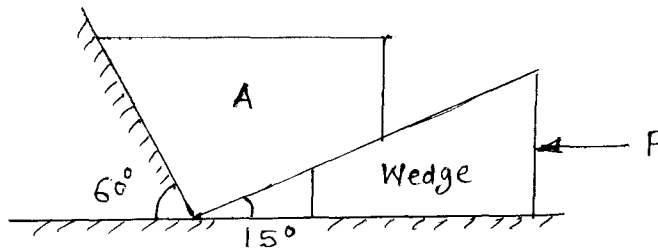


**OR**

- Q.1** Calculate support reactions for the beam shown in figure. **(10)**

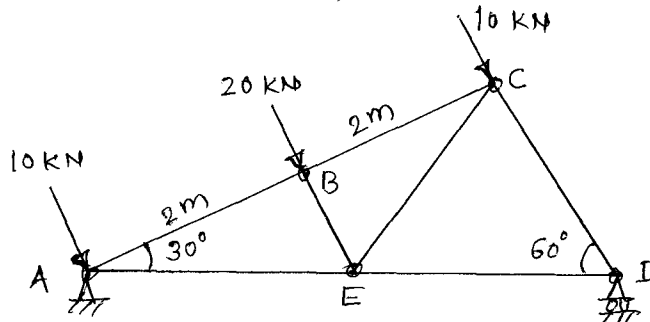


- Q.2** Determine the force 'P' required to move the block 'A' of weight 5000N up the inclined plane. Neglect weight of wedge. Take  $\mu = 0.25$  for all contacts. **(10)**



**OR**

- Q.2** Calculate forces in the members BC, EC and ED of the truss shown below: **(10)**

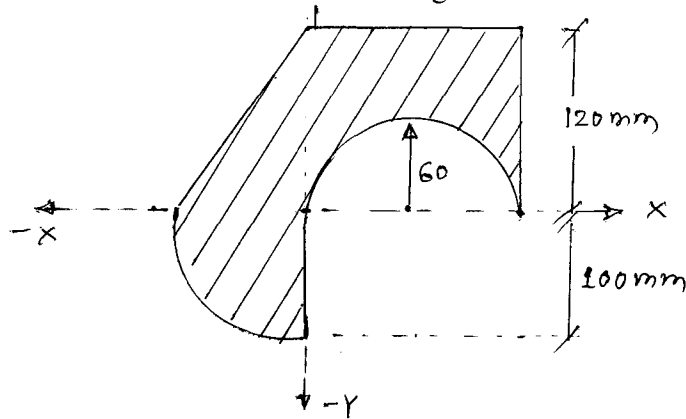


- Q.3 a)** Explain parallel axis theorem for calculation of moment of Inertia. **(05)**  
**b)** Find out least radius of gyration for the area of quarter circle of radius 100mm. **(05)**

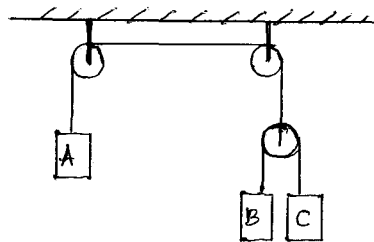
**P. T. O.**

**OR**

- Q.3 Calculate centroid of area shown in the figure. (10)



- Q.4 Three blocks connected as shown in figure moves with constant velocities, knowing that relative velocity of A with respect to C is 120 mm/s upward and relative velocity of B with respect to A is 40 mm/s upward, find absolute velocity of each block. (10)



OR

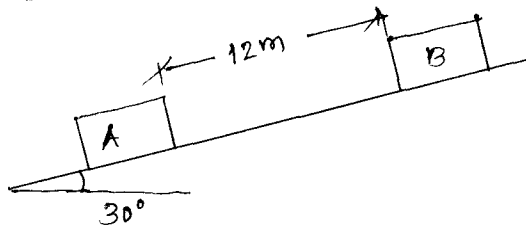
- Q.4 A train travelling with uniform speed 90 kmph slow down on account of work in progress, at retardation of 1.8 kmph per second to 36 kmph. With this it travels 600 m. There after it gain further speed with acceleration 0.9 kmph per second till getting original speed. Find the delay caused due to this. (10)

- Q.5 A rocket follows path such that its acceleration  $\vec{a} = (4i + t j) m/s^2$  at  $\vec{r} = 0$  it starts from rest. Determine at  $t = 10$  sec,  
 i) Speed of rocket, ii) Radius of curvature of path  
 iii) Normal and tangential component of acceleration. (10)

OR

- Q.5 An object is projected from horizontal ground just clears two obstacles each 7.5m high which are situated 50m from each other. If the time of passing between obstacles is 2.5 sec, calculate range of projectile and initial velocity of projection. (10)

- Q.6 Two blocks A and B of mass 10 kg and 28 kg respectively are separated by 12m. If blocks start moving from rest, find the time 't' when blocks collide. Take  $\mu_A = 0.25$  and  $\mu_B = 0.10$ . (10)



OR

- Q.6 A 50 g ball is dropped from height 600 mm on a small plate. It rebounds to height 400 mm when plate directly rests on ground and to a height 250 mm when a foam rubber is placed between plate and the ground. Determine:  
 i) Coefficient of restitution between plate and ground  
 ii) Mass of plate. (10)

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