

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, JULY 2020

Programme Name: B Tech Mechatronics

Course Name : CAD/CAM

Course Code : ADEG 424

Nos. of page(s) :

Semester : VI

Time: As per instruction

Max. Marks: 100

Instructions:

1. Read the instruction carefully before attempting.
2. This question paper has two section, Section A and Section B.
3. There are total of six questions in this question paper. **One in Section A and five in Section B**
4. **Section A** consist of multiple choice based questions and has the total weightage of 25%.
5. **Section A** will be conducted online on BB Collaborate platform
6. **Section B** consist of long answer based questions and has the total weightage of 75%. The questions for section B shall also appear in BB Collaborate
7. The maximum time allocated to **Section A** is one Hrs.
8. **Section B** to be submitted within 24 hrs from the scheduled time (*exceptional provision due extraordinary circumstance due to COVID-19 and due to internet connectivity issues in the far-flung areas*).
9. No submission of **Section B** shall be entertained after 24 Hrs.
10. **Section B** should be attempted after **Section A**
11. **The section B** should be attempted in blank white sheets (hand written) with all the details like programme, semester, course name, course code, name of the student, Sapid at the top (as in the format) and signature at the bottom (right hand side bottom corner)

SECTION A

Time : 01 Hour.

S. No.		Marks	CO
Q1.	MCQs (1 x 25)		
A	Which of the following does not come under CAD a) Computer Graphics b) Mechanism test and analysis c) Robot programming d) Variational and parametric modelling	1	CO1
B	Which of the following is/are achieved through implementation of CAM. 1) Greater design freedom 2) Shorter lead time 3) Reduced scrap and rework 4) All of the above	1	CO1

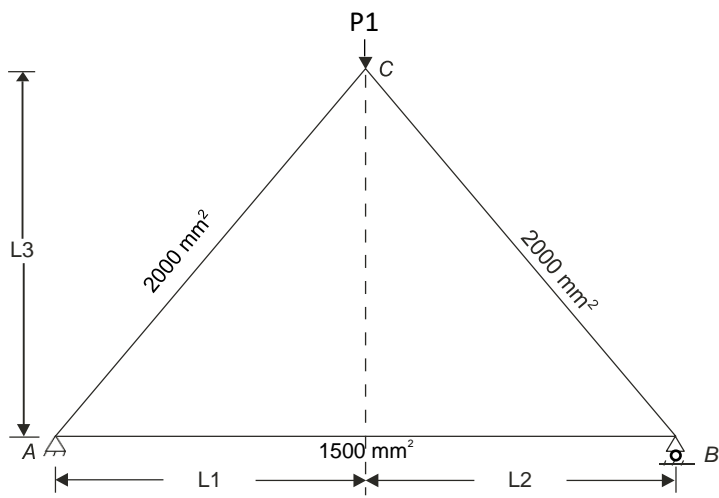
C	Which of the following is not synthetic entity. a) Bezier Curve b) B- Spline c) Parabola d) Hermite curve	1	CO1
D	On raster system, lines are plotted with a) Lines b) Dots c) Pixels d) None of the mentioned	1	CO2
E	The disadvantage of DDA is a) Time consuming b) Complex c) Neither a nor b d) None of the mentioned	1	CO2
F	In 2D-translation, a point (x, y) can move to the new position (x', y') by using the equation a) $x'=x+dx$ and $y'=y+dx$ b) $x'=x+dx$ and $y'=y+dy$ c) $x'=x+dy$ and $Y'=y+dx$ d) $x'=x-dx$ and $y'=y-dy$	1	CO2
G	_____ is a rigid body transformation that moves objects without deformation. a) Rotation b) Scaling c) Translation d) All of the mentioned	1	CO2
H	To change the position of a circle or ellipse we translate a) Center coordinates b) Center coordinates and redraw the figure in new location c) Outline coordinates d) All of the mentioned	1	CO2
I	Two successive translations are_____ a) Multiplicative b) Inverse	1	CO2

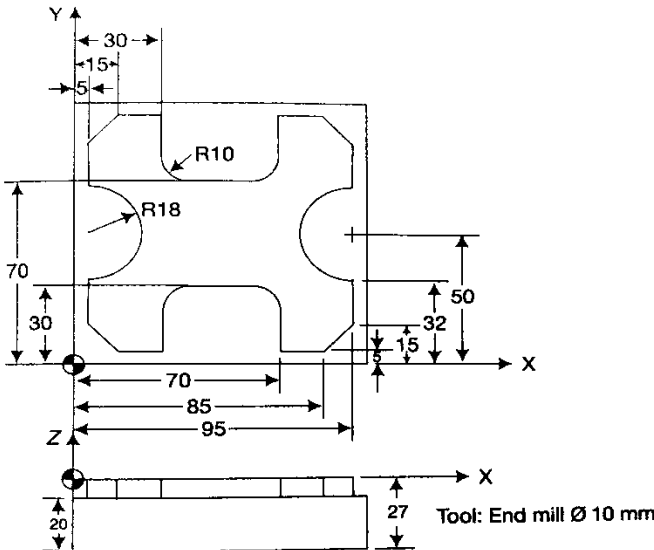
	<p>c) Subtractive d) Additive</p>		
J	<p>Reflection about the line $y=0$, the axis, is accomplished with the transformation matrix with how many elements as '0'?</p> <p>a) 8 b) 9 c) 4 d) 6</p>	1	CO2
K	<p>Reversing the order in which a sequence of transformations is performed may affect the transformed position of an object.</p> <p>a) True b) False</p>	1	CO2
L	<p>The truss elements are the part of a truss structure linked together by point/ joints, which transmit only axial force to the element.</p> <p>a) True b) False</p>	1	CO3
M	<p>The art of subdividing a structure into a convenient number of smaller components is Called</p> <p>a) discretization b) numbering of nodes c) continuum d) both a &b</p>	1	CO3
N	<p>The degree of the Bezier curve is</p> <p>a) Equal to no of control points b) One less than the number of control points c) Can have any value d) Can't say</p>	1	CO3
O	<p>If 10 control points are given, the degree of B- Spline is</p> <p>a) Less than or equal to 9 b) Exactly 9 c) Exactly 8 d) None of above</p>	1	CO3

P	NC contouring is an example of a) continuous path positioning b) point-to-point positioning c) absolute positioning d) incremental positioning	1	CO4										
Q	Numerical control _____ a) applies only to milling machines b) is a method for producing exact number of parts per hour c) is a method for controlling by means of alphanumeric digits. d) None of the above.	1	CO4										
R	The repeatability of NC machine depends on a) control loop errors b) mechanical errors c) electrical errors d) none of the mentioned	1	CO4										
S	An absolute NC system is one in which all position coordinates are referred to one fixed origin called the zero point. a) True b) False	1	CO4										
T	Match the following: <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">NC code</th> <th style="text-align: left;">Definition</th> </tr> </thead> <tbody> <tr> <td>P. M05</td> <td>1. Absolute coordinate system</td> </tr> <tr> <td>Q. G01</td> <td>2. Dwell</td> </tr> <tr> <td>R. G04</td> <td>3. Spindle stop</td> </tr> <tr> <td>S. G90</td> <td>4. Linear interpolation</td> </tr> </tbody> </table> a)P-2,Q-3,R-4,S-1 b)P-3,Q-4,R-1,S-2 c)P-3,Q-4,R-2,S-1 d) P-4,Q-3,R-2,S-1	NC code	Definition	P. M05	1. Absolute coordinate system	Q. G01	2. Dwell	R. G04	3. Spindle stop	S. G90	4. Linear interpolation	1	CO5
NC code	Definition												
P. M05	1. Absolute coordinate system												
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U	The axis of turning machines are a) Z and X axis b) X and Y axis c) Y and Z axis d) X, Y and Z axis	1	CO5										

V	Which of the following is not an auxiliary statement a) FINI b) INTOL c) END d) PARTNO	1	CO5
W	APT motion statements allow for simple English like statements to generate the program a) True b) False	1	CO5
X	Which of the following word is not used in part programming a) G- word b) U- word c) M- Word d) T- word	1	CO5
Y	CLPRNT statement is used for a) Cutter location b) Cutter location print c) Cutter location change d) None of the above	1	CO5

SECTION B (15 x 5)

Q 2	 <p align="center">Fig. 1</p>	15	CO3
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	<p>For the three – bar truss shown in Fig. 1, determine the nodal displacements and the stress in each member using FEM. Find the support reactions also. Take modulus of elasticity as 200 GPa,</p> <p>$L1 = L2 = L3 =$ Addition of all the digits of your SAP ID x 10 in mm</p> <p>$P1 =$ Addition of all the digits of your SAP ID x 10 in KN</p>		
<p>Q 3</p>	<p>A) Suppose you are a design engineer in CNC cylindrical grinding machines manufacturing company. How will you implement CAD in your company? How will you use CAD to improve your design productivity? comment.</p> <p>B) What do we expect from a geometric modelling system to accomplish, in a broad sense, in the total manufacturing scene?</p>	<p>10+5</p>	<p>CO1</p>
<p>Q 4</p>	<p>A) Using midpoint circle algorithm plot a circle whose radius = R units. Where R = sum of all digits of your SAP ID.</p> <p>B) Prove that the multiplication of transformation matrices for the following of operations is commutative:</p> <ol style="list-style-type: none"> Two successive rotations Two successive translations Two successive scaling. 	<p>8+7</p>	<p>CO2</p>
<p>Q 5</p>	<p>A) To develop a Part program what is the know-how a computer numerical programmer should have?</p> <p>B) For the component shown in figure below, make part program for machining on a CNC machining centre.</p> 	<p>5+10</p>	<p>CO5</p>

Q 6	<p>A) Discuss various types of automation. NC machine fall in which type of automation and why?</p> <p>B) What are the factors that contribute to the development of numerical control?</p> <p>C) Briefly explain the functions that are expected to be served by numerical control in machine tools.</p>	5+5+5	CO4