K. D. K. COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF MECHANICAL ENGINEERING
First Sessional Online Exam (2021-22)

Semester: VII **Time: 1 Hour**
Subject: Computer Aided Design **Marks: 20**

CO1: Know basic concept of CAD, Comparison between CAD and conventional design, generation of algorithms for basic geometric entities.
CO2: Understand introduction to windowing & clipping, 2D transformation & 3D transformation.

Que. 1) Write Bresenham's algorithm for line generation for slope less than one (m<1). Using the algorithm generate line from (5, 8) and (9, 11). (10) [BTL 3]

OR

Que. 2)

a) Explain the phases of computer aided design process and how it helps over conventional design process. (5) [BTL 2]

b) Explain rasterization technique. (5) [BTL 2]

Que. 3) A triangle having vertices (5, 5), (10, 5), (7,9) is translated by 5 units in x-direction, them it is rotated by 30° in clockwise direction and them it is scaled by 3 units in y-direction. Determine the final position of the triangle. (10) [BTL 3]

OR

Que. 4)

a) What is windowing, viewport and clipping. (4) [BTL 2]

b) Write 3-D transformation matrix for translation, scaling and rotation about Z-axis. (6) [BTL 2]

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
MECHANICAL ENGINEERING DEPARTMENT
First Sessional Online Exam 2021-22
Objective Test

Subject: CAD **Sem: VII** **Max. Marks: 10**
Name of Student :______________________________ Roll No. :_____ Signature :____________

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1. The advantages of CAD are
a) Drawing can be edited easily
b) CAD Infrastructure & Trained resource required
c) Reduction in time for product development
d) Both (a) & (c)

2. The disadvantage of CAD is
a) More accuracy in design
b) Drawing can be edited easily
c) Reduction in time for product development
d) CAD Infrastructure & Trained resource required

3. The line generation algorithm is
a) DDA Algorithm
b) Bresenham's Algorithm
c) None
d) Both (a) & (b)

4. Formula for first decision variable in Bresenham's line algorithm having slope less than one is
a) $P_o = 2dy - dx$
b) $P_o = dy - dx$
c) $P_o = 2dy - 2dx$
d) $P_o = 2dy + dx$

5. Formula for first decision variable in Bresenham's line algorithm having slope greater than one is
a) $P_o = 2dx - dy$
b) $P_o = dy - dx$
c) $P_o = 2dy - 2dx$
d) $P_o = 2dy + dx$

6. The _______ software can be used for part modeling.
a) ANSYS
b) Solidworks
c) LS-DYNA

d) HYPERMESH

7. CAD helps in
a) Increased productivity of the designer
b) Reduction in time
c) Improves documentation
d) all of the above

8. Formula for first decision variable in Bresenham's circle algorithm is
a) $P_o = 5/4 + R$
b) $P_o = R – 5/4$
c) $P_o = 5/4 – R$
d) None of the above

9. DDA stands for
a) Differential Digital Algorithm
b) Digital Differential Analyzer
c) Digital Different Analyzer
d) None of the above

10. The process of determining the appropriate pixels for representing picture of graphics object is known as
a) Rasterization
b) Animation
c) Both (a) and (b)
d) Representation

11. A scaling transformation changes the **_________** of an object
a) Size
b) Location
c) Shape
d) Both a) and b)

12. The triangle ABC having vertices at A=(2, 2); B=(4, 2) and C=(3, 4). It is scaled by 2 units in X & Y direction. The final position of triangle is
a) A=(4, 4) B=(8, 4) and C=(6, 8)
b) A=(4, 4) B=(8, 4) and C=(3, 4)
c) A=(4, 4) B=(4, 2) and C=(6, 8)
d) A=(2, 2) B=(8, 4) and C=(6, 8)

13. A process of changing the position of an object in a straight line path from one coordinate location to another is called______
a) Rotation
b) Translation
c) Motion

d) all of the above

14. 3-D transformation matrix for rotation is
a) 3*3
b) 2*2
c) 4*4
d) None

15. ____________ is a transformation that produces mirror image of an object relative to axis.
a) Reflection
b) Shear
c) rotation
d) clipping

16. _________ comes under the special transformation in CAD.
a) Scaling
b) Rotation
c) Shear
d) Translation

17. The process of selecting and viewing the picture with different views is called_____
a) Clipping
b) Windowing
c) Projecting
d) None of the above

18. Translate the point P(5, 10) by 3 units in X-direction and 2 units in Y-direction. The new position of point will be
a) [2; 8]
b) [8; 11]
c) [8; 12]
d) None of the above

19. 3-D transformation matrix for scaling is
a) [Sx,0,0,0; 0,Sy,0,0; 0,0,Sz,0; 0,0,0,1]
b) [0,Sx,0,0; 0,Sy,0,0; 0,0,Sz,0; 0,0,0,1]
c) [Sx,0,0,0; 0,0,Sy,0; 0,0,Sz,0; 0,0,0,1]
d) [Sx,0,0,0; 0,0,Sy,0; 0,0,0,Sz; 0,0,0,1]

20. Concatenation is the process in which all the transformation matrices are _____ together.
a) Added
b) Multiplied
c) Subtracted
d) Divided

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF MECHANICAL ENGINEERING
Second Sessional Exam (2021-22)

Semester: VII **Time: 1 Hour**
Subject: Computer Aided Design **Marks: 20**

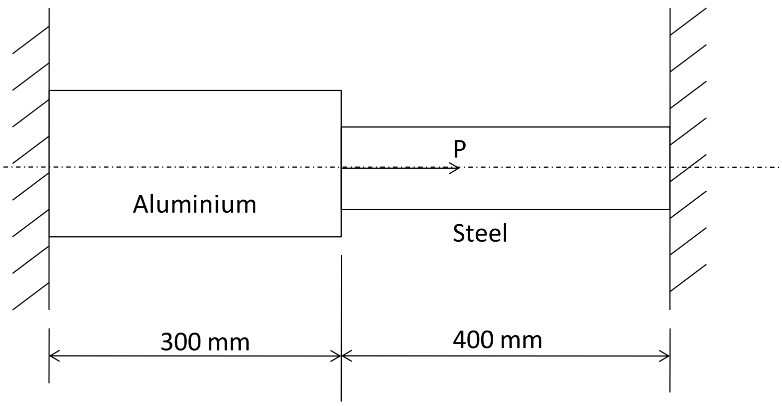
CO3: Know Techniques for geometric modeling and assembly modeling.
CO4: Understand Finite element analysis of one dimensional problem, Finite element modeling and Potential energy approach.

Que. 1
Determine the five points on the Bezier curve if P_0 [1, 1], P_1 [2, 3], P_2 [4, 3], P_2 [3, 1] the vertices of a Bezier polygon at t = [0, 0.2, 0.4, 0.6, 0.8, 1]. **(10) [BTL 3]**

OR

Que. 2
a) Discuss in brief solid modeling. **(5) [BTL 2]**
b) Discuss in brief Assembly modeling. **(5) [BTL 2]**

Que.3
Consider the bar shown in below figure. An axial load P = 200 KN is applied as shown.
Determine: a) Nodal displacement b) Stress in each element c) Reaction forces
(10) [BTL 5]



For Aluminium: $A_1 = 2400\ mm^2$; $E_1 = 70$ GPa
For Steel: $A_2 = 600\ mm^2$; $E_2 = 200$ GPa

OR

Que. 4
a) Write the name of various types of element, their number of nodes and number of degrees of freedom of each node of various elements. **(3) [BTL 2]**

b) Derive stiffness matrix for 1-D Element. **(7) [BTL 3]**

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
MECHANICAL ENGINEERING DEPARTMENT
Objective Test Second Sessional Exam 2021-22

Subject: CAD **Sem: VII** **Max. Marks: 20** **Time: 30 Min.**

Name of Student: ____________________________ **Roll No.:** ______ **Signature:** ______

1) The degree of the Bezier curve with 'n' control points is
a) n+1 b) n-1 c) n d) 2n

2) Which of the following is not an analytic entity?
a) Line b) Circle c) Spline d) Parabola

3) The basic geometric building blocks provided in a CAD/CAM package are
a) points b) lines c) circles d) all of the above

4) The _________ is analytic curves.
a) Bezier curve b) Hermite cuvec) Line d) None

5) The synthetic curve is/are
a) Bezier curvesb) Cubic spline curves c) B-Spline curves d) All of the above

6) In assembly modeling
a) Part modeling is carried out b) Different parts & sub-assemblies are assembled together
c) Drafting is carried out d) None of the above

7) The characteristic equation of Bezier Curve is for four control points is
a) P(u) = [(Po)(1-u)^3] + [3(P1)u(1-u)^2] + [3(P2)(u^2)(1-u)] + [(P3)(u^3)]
b) P(u) = [(Po)(1-u)^4] + [3(P1)u(1-u)^2] + [3(P2)(u^2)(1-u)] + [(P3)(u^4)]
c) P(u) = [(P1)(u^3)] + [3(P1)u(1-u)^2] + [3(P2)(u^2)(1-u)] + [(P3)(u^3)]
d) None of the above

8) The process of selecting and viewing the picture with different views is called_____
a) Clipping b) Windowing c) Projecting d) None of the above

9) In the following geometric modeling techniques which are not three-dimensional modeling?
a) Wireframe Modeling b) Drafting c) Surface Modeling d) Solid Modeling

10) In the following three-dimensional modeling techniques, which do not require much computer time and memory?
a) Surface modeling b) Solid modeling c) Wireframe modeling d) All of the above

11) The degrees of freedom of a two-node bar element are
a) 1 b) 2 c) 3 d) 4

12) Stiffness is __________ to the cross section area of the element.
a) Inversely proportional b) Exponential c) Directly proportional d) Independent

13) The function which relates the displacement at any point within the element with nodal displacement is called as ___________
a) Stiffness b) Global displacement c) Shape function d) Polynomial function

14) Stiffness matrix is
a) Singular b) Asymmetric c) Unity d) None

15) The shape function ___________ nodal quantities.
a) Interpolate b) extrapolate c) add d) none

16) On gathering stiffness and loads, the system of equations is given by
a) KQ=F b) KQ≠F c) K=QF d) K≠QF

17) The natural coordinate system is also called as___________.
a) Local coordinate b) Global coordinate c) Intrinsic coordinate d) None

18. The global stiffness matrix is
a) Symmetric b) un-Symmetric b) both a & b d) None of the above

19) The software exclusively used for finite element analysis are
a) ANSYS b) NASTRAN c) LS-DYNA d) All of the above

20) The body is discretized into a number of small segments known as
a) Node b) Element c) Both (a) & (b) d) None of the above

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF MECHANICAL ENGINEERING
Second Sessional Online Exam (2020-21)

Semester: VII **Time: 1 Hour**
Subject: Computer Aided Design **Marks: 20**

CO1: Understand introduction to windowing & clipping, 2D transformation & 3D transformation.

Que.1

a) What is windowing and clipping? (3) [BTL 2]

b) A triangle having vertices (5, 5), (10, 5), (7,9) is translated by 5 units in x-direction, them it is rotated by 30° in clockwise direction and them it is scaled by 3 units in y-direction. Determine the final position of the triangle. (7) [BTL 3]

OR

Que.2

What is transformation? Explain the terms: translation, rotation, scaling and reflection. Write their transformation matrix also in 2-D and 3-D. (10) [BTL 2]

Que.3

a) What is windowing and viewport? (3) [BTL 2]

b) Find out the final position of line having end points (2, 2) and (10, 4), when it is translated by 5 units in Y – direction. Then scaled 2 units in X – direction and then rotated by 45° in clockwise direction about fixed point (2, 2). (7) [BTL 3]

OR

Que.4

A tetrahedron is having vertices (6, 6, 0); (14, 6, 0); (10, 13, 0) and (10, 13, 7.75) is scaled by 1.5 unit in x, y and z direction respectively find the final position of tetrahedron. (10) [BTL 3]

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
MECHANICAL ENGINEERING DEPARTMENT
Second Sessional Online Exam 2020-21
Objective Test

Subject: CAD **Sem: VII** **Max. Marks: 10**
Name of Student :_____________________________ **Roll No. :**____ **Signature :**____________

1. A scaling transformation changes the _________ of an object
a) Size
b) Location
c) Shape
d) Both a) and b)

2. A two dimensional rotation is applied to an object by repositioning it along a
a) Circular path in the x-y plane
b) Straight path in the x-y plane
c) Diagonals path in x-y plane
d) Upwards in the x-y plane

3. A process of changing the position of an object in a straight line path from one coordinate location to another is called______
a) Rotation
b) Translation
c) Motion
d) all of the above

4. 2-D transformation matrix for rotation is
a) 3*3
b) 2*2
c) 2*3
d) None

5. ____________ is a transformation that produces mirror image of an object relative to axis.
a) Reflection
b) Shear
c) rotation
d) clipping

6. _________ comes under the special transformation in CAD.
a) Scaling
b) Rotation
c) Shear
d) Translation

7. The process of selecting and viewing the picture with different views is called_____
a) Clipping
b) Windowing
c) Projecting
d) None of the above

8. The type of transformation matrices are

a) 1-D transformation
b) 2-D transformation
c) 3-D transformation
d) Both b & c

9. 3-D transformation matrix for scaling is
a) [Sx,0,0,0; 0,Sy,0,0; 0,0,Sz,0; 0,0,0,1]
b) [0,Sx,0,0; 0,Sy,0,0; 0,0,Sz,0; 0,0,0,1]
c) [Sx,0,0,0; 0,0,Sy,0; 0,0,Sz,0; 0,0,0,1]
d) [Sx,0,0,0; 0,0,Sy,0; 0,0,0,Sz; 0,0,0,1]

10. Concatenation is the process in which all the transformation matrices are _____ together.
a) Added
b) Multiplied
c) Subtracted
d) Divided

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF MECHANICAL ENGINEERING
PUT Online Exam (2020-21)

Semester: VII **Time: 1Hr. 30 Min.**
Subject: Computer Aided Design **Marks: 40**

CO703.1 Know basic concept of CAD, Comparison between CAD and conventional design, generation of algorithms for basic geometric entities.
CO703.2 Understand Introduction to windowing & clipping, 2D transformation, 3D transformation.
CO703.3 Know Techniques for geometric modeling and assembly modeling.
CO703.4 Understand Finite element analysis of one dimensional problem, Finite element modeling and Potential energy approach.
CO703.5 Analyze Truss and Two dimensional Problems, Derivation of shape functions for CST element, Pre processing and Post processing.
CO703.6 Know optimization in Design, objectives of optimum design, Johnson's method of optimum design, Optimum design with normal and redundant specifications of simple machine elements.

Note: Solve any 3 questions.

Que.1

a) Differentiate between CAD and conventional design. (4) [BTL 2]

b) Write Bresenham's algorithm for circle generation. (9) [BTL 4]

Que.2

a) Write the transformation matrices of translation, scaling and rotation in case of 2-D transformation. (3) [BTL 2]

b) A triangle ABC has its vertices at A(0, 0), B(5, 0) and C(3, 4). It is to be translated by 5 units x-direction and 2 units y-direction, then it is to be rotated in anticlockwise direction about the new position of point 'C' through 90º. Find the new position of triangle. (10) [BTL 3]

Que.3

a) A cubic Bezier curve is defined by the control points as $P_0 = [1, 1]$; $P_1 = [2, 3]$; $P_2 = [4, 3]$; $P_3 = [5, 1]$. Find the equation of curve and its mid point. (6) [BTL 3]

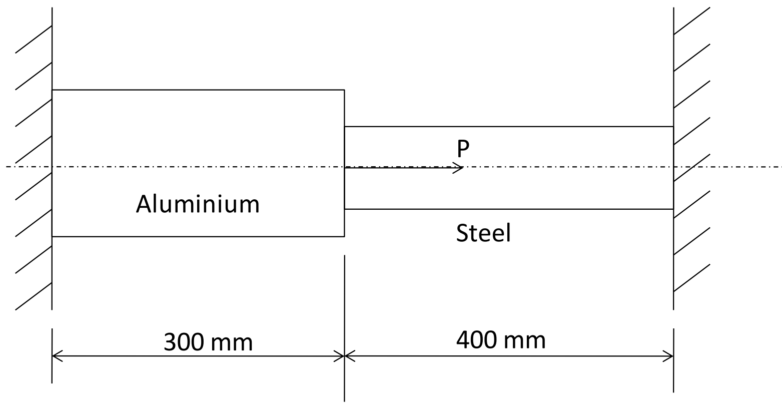
b) Write short notes on **any two**. (8) [BTL 2]

i) CSG technique.
ii) Boundary representation technique.
iii) Importance of precedence diagram.

Que.4

Consider the bar shown in below figure. An axial load P = 200 KN is applied as shown. Determine the following

a) Nodal displacement b) Stress in each element c) Reaction forces (13) [BTL 5]



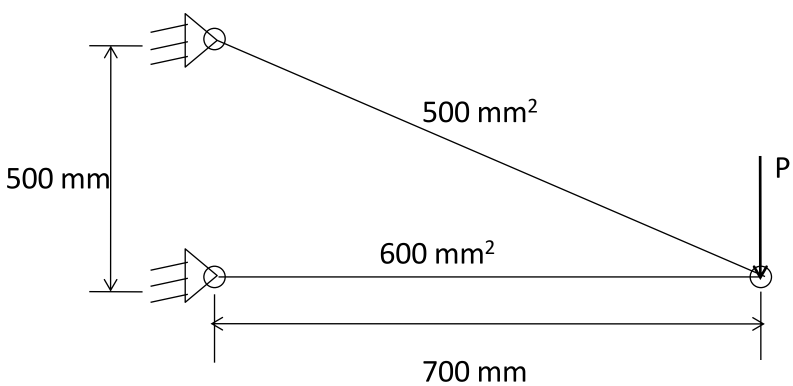
For Aluminium: $A_1 = 2400\ mm^2$; $E_1 = 70$ GPa

For Steel: $A_2 = 600\ mm^2$; $E_1 = 200$ GPa

Que. 5

For the pin jointed configuration as shown in figure subjected to load P = 50 KN, determine nodal displacement and reaction at fixed support. Take Young's modulus, E = 210 GPa.

(14) [BTL 5]



Que. 6

Consider a simply supported beam is subjected to a load of 70 N acting at centre, the length of beam is 700 mm and factor of safety is 1.6. Design the beam for minimum deflection. Consider material as

a) SAE 1045 (Oil quenched and drawn at 700^0 C)

b) SAE 2340 (Annealed)

c) SAE 2345 (drawn at 425^0 C)

d) SAE 3145 (drawn at 425^0 C)

e) SAE 4340 (Cold rolled) (13) [BTL 5]

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PUT Online Exam (2021-22)

Semester: VII | **Time: 1Hr. 30 Min.**
Subject: Computer Aided Design | **Marks: 40**

CO703.1 Know basic concept of CAD, Comparison between CAD and conventional design, generation of algorithms for basic geometric entities.
CO703.2 Understand Introduction to windowing & clipping, 2D transformation, 3D transformation.
CO703.3 Know Techniques for geometric modeling and assembly modeling.
CO703.4 Understand Finite element analysis of one dimensional problem, Finite element modeling and Potential energy approach.
CO703.5 Analyze Truss and Two dimensional Problems, Derivation of shape functions for CST element, Pre processing and Post processing.
CO703.6 Know optimization in Design, objectives of optimum design, Johnson's method of optimum design, Optimum design with normal and redundant specifications of simple machine elements.

Note: Solve any 3 questions.

Que.1

a) Discuss CAD in brief along with its advantages. (4) [BTL 2]

b) Write Bresenham's algorithm for circle generation. (9) [BTL 4]

Que.2

a) Write the transformation matrices of translation, scaling and rotation in case of 2-D transformation. (3) [BTL 2]

b) A rectangle A(4, 4); B(8, 4); C(8, 8) and D(4, 8) is scaled by 1.5 units in Y-direction about its centre point. Further it is rotated about its centre point by 90^0 in CCW direction. Find the final position of rectangle. (10) [BTL 3]

Que.3

b) Determine the five points on the Bezier curve if B_0 [1, 1], B_1[2, 3], B_2 [4, 3], B_3 [3, 1] the vertices of a Bezier polygon at t = [0, 0.2, 0.4, 0.6, 0.8, 1]. (6) [BTL 3]

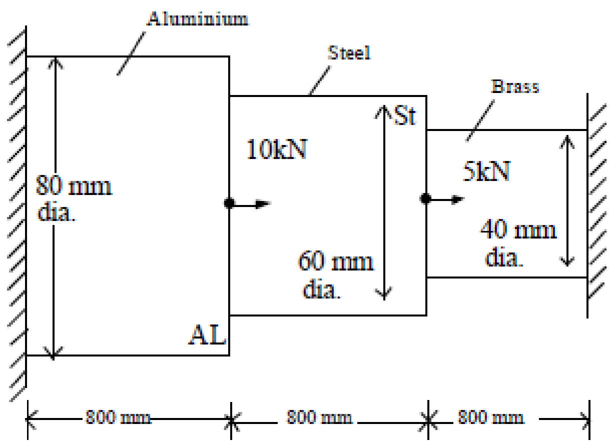
b) Write short notes on **any two**. (8) [BTL 2]

i) CSG technique.
ii) Wireframe modeling
iii) Assembly Modelling

Que.4

A composite shaft is subjected to load as shown in figure. Determine displacement at nodes.

E_{al} = 70 GPa, E_{st} = 200 GPa and E_{br} = 105 GPa (13) [BTL 5]



Que. 5

a. Discuss pre-processing and post-processing in FEM. (8) [BTL 2]

b. Derive stiffness matrix for truss element. (6) [BTL 3]

Que. 6

Consider a simply supported beam is subjected to a load of 70 N acting at centre, the length of beam is 700 mm and factor of safety is 1.6. Design the beam for minimum deflection. Consider material as

a) SAE 1045 (Oil quenched and drawn at 700^0 C)

b) SAE 2340 (Annealed)

c) SAE 2345 (drawn at 425^0 C)

d) SAE 3145 (drawn at 425^0 C) (13) [BTL 5]

UNIT - I

1) An accurate and efficient raster line-generating algorithm is
a) DDA algorithm
b) Mid-point algorithm
c) Parallel line algorithm
d) Bresenham's line algorithm

2) CAD helps in
a) Increased productivity of the designer
b) Reduction in time
c) Improves documentation
d) all of the above

3) Which two disciplines are tied by a common database?
a) Documentation and geometric modeling
b) CAD and CAM
c) drafting and documentation
d) none of the mentioned

4) Formula for first decision variable in Bresenham's circle algorithm is
a) $P_o = 5/4 + R$
b) $P_o = R – 5/4$
c) $P_o = 5/4 – R$
d) None of the above

5) In line generation algorithm, if the slope of line is less than one then_____ (Where dx is difference between X-coordinate of two consecutive points & dy is difference between Y-coordinates of two consecutive points.)
a) dx is considered as unity
a) dy is considered as unity
a) dx & dy are considered as unity
a) None

6) The midpoint circle drawing algorithm also uses the ________________ of the circle to generate.
a) Two way symmetry
b) Four way symmetry
c) Eighty way symmetry
d) Both a) and b)

UNIT - II

7) Transformation matrix for Reflection about Y-axis is given by
a) [1,0,0; 0,-1,0; 0,0,1]
b) [-1,0,0; 0,1,0; 0,0,1]
c) [-1,0,0; 0,-1,0; 0,0,1]
d) [1,0,0; 0,1,0; 0,0,1]

8) Transformation matrix for Y-shear
a) [1,0,0; Shx,1,0; 0,0,1]
b) [1,Shy,0; 0,1,0; 0,0,1]
c) [1,0,0;1, Shx,0; 0,0,1]
d) [Shy,1,0; 0,1,0; 0,0,1]

9) To convert circle into ellipse, the _______ transformation is used
a) Rotation
b) Translation
c) Scaling
d) Reflection

10) 2-D transformation matrix for rotation is
a) 3*3
b) 2*2
c) 2*3
d) None

11) The region against which an object is to be clipped is called
a) Clip window or clipping window
b) Drawing window
c) Image window
d) Both b) and c)

12) ____________ is a transformation that produces mirror image of an object relative to axis.
a) Shear
b) Reflection
c) rotation
d) clipping

13) _________ comes under the special transformation in CAD.
a) Scaling
b) Rotation
c) Shear
d) Translation

UNIT – III

14) The degree of the Bezier curve with 'n' control points is
a) n+1
b) n-1
c) n
d) 2n

15) Which of the following is not an analytic entity?
a) Line
b) Circle
c) Spline
d) Parabola

16) The basic geometric building blocks provided in a CAD/CAM package are
a) points
b) lines
c) circles
d) all of the above

17) The _________ is analytic curves.
a) Bezier curve
b) Hermite cuve

c) Line
d) None

18) The synthetic curve is/are
a) Bezier curves
b) Cubic spline curves
c) B-Spline curves
d) All of the above

19) In assembly modeling
a) Part modeling is carried out
b) Different parts & sub-assemblies are assembled together
c) Drafting is carried out
d) None of the above

20) The characteristic equation of Bezier Curve is for four control points is
a) P(u) = [(Po)(1-u)^3] + [3(P1)u(1-u)^2] + [3(P2)(u^2)(1-u)] + [(P3)(u^3)]
b) P(u) = [(Po)(1-u)^4] + [3(P1)u(1-u)^2] + [3(P2)(u^2)(1-u)] + [(P3)(u^4)]
c) P(u) = [(P1)(u^3)] + [3(P1)u(1-u)^2] + [3(P2)(u^2)(1-u)] + [(P3)(u^3)]
d) None of the above

UNIT – IV

21) The degrees of freedom of a two-node bar element are
a) 1
b) 2
c) 3
d) 4

22) Stiffness is ___________ to the cross section area of the element.
a) Inversely proportional
b) Exponential
c) Directly proportional
d) Independent

23) The function which relates the displacement at any point within the element with nodal displacement is called as ____________
a) Stiffness
b) Global displacement
c) Shape function
d) Polynomial function

24) Stiffness matrix is always
a) Symmetric
b) Asymmetric
c) Unity
d) None

25) The shape function ____________ nodal quantities.
a) Interpolate
b) extrapolate
c) add

d) none

26) On gathering stiffness and loads, the system of equations is given by
a) KQ=F
b) KQ≠F
c) K=QF
d) K≠QF

27) The natural coordinate system is also called as___________.
a) Local coordinate
b) Global coordinate
c) Intrinsic coordinate
d) None

UNIT – V

28) The stages of FEA are
a) Pre-processing
b) Solver
c) Post-processing
d) All of the above

29) A triangular plane stress element has ………degree's of freedom
a) 3
b) 4
c) 5
d) 6

30) The stress for truss element is given by
a) $\frac{E}{l}[-l-m-l-m]q$
b) $\boldsymbol{\frac{E}{l}[-l-m\ \ l\ \ m]q}$
c) $\frac{E}{l}[-l-m\,l-m]q$
d) $\frac{A}{l}[-l-m\,l\,m]q$

31) The direction cosines 'l' & 'm' are given by
a) $l = (x_2-x_1)/l_e$ & $m = (y_2-y_1)/l_e$
b) $l = (x_2-x_1)/m$ & $m = (y_2-y_1)/l$
c) $l = (y_2-y_1)/l_e$ & $m = (x_2-x_1)/l_e$
d) $l = (x_1-x_2)/l_e$ & $m = (y_1-y_2)/l_e$

32) In CST element 'B' matrix is
a) Stiffness matrix
b) Strain-displacement matrix
c) material matrix
d) Force matrix

33) The material, boundary conditions and loads are applied in
a) Pre-processing
b) Post-processing
c) Solver

d) None of the above

34) The results are extracted from the model in
a) Pre-processing
b) Post-processing
c) Solver
d) None of the above

UNIT – VI

35) The type of problem in optimization
a) Normal specification
b) Redundant specification
c) both a & b
d) none

36) Condition for normal specification problem is
a) No. of free variables greater than or equal to No. of secondary design equation and no constraint on dimension
b) No. of free variables greater than No. of secondary design equation and no constraint on dimension
c) No. of free variables greater or equal to No. of secondary design equation and constraint on dimension
d) None of the above

37) Various Optimization parameters are
a) Minimum cost & weight
b) Minimum deflection
c) Maximum energy absorption
d) all of the above

38) The variables other than functional variables and constraint variables are called as
a) Functional Variables
b) Constraint Variables
c) Free Variables
d) All of the above

39) The type of equations in Optimization is
a) Primary Design Equation
b) Secondary Design Equation
c) Limiting Equation
d) All of the above

40) By using Optimization techniques, the design objective of ________ can be achieved.
a) Economical
b) Better functional performance
c) Both (a) & (b)
d) None of the above

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
MECHANICAL ENGINEERING DEPARTMENT
First Sessional Online Exam 2020-21
Objective Test

Subject: CAD **Sem: VII** **Max. Marks: 10**
Name of Student :________________________ Roll No. :____ Signature :___________

1. The advantages of CAD are
a) Drawing can be edited easily b) CAD Infrastructure & Trained resource required
c) Reduction in time for product development d) Both (a) & (c)

2. The disadvantage of CAD is
a) More accuracy in design b) Drawing can be edited easily c) Reduction in time for product development d) CAD Infrastructure & Trained resource required

3. The line generation algorithm is
a) DDA Algorithm b) Bresenham's Algorithm c) None d) Both (a) & (b)

4. Formula for first decision variable in Bresenham's line algorithm having slope less than one is
a) $P_o = 2dy - dx$ b) $P_o = dy - dx$ c) $P_o = 2dy - 2dx$ d) $P_o = 2dy + dx$

5. Formula for first decision variable in Bresenham's line algorithm having slope greater than one is
a) $P_o = 2dx - dy$ b) $P_o = dy - dx$ c) $P_o = 2dy - 2dx$ d) $P_o = 2dy + dx$

6. The _______ software can be used for part modeling.
a) ANSYS b) Solidworks c) LS-DYNA d) HYPERMESH

7. CAD helps in
a) Increased productivity of the designer b) Reduction in time c) Improves documentation
d) all of the above

8. Formula for first decision variable in Bresenham's circle algorithm is
a) $P_o = 5/4 + R$ b) $P_o = R - 5/4$ c) $P_o = 5/4 - R$ d) None of the above

9. DDA stands for
a) Differential Digital Algorithm b) Digital Differential Analyzer
c) Digital Different Analyzer d) None of the above

10. The process of determining the appropriate pixels for representing picture of graphics object is known as
a) Rasterization b) Animation c) Both (a) and (b) d) Representation

K. D. K. COLLEGE OF ENGINEERING, NAGPUR
DEPARTMENT OF MECHANICAL ENGINEERING
First Sessional Online Exam (2020-21)

Semester: VII | **Time: 1 Hour**
Subject: Computer Aided Design | **Marks: 20**

CO1: Know basic concept of CAD, Comparison between CAD and conventional design, generation of algorithms for basic geometric entities.

Que.1

a) Explain Role of CAD for Mechanical engineering nowadays in Industry. (5) [BTL 2]

b) Explain rasterization techniques. (5) [BTL 2]

OR

Que.2

a) Explain the phases of computer aided design process and how it helps in conventional design process. (5) [BTL 2]

b) Draw the line between end points (10,5) and (15,9) by using Bresenham's line algorithm. (5) [BTL 3]

Que.3

Write Bresenham's algorithm for circle generation using the algorithm generate circle with radius 10 unit at centre (1, 1) upto first octant. (10) [BTL 3]

OR

Que.4

Derive the necessary equations used for Bresenham's line generation algorithm for slope less than one. (10) [BTL 6]