WALCHAND COLLEGE OF ENGINEERING
(Government Aided Autonomous Institute)
Visharambag, Sangli – 416415
First YearB.Tech. (ELE, ELN, CSE, IT.)
Re-Exam,Odd and Even SemesterAY 2023-24
Engineering Mechanics(7AM102)

Re-Exam

PRN: _____

Day & Date: Tuesday, 02/07/2024   Time : 10.00 am to 01.00 pm

Max Marks: **100**

IMP: Verify that you have received question papers with correct course code, branch etc.

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.

Text on the right of marks indicates course outcomes (Only for faculty use)   Marks

1 A) ABCD is a square as shown in Fig. No. 1, each side being 20 cm and E is the middle point   CO1
of AB. Forces of 7, 8, 12, 5, 9 and 6 kN act on the lines of directions AB, EC, BC, BD,
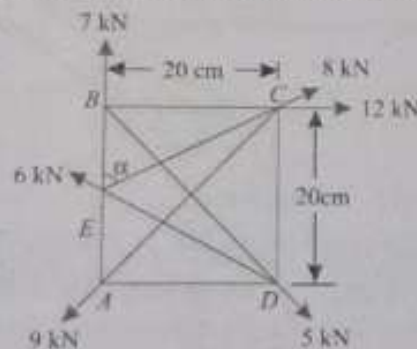CA and DE respectively. Find the magnitude, direction and position of the resultant force.

6

Fig. No. 1

B) A machine component 1.5 m long and weight 1000 N is supported by two ropes AB and   CO1
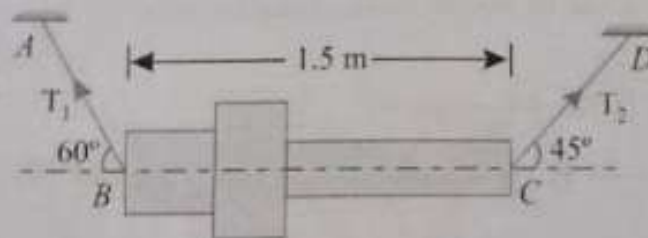CD as shown in Fig. No. 2 given below. Calculate the tensions T_1 and T_2 in the ropes AB
and CD.

4

Fig. No. 2

C) State and explain Varignon's Theorem with suitable example.   **5**   CO1

D) The screw eye in Fig. No. 3 is subjected to two forces, F_1 and F_2. Determine the magnitude of the resultant force using Law of Parallelogram.
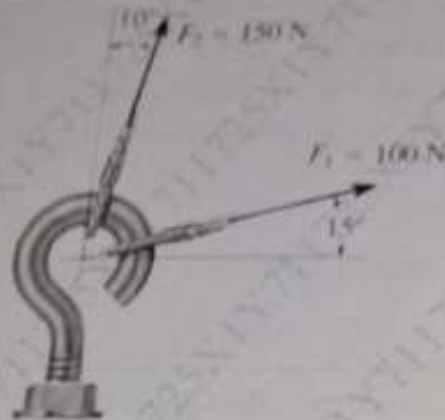

$F_2 = 150 N$

$F_1 = 100 N$

Fig. No. 3

Q2 A) Two beams AB & CD are arranged as shown in Fig. No. 4. The support A and C are hinge and B and D are roller. Find the support reactions at A, B, C and D.
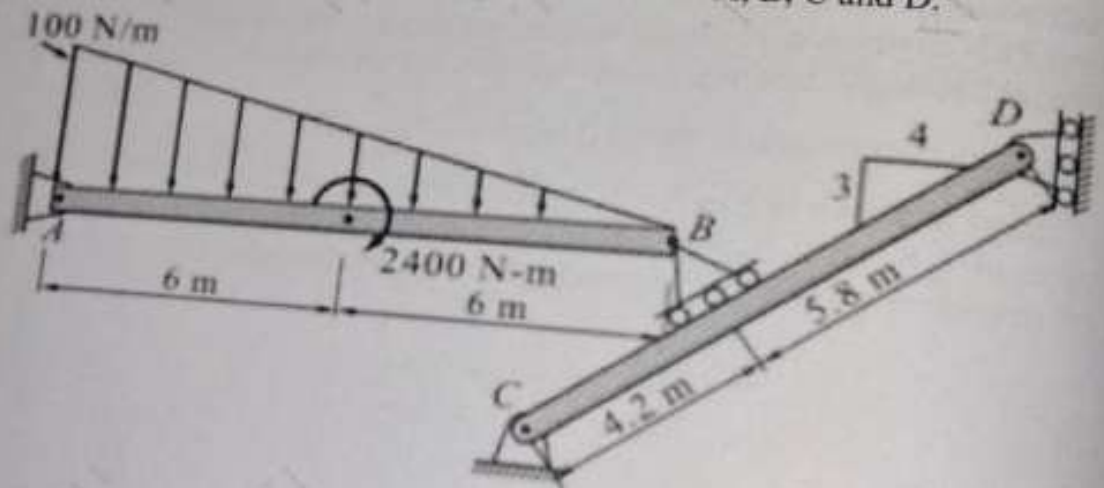

100 N/m

2400 N-m

6 m

6 m

B

C

4.2 m

5.8 m

4

3

D

Fig. No. 4

B) A beam AD of 8m hinged at A and roller supported at C. The beam is loaded as shown in Fig. No. 5. Determine reaction at A and C by using principle of Virtual Work.
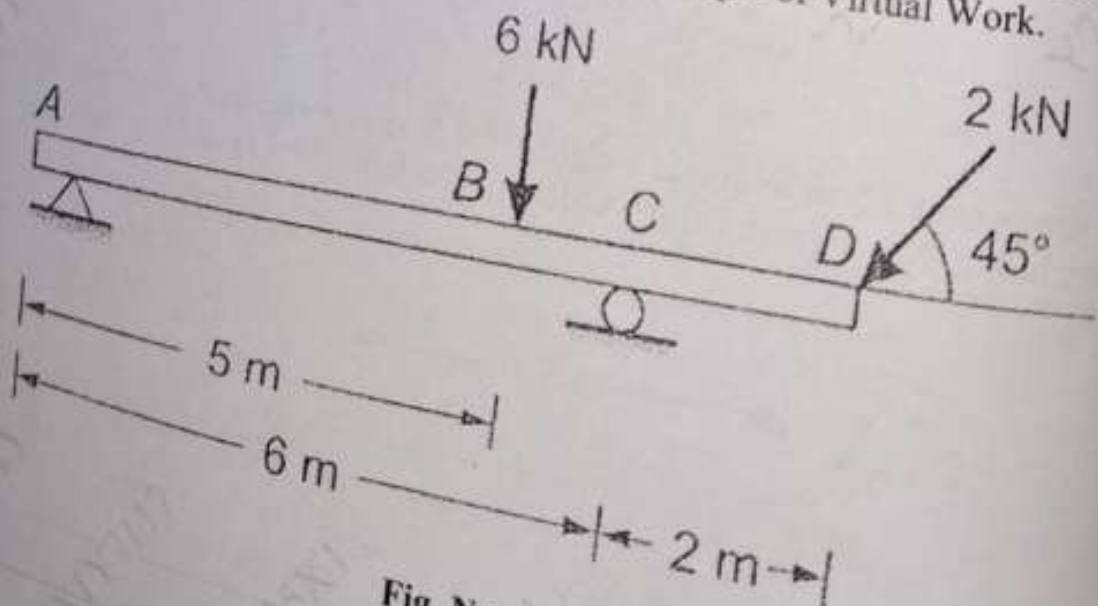

6 kN

2 kN

A

B

C

D

45°

5 m

6 m

2 m

Fig. No. 5

A) Determine the centroid of given figure about point A. (Fig. No. 6)
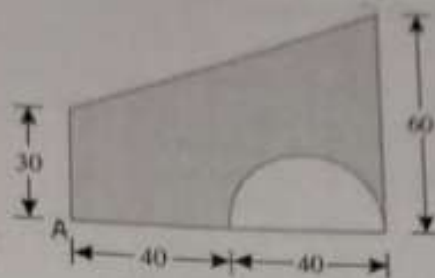
CO2

6

Fig. No. 6

B) Determine moment of inertia about both axes of a built up section as shown in Fig. No. 7.
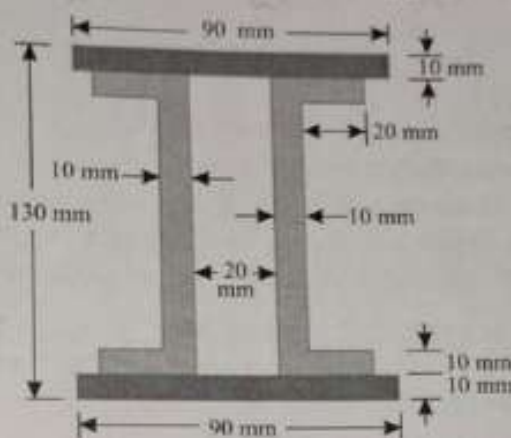
CO2

Fig. No. 7

12

4 A) A stone is thrown vertically up from the top of a tower with a certain initial velocity. It reaches ground in 5.64 seconds. A second stone, thrown down from the same tower with the same initial velocity reaches ground in 3.6 seconds.
Determine (i) the height of the tower, and (ii) the initial velocity of the stones.

CO3

6

B) A motor car takes 10 seconds to cover 30 meters and 12 seconds to cover 42 meters. Find the uniform acceleration of the car and its velocity at the end of 15 seconds.

CO3

6

C) A body is projected at such an angle that the horizontal range is three times the greatest height. Find the angle of projection.

CO

4

25 A) Two blocks A and B, connected by a horizontal rod and frictionless hinges are supported on two rough planes as shown in Fig. No. 8. The coefficients of friction are 0.3 between block A and the horizontal surface, and 0.4 between block B and the inclined surface. If the block B weighs 100 N, what is the smallest weight of block A, that will hold the system in equilibrium.

CO

8

Fig. No. 8