Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2021

Programme Name: B Tech (Mechatronics) **Semester : VI**
Course Name : CAD/CAM **Time : 03 hrs**
Course Code : MEPD 4010 **Max. Marks : 100**
Nos. of page(s) : 02
Instructions:

SECTION A

S. No.		Marks	CO
Q 1	Differentiate between computer aided design and computer aided engineering.	**5**	**CO1**
Q 2	List various activities involved in product development.	**5**	**CO1**
Q 3	Why Bresenham's line algorithm is preferred to DDA algorithm?	**5**	**CO2**
Q 4	Explain the concept of homogeneous transformation matrix.	**5**	**CO2**
Q 5	Differentiate between incremental and absolute positioning system.	**5**	**CO4**
Q 6	What is concurrent engineering?	**5**	**CO4**

SECTION B

Q 7	Explain and write DDA algorithm to draw line between any two points and slope less than unity.	**10**	**CO2**
Q 8	For the position vectors P1 (1,1), P2 (3,1), P3 (4,2), P4 (2,3) that define a 2-D polygon develop a single transformation matrix that i. Reflects about the line x=0 ii. Translates by -1 in both x and y- direction iii. Rotates about the origin by 1800.	**10**	**CO2**
Q 9	Draw and explain the coordinate system used by various NC machines.	**10**	**CO4**
Q 10	Illustrate Point to point (PTP) and Contouring Operations in NC/CNC system.	**10**	**CO5**
Q 11	Define Adaptive Control for CNC machines and justify their use in CNC systems giving their advantages**.**	**10**	**CO5**

SECTION-C

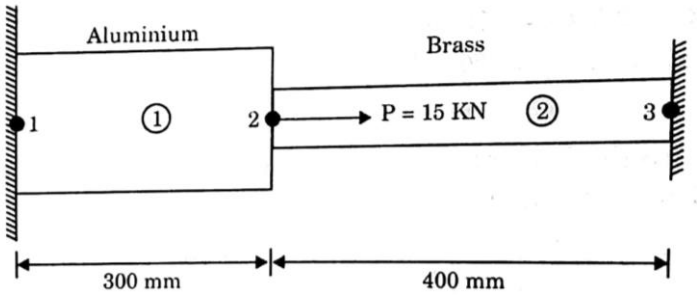
Q 12

Consider the bar shown in the figure below. An axial load of 15 kN is applied as shown in figure.

(1) Determine the displacement at each node.

(2) Determine the stress in each element and the reaction at the fixed node.

Material	Area	Young's Modulus
Aluminium	600 mm^2	70 GPa
Brass	300 mm^2	83 GPa



20 **CO3**

OR

Consider the assemblage of three springs as shown below. Calculate the displacement of the nodal points 2 and 3. Also calculate forces at node 1 and 4 taking force at 3 equal to 0.