B.Tech. sem-II All Branch.

B.Tech. SEM -II (Chemical/ Civil/ Electrical/ Mechanical/ Production/ Computer/ Info. Tech./ Electronics / Bio Medical / E & TC) 2014

Course (CBCS) : SUMMER - 2019

SUBJECT: ENGINEERING MECHANICS

Day: Friday
Date: 24/05/2019

S-2019-2535

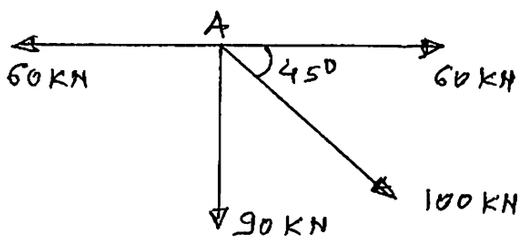
Time: 10.00 AM TO 01.00 PM
Max Marks: 60

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Assume suitable data if necessary.

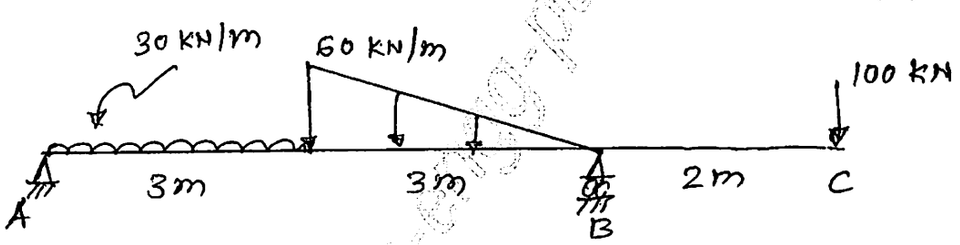
Q.1 **a)** What is difference between moment of force and couple of forces? **(03)**

b) Calculate resultant of force system shown in figure. **(07)**

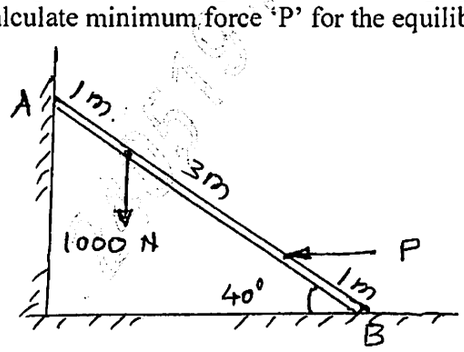


OR

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



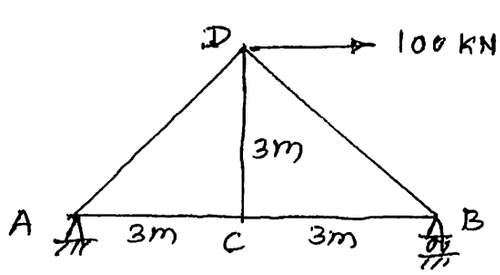
Q.2 A ladder of length 5 m and weight 800 N is resting against surface as shown in figure. Calculate minimum force 'P' for the equilibrium. take μ=0.15. **(10)**



OR

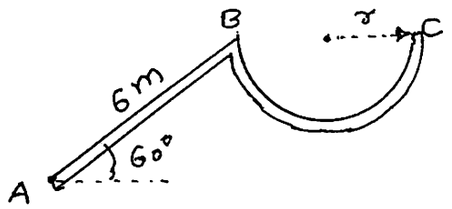
Q.2 **a)** What is perfect truss? **(03)**

b) Calculate forces in all the members of truss shown in figure. **(07)**



P.T.O.

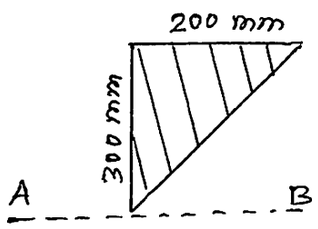
Q.3 Calculate centroid of the rod of length 15 m bend in the form shown in figure. **(10)**



OR

Q.3 a) What is parallel axis theorem for M.I.? **(03)**

b) Calculate M.I. of area shown in figure about axis AB. **(07)**



Q.4 A driver of car travelling at 72 kmph observes the light 300 m ahead of him turning red. The tragic light is timed to remain red for 20sec before it turns green. If the driver wishes to pass the lights without stopping to wait for it to turn green, determine a) Acceleration of the car b) Speed with which it crosses traffic light. **(10)**

OR

Q.4 The motion of particle is given by $x= t^3 - 3t^2 - 9t + 12$. Determine the time and acceleration when their velocities become zero. **(10)**

Q.5 Derive an expression for normal and tangential component of velocity and acceleration. **(10)**

OR

Q.5 A soldier positioned on a hill fires a bullet with 100m/s at an angle 30^0 upwords with horizontal. The target lies 50 m below him. Determine: **(10)**

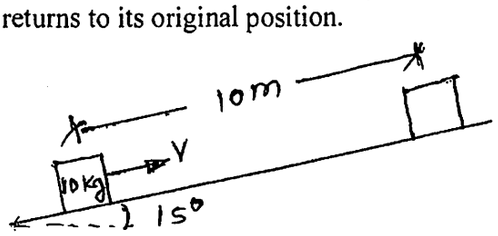
a) Maximum height to which bullet will rise
b) Velocity of bullet when it hits target
c) Time required to hit target.

Q.6 a) What is coefficient of restitution? **(03)**

b) A ball a mass 10 kg is dropped on floor. Find out the maximum height gained by ball after third impact. Take e = 0.9 **(07)**

OR

A block of mass 10 kg is projected 10 m up on an inclined plane so that it just reaches the top of inclined plane with zero velocity. If $\mu = 0.12$ between the block and plane. Determine the initial velocity of block A and the velocity when it returns to its original position. **(10)**



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