Total No. of Printed Pages:3

SUBJECT CODE NO: E-25
FACULTY OF ENGINEERING AND TECHNOLOGY
F.E.(All) (CGPA) Examination Nov/Dec 2017
Engineering Mechanics
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

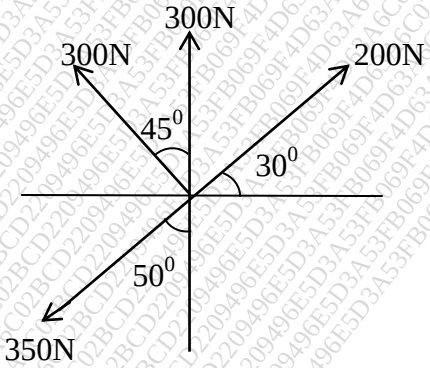
N.B
1. Q.No.one & six are compulsory.
2. Attempt any two questions from each section from remaining.
3. Figures to the right indicate full marks.
4. Assume suitable data if necessary.

Section -A

Q.1 Attempt any five from the following. 10

a) Define force.
b) State law of parallelogram of forces
c) State law of triangle of forces
d) What are the assumptions made in the analysis of a simple truss
e) State parallel axis theorem
f) What is difference between coefficient of friction & angle of friction
g) What do you mean by friction
h) Enlist types of beam

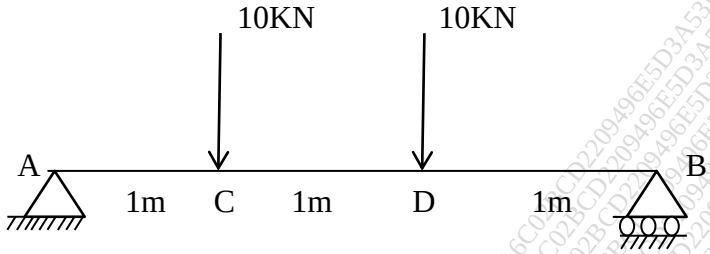
Q.2 a) Find the magnitude of resultant & its location of the following forces acting at a point o as shown in fig. 07



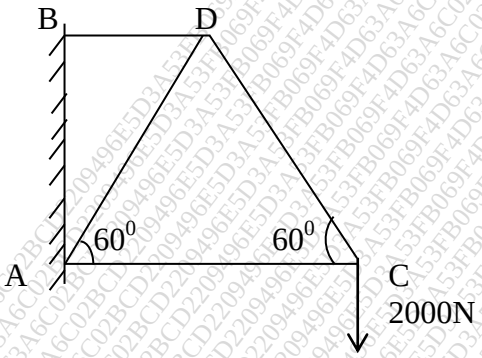
b) Two mean carry a weight of 200 N by means of rope fixed to the weight one rope is inclined at 45^0 & other at 30^0 with vertical. Find tension in each rope. 08

Q.3 a) A body of weight 90N is placed on a rough horizontal plane. Determine the coefficient of friction if a horizontal force of 63N just causes the body to slide over the horizontal plane. 07

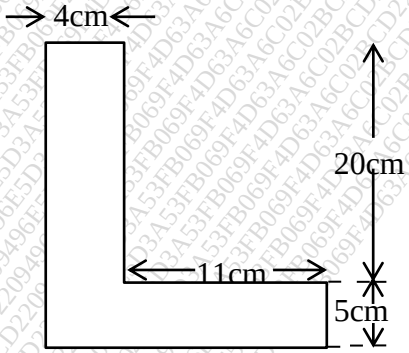
b) Determine the reaction at the support A & B of the beam loaded as shown in fig. use principle of virtual work method 08



Q.4 Determine the forces in all the members of cantilever truss shown in fig. 15



Q.5 Determine the moment of inertia of the area about the centroidal axis. 15



Section -B

Q.6 Attempt <u>any five</u> questions from the following. 10

a) Define the term 'Trajectory'
b) Define time of flight
c) What is Rectilinear motion
d) Distinguish between uniform motion and uniformly accelerated motion.
e) A flywheel starts from rests and revolves with an acceleration of 0.5 rad/ sec^2. What will be its angular velocity and angular displacement after 10 seconds?
f) Define the term instantaneous centre
g) Define the term 'collision of elastic bodies'
h) Define 'power'

Q.7 a) A body starts with a velocity of 3m/s and moves in a straight line with constant acceleration. If its velocity at the end of 5 seconds is 5.5 m/s, find 07

i) The uniform acceleration

ii) Distance travelled in 10 second.

b) A stone is dropped from a height. After falling 5 seconds from rest, the stone breaks the glass pane and in breaking, the stone loses 20% of its velocity. Find the distance travelled by the stone in the next seconds. Take g= 9.81 m/s^2. 08

Q.8 a) A particle is projected from a point on an inclined plane with a velocity of 30m/s. the angle of projection & angle of the plane are 45^0 & 15^0 to the horizontal respectively. If the motion of the particle is up the plane. Determine 07

i) time of flight

ii) range of projectile

iii) angle of projection for maximum range

b) A car moves along a straight line whose equation of motion is given by 08

$s = 12t + 3t^2 - 2t^3$

Where (s) is in meters & (t) is in seconds

Calculate

i) velocity & acceleration at start

ii) Acceleration when velocity is zero.

Q.9 a) Two bodies of weight 60N & 40N are connected to the two ends of a light inextensible string. The string is passing over a smooth pulley. Determine 07

i) the acceleration of the system &

ii) Tension in the string. Take g =9.80 m/s^2.

b) A body of mass 50kg, moving with a velocity of 6 m/s, collides directly with a stationary body of mass 30 kg. If the two bodies become coupled so that they move on together after the impact what is their common velocity. 08

Q.10 a) A block of wood of weight 1200N is placed on a smooth inclined plane which makes an angle of 30^0 with the horizontal. Find the work done is pulling the block up for a length of 8m. 07

b) A body is rotating with an angular velocity of 8 radian/ sec. after 5 sec the angular velocity of the body becomes 28 rad/s. determine the angular acceleration of the body. 08