Subject
COMPUTER GRAPHICS
(22318)

SYLLABUS

Chapter No.	Name of chapter	Marks With Option	Marks Without Option (Final Exam)
1	Basic of Computer graphics	14	08
2	Raster scan graphics	30	18
3	Overview of Transformations	26	18
4	Windowing and clipping	18	14
5	Introduction to curve	14	12
	Total Marks :-	102	70

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BOARD THEORY PAPER PATTERN FOR CGR(22318)

Q.1		**Attempt any FIVE**	**5*2=10**
	a)	Basic of Computer graphics CO-318.1	
	b)	Basic of Computer graphics CO-318.1	
	c)	Basic of Computer graphics CO-318.1	
	d)	Raster scan graphics CO-318.2	
	e)	Raster scan graphics CO-318.2	
	f)	Raster scan graphics CO-318.2	
	g)	Overview of Transformations CO-318.3	
Q.2		**Attempt any THREE**	**3*4=12**
	a)	Basic of Computer graphics CO-318.1	
	b)	Raster scan graphics CO-318.2	
	c)	Overview of Transformations CO-318.3	
	d)	Windowing and clipping CO-318.4	
Q.3		**Attempt any THREE**	**3*4=12**
	a)	Raster scan graphics CO-318.2	
	b)	Overview of Transformations CO-318.3	
	c)	Windowing and clipping CO-318.4	
	d)	Introduction to curve CO-318.5	
Q.4		**Attempt any THREE**	**3*4=12**
	a)	Basic of Computer graphics CO-318.1	
	b)	Raster scan graphics CO-318.2	
	c)	Overview of Transformations CO-318.3	
	d)	Windowing and clipping CO-318.4	
	e)	Introduction to curve CO-318.5	
Q.5		**Attempt any TWO**	**2*6=12**
	a)	Raster scan graphics CO-318.2	
	b)	Overview of Transformations CO-318.3	
	c)	Introduction to curve CO-318.5	
Q.6		**Attempt any TWO**	**2*6=12**
	a)	Raster scan graphics CO-318.2	
	b)	Overview of Transformations CO-318.3	
	c)	Windowing and clipping CO-318.4	

CLASS TEST - I
PAPER PATTERN

Syllabus:-

Unit No.	Name of the Unit	Course Outcome (CO)
1	Basic of Computer graphics	CO-318.01
2	Raster scan graphics	CO-318.02

		Course Outcome (CO)
Q.1	**Attempt any FOUR 4*2=08Marks**	
a)	Basic of Computer graphics	CO-318.1
b)	Basic of Computer graphics	CO-318.1
c)	Basic of Computer graphics	CO-318.1
d)	Raster scan graphics	CO-318.2
e)	Raster scan graphics	CO-318.2
f)	Raster scan graphics	CO-318.2
Q.2	**Attempt any THREE 3*4= 12Marks**	
a)	Basic of Computer graphics	CO-318.1
b)	Basic of Computer graphics	CO-318.1
c)	Basic of Computer graphics	CO-318.1
d)	Raster scan graphics	CO-318.2
e)	Raster scan graphics	CO-318.2
f)	Raster scan graphics	CO-318.2

CLASS TEST - II
PAPER PATTERN
Syllabus:-

Unit No.	Name of the Unit	Course Outcome (CO)
3	Overview of Transformations	CO-318.03,04
4	Windowing and clipping	CO-318.05
5	Introduction to curve	CO-318.06

			Course Outcome (CO)
Q.1	**Attempt any FOUR**	**4*2=08Marks**	
a)	Overview of Transformations		CO-318.3,4
b)	Overview of Transformations		CO-318.3,4
c)	Windowing and clipping		CO-318.5
d)	Windowing and clipping		CO-318.5
e)	Introduction to curve		CO-318.6
f)	Introduction to curve		CO-318.6
Q.2	**Attempt any THREE**	**3*4= 12Marks**	
a)	Overview of Transformations		CO-318.3,4
b)	Overview of Transformations		CO-318.3,4
c)	Windowing and clipping		CO-318.5
d)	Windowing and clipping		CO-318.5
e)	Windowing and clipping		CO-318.5
f)	Introduction to curve		CO-318.6

COURSE OUTCOME (CO)

COURSE: - COMPUTER GRAPHICS (22318)

CO.NO	Course Outcome
CO-318.1	Convert screen text mode to graphics mode.
CO-318.2	Develop C programs to draw different shapes using algorithms
CO-318.3	Develop C programs 2D transformation.
CO-318.4	Develop C programs 3D transformation.
CO-318.5	Develop program to Clip the line or polygon
CO-318.6	Draw the fractal line using different curves

1. Basic of Computer graphics

Position in Question Paper   Total Marks-14

Q.1. a)2-Marks.

Q.1. b)2-Marks.

Q.1. c)2-Marks.

Q.2. a)4-Marks.

Q.4. a)4-Marks.

Descriptive Question

1) Define

   a)   Pixel

   b)   Frame buffer

2) Give characteristics of display adapter

3) Explain raster scan

4) Differentiate between random scan and raster scan

5) Compare Bitmap Graphics and Vector based graphics.

6) Define aspect ratio. Give one example of an aspect ratio

7) List any four applications of computer graphics.

8) Define virtual reality. List any two advantages of virtual reality.

9) Describe the vector scan display techniques with neat diagram.

10)   Difference between virtual and augmented reality

11)   Define display devices and explain types of display devices in details

12)   List various graphics standards

13)   List attributes of line segment and text

MCQ Question

(Total number of Question=Marks*3=8*3=24)

1. Which devices provide positional information to the graphics system?

   a) Input devices   b) Output devices

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c) Pointing devices   **d) Both a and c**

2. The devices which converts the electrical energy into light is called
  a) Liquid-crystal displays   c) Plasma panels
  b) Non-emitters   **d) Emitters**

3. Random-scan system mainly designed for
  a) Realistic shaded screen   **c) Line-drawing applications**
  b) Fog effect   d) Only b

4. The quality of a picture obtained from a device depends on
  a) Dot size   c) Number of lines per inch
  b) Number of dots per inch   **d) All of the mentioned**

5. The Graphics can be…
  a) Drawing   c) Simulation
  b) Photograph, movies   **d) All of these**

6. Computer Graphics was first used by
  a) William fetter in 1960   c) James gosling in 1991
  b) James fetter in 1969   d) John Taylor in 1980

7. Graphics is one of the …….major key element in design of multimedia application.
  a) 5   c) 4
  b) 3   d) 2

8. Types of computer graphics are…
  a) Vector and raster   c) Vector and scalar
  b) Scalar and raster   d) None of these

9. Vector graphics is composed of….
  a) Pixels   c) Palette
  b) Paths   d) None of these

10. Raster graphics is composed of…
  a) Pixels   c) Palette
  b) Paths   d) None of these

11. Raster images are more commonly called…
  a) Pix map   c) Both a&b
  b) Bitmap   d) None

12. Pixel can be arranged in a regular……

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a) One dimensional grid   c) Three dimensional grid

b) Two dimensional grid   d) None

13. The brightness of each pixel is…

a) Compatible   c) Both a&b

b) Incompatible   d) None

14. Each pixel has ….basic color components.

a) 2 or 3   **c) 3 or 4**

b) 1 or 4   d) None

15. The quantity of an image depend on …

a) No. of pixel used by image   c) No.of resolution used by image

b) No of pixel line used by image d) None

16. Higher the no of pixels….the image quality

a) Bad   c) Smaller

b) Better   d) None

17. A palette can be defined as a finite colors for merging the…..

a) Analog image   c) Both a&b

b) Digital image   d) None

18. Which one is not a type of basic fill styles>

a) Solid color   c) Pattern

b) Hollow   **d) Dark**

19. The operator that is used for combining fill pattern with a background pattern is….

a) OR operator   c) X-OR operator

b) AND operator   **d) All of these**

20.………representation gives the final classification to use computer graphics.

a) Graphical   **c) Pictorial**

b) Coordinate   d) Characters

21. In vector display beam is deflected from the endpoint to endpoint and the technique is called…….

a) Raster scan   c) Vector scan

b) Random scan   d) Conversion scan

22.……….is responsible for producing the picture from the detailed description.

a) Graphical system   b) Application model

   c) Conceptual model   d) Application program

23. The raster scan generator produces……that generate the raster scan.

   a) Pixel values   **c) Deflection signals**

   b) Deflection beam   d) None

24. To create scenes, images, pictures and also animated lectures ….acts as a very powerful tool

   a) Graphics packages   **c) Graphics software**

   b) Graphics controller   d) Graphics card

2. Raster scan graphics

  Position in Question Paper   **Total Marks-30**

   Q.1. d) 2-Marks.
   Q.1. e) 2-Marks.
   Q.1. f) 2-Marks.
   Q.2. b) 4-Marks.
   Q.3. a) 4-Marks.
   Q.4. b) 4-Marks.
   Q.5. a) 6-Marks.
   Q.6. a) 6-Marks.

Descriptive Question

1) State two line drawing algorithms

2) List types of polygon

3) List various polygon filling algorithms

4) Explain and write steps for DDA line drawing algorithm

5) Explain stroke method and bitmap method with example

6) Consider line from (4, 4) to (12, 9). Use Bresenham's algorithm to rasterize this line.

7) Explain boundary fill algorithm with pseudo code. Also mention its limitations if any.

8) Derive the expression for decision parameter used in Bresenham's circle drawing algorithm.

9) Define convex and concave polygons.

10) Rephrase the Bresenham's algorithm to plot 1/8th of the circle and write the algorithm required to plot the same.

11) State the different character generation methods. Describe any one with diagram.

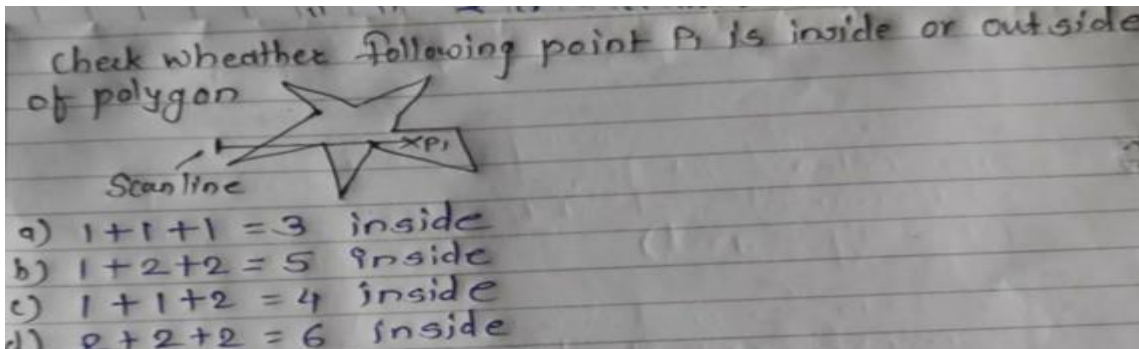12) Consider the line from (0, 0) to (4, 6). Use the simple DDA algorithm to rasterize this line.

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13) Consider the line from (5, 5) to (13, 9). Use the Bresenham's algorithm to rasterize the line.

14) List any two line drawing algorithms. Also, list two merits of any line drawing algorithm

15) write a Program in 'C' for DDA Circle drawing algorithm

16) Explain Symmetry of circle

17) Explain even out and winding number method for test the point is outside or inside the polygon
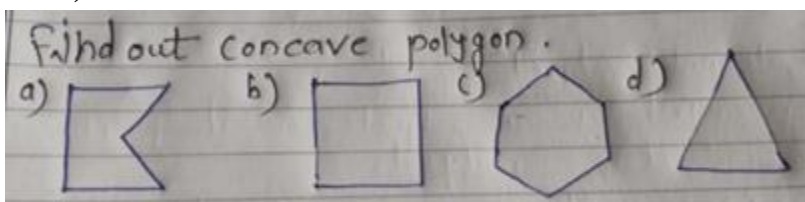
MCQ Question

(Total number of Question=Marks*3=18*3=54)

1. A polygon in which the line segment joining any two points within the polygon lies completely inside the polygon, is called _____ polygon.
   a) Convex
   b) Concave
   c) Closed
   d) Complete

2. If we used Left->Right->Up->Bottom, the final output will be the vertex list outputted by the _____ edge.
   a) left edge
   b) right edge
   c) top edge
   d) bottom edge

3. Only vertices from the subject polygon that are on the _____ are selected.
   a) lower half
   b) boundary
   c) opaque side
   d) visible side

4. Expansion of line DDA algorithm is
   a) Digital difference analyzer
   b) Direct differential analyzer
   c) Digital differential analyzer
   d) Data differential analyzer

5. In Bresenham's circle algorithm, if points are generated from 900 to 450 and (x,y) are the Coordinate of last scan converted pixel then the next pixel coordinate is
   a) a(x+1,y+1)or(x-1,y-1)
   b) (x+1,y)or(x,y+1)
   c) (x,y+1)or(x+1,y-1)
   d) (x+1,y)or(x+1,y-1)

6. For lines with slope magnitude $|m|<1$, ?x can be_____
   a) A set corresponding vertical deflection
   b) A set proportional to a small horizontal deflection voltage
   c) Only a
   d) All of the mentioned

7. In a boundary fill algorithm for filling polygon, boundary defined regions may be either _____ connected or_____ connected.
   a) 2,4   c) 8,16
   b) 4,8   d) 8,6

8. The reflection matrix of a point P(x,y) about the straight line y = -x is CO-2
   a) a   c) c
   b) b   d) d

Check wheather Following point P₁ is inside or outside of polygon

Scan line
a) 1+1+1 = 3 inside
b) 1+2+2 = 5 inside
c) 1+1+2 = 4 inside
d) 2+2+2 = 6 inside

9.
   a) a   c) c
   b) b   d) d

Find out concave polygon.
a)   b)   c)   d)

10.
   a) a   c) c
   b) b   d) d

11. Consider the following statement: "The boundary is specified in a single color, and the algorithm proceeds pixel by pixel until the boundary color is encountered. "The above statement defines which of the following algorithms?
    a) Scan-line fill algorithm   c) Entire fill algorithm
    b) Boundary-fill algorithm   d) Slide curve algorithm

12. What are Random scan and Raster scan techniques?
    a) Techniques to display an image on the   screen
    b) Line Drawing Techniques

c) Polygon Drawing Techniques

d) None of the above

13. Which among the following is best suited for a smooth line drawing on the screen?

   a) Random Scan Display Algorithm   c) Both a. and b.

   b) Raster Scan Display Algorithm   d) None of the above

14. Which of the following options is correct in accordance with the Random Scan Display Algorithm?

   a) It is best suited for line drawing algorithm.

   b) It has a high resolution.

   c) It has an electron beam which strikes only that part of the screen where the drawing is needed.

   d) All of the above

15. The resolution of raster scan display is

   a) Low   c) Median

   b) High   d) None

16. Random scan system are designed for

   a) Line drawing application   c) Color drawing application

   b) Pixel drawing application   d) None of these

17. Solid pattern in random scan display is …….. to random

   a) Difficult   c) Not fill

   b) Easy   d) None of these

18. Raster scan display is ……. Expensive than random scan

   a) More   c) Both a&b

   b) Less   d) None

19. The raster-scan generator produces _____ that generate the raster scan.

   a) Pixel values   **c) Deflection signals**

   b) Deflection beams   d) None of the above

20. Expansion of line DDA algorithm is

   a) Digital difference analyzer   **c) Digital differential analyzer**

   b) Direct differential analyzer   d) Data differential analyzer

21. Which algorithm is a faster method for calculating pixel positions?

   a) Bresenham's line algorithm   c) Mid-point algorithm

   b) Parallel line algorithm   **d) DDA line algorithm**

22. The disadvantage of line DDA is

   a) Time consuming   c) Neither a nor b

   b) Faster   d) None of the mentioned

23. 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

24. Which of the following is true with respect to the Bresenham's line drawing algorithm?
   a) It overcomes the drawbacks of DDA line drawing algorithm
   b) The DDA algorithm was proposed to overcome the limitations of Bresenham's line drawing algorithm
   c) Both a. and b.
   d) None of the above

25. The end point accuracy of DDA line drawing algorithm is _____.
   a) good
   b) better
   c) best
   d) poor

26. Floating point arithmetic in DDA algorithm is _____.
   a) Time efficient
   b) Time consuming
   c) fast
   d) slow

27. DDA line drawing algorithm for calculating pixel positions is _____ the direct use of equation y = mx+b.
   a) slower than
   b) faster than
   c) of equal speed to that of
   d) none of these

28. Polygon filling algorithms those fill interior-defined regions are called _____ algorithms.
   a) flood fill
   b) boundary fill
   c) scan line
   d) edge fill

29. Polygon filling algorithms those fill boundary defined regions are called _____ algorithms.
   a) flood fill
   b) boundary fill
   c) edge line
   d) A and B

30. In a boundary fill algorithm for filling polygon, boundary defined regions may be either _____ connected or_____ connected.
   a) 2,4
   b) 4,8
   c) 8,16
   d) 8,6

31. Scan line algorithm for filling polygon is _____ algorithm.
   a) Recursive
   b) non-recursive
   c) A and B
   d) None of these

32. Random-scan system mainly designed for

a) Realistic shaded screen   **c) Line-drawing applications**

b) Fog effect   d) Only b

33. On a colour monitor, the refresh buffer is also called.....................

    a) Frame buffer   c)Bitmap

    b) Pixmap   d)Display file

34. Raster images are more commonly called?

    a) Pix map   **c) Both A and B**

    b) bitmap   d) None of these

35. If the pixel is already filled with desired color then leaves it otherwise fills it, this is called_____.

    a) Flood fill algorithm   c) Scanline polygon filling algorithm

    b) Boundary fill algorithm   d) None of these

36. The function of scan line polygon fill algorithm are_____.

    a) Find intersection point of the boundary of polygon and scan line

    b) Find intersection point of the boundary of polygon and point

    c) Both a&b

    d) None of these

37. Scaling of a polygon is done by computing_____.

    a) The product of (x, y) of each vertex   c) Centre coordinates

    b) (x, y) of end points   **d) Only a**

38. On a black and white system with one bit per pixel, the frame buffer is called a_____.

    a) Bitmap   c) Bitpix map

    b) Pixmap   d) Pixbitmap

39. The cost of vector scan display is_____ cost of raster scan display.

    a) equal to   **c) more than**

    b) less than   d) none of these

40. The size of frame buffer (video memory) depends on_____.

    a) resolution only   **c) both (B) and(C)**

    b) number of different colours only   d) computer byte

41. Special area of the memory is dedicated to graphics only in raster scan display called_____.

    a) Frame buffer   c) display controller

    b) video controller   d) Monitor

42. The disadvantage of raster graphics display system is _____.

a) **It require large number of frame buffer memory cycles needed for video scan out**

b) The burden of image generation is on the main CPU

c) Insufficient frame buffer memory band width

d) All of these

43. Which is not true statement for raster scan generator.

   a) It produces deflection signals

   b) It consists of raster scan generator, x&y address register & pixel

   c) **it receive the intensity information of each pixel from frame buffer**

   d) it controls the x&y address registers

44. What is true about DDA algorithm for scan conversion of a line

   a) General purpose method

   b) **Incremental**

   c) current calculation is independent of previous step

   d) Is slower than the use of line equation

45. In DDA algorithm for scan conversion of line

   a) **if |m|<=1 then dx=1**

   c) if |m|<=1 then dy=1

   b) if |m|>=1 then dx=1

   d) none of the above

46. Which of these is true about Bresenham's Line Algorithm?

   a) **Highly efficient incremental method**

   b) Uses scan conversion

   c) uses integer addition, subtraction and multiplication by 2

   d) all of the above

47. Integer addition, subtraction and multiplication by 2 in Bresenham's Line Algorithm can be done by

   a) Simple arithmetic shift operation

   c) XOR Operation

   b) **circular shift operation**

   d) none of the above

48. In Bresenham's algorithm for scan conversion of line

   a) **d=2dy-dx**

   c) d=4dy-dx

   b) d=2dx-dy

   d) d=4dx-dy

49. What is true about the Bresenhem's Circle algorithm?

   a) **if d<0 then d=d+4x+6**

   c) if d<0 then d=d+4(x-y)+10 and y—

   b) if d>0 then d=d+4x+6

   d) none of the above

50. Which of these is a characteristic of midpoint circle algorithm?

   a) Produces pixel points for an semicircle

   b) Produces pixel points for an quadrant

   c) **Produces pixel points for an octant**

d) none of the above

51. What is the initial value for the decision parameter in midpoint circle algorithm?

   a) 5/4-r   c) r-5/4

   b) 4/5-r   d) r-4/5

52. The DDA algorithm is a faster method for calculating pixel positions than the direct use of Eq. y = m.x + b.

   a) TRUE   b) FALSE

53. The method which used either delta x or delta y, whichever is larger, is chosen as one raster unit to draw the line .the algorithm is called?

   a) Bresenham`s Line Algorithm   **c) DDA Line Algorithm**

   b) Generalized Bresenham`s Algorithm   d) Midpoint Line Algorithm

54. Floating point arithmetic in DDA algorithm is_____

   a) time efficient   c) Fast

   b) time consuming   d) slow

3. Overview of Transformations

 Position in Question Paper   Total Marks-26

  Q.1. g) 2-Marks.
  Q.2. c) 4-Marks.
  Q.3. b) 4-Marks.
  Q.4. c) 4-Marks.
  Q.5. b) 6-Marks.
  Q.6. b) 6-Marks.

Descriptive Question

1) Give matrix representation for 2D scaling
2) List out basic transformation techniques. Explain scaling transformation with respect to 2D
3) Explain types of parallel projection wit example
4) Consider the square A (1, 0), B (0, 0), C (O, 1), D (1, I). Rotate the square ABCD by 45° anticlockwise about point A (1. 0).
5) Rotate a triangle defined by A(0,0), B(6,0), & C(3,3) by 90 degree about origin in anti-clock wise direction
6) Write matrices in homogeneous co-ordinates system for 3D scaling transformation.
7) What is homogeneous co-ordinate? Why is it required?
8) Write the transformation matrix for y-shear.
9) Translate the polygon with co-ordinates A (3, 6), B (8, 11), & C (11, 3) by 2 units in X direction and 3 units in Y direction.
10) Obtain a transformation matrix for rotating an object about a specified pivot point.
11) Consider a square A (1, 0), B (0, 0), C (0, 1), D (1, 1). Rotate the square by 45-degree anti-clockwise direction followed by reflection about X-axis.
12)Apply the shearing transformation to square with A(0,0), B(1,0), C(1,1), D(0,1) as   given below.

Shear Parameter value of 0.5 relative to the line Yref = -1.

Shear Parameter value of 0.5 relative to the line Xref = -1.

13) Perform a 45 degree rotation of triangle A (0, 0), B (1, 1), C (5, 2) about the origin

About P (-1,-1)

14) Obtain a transformation matrix for rotating an object about a specified pivot point.

15) Perform a 45□ rotation of a triangle A (0, 0), B (1, 1), C (5, 2) about the origin

About P (–1, –1)

MCQ Question

(Total number of Question=Marks*3=18*3=54)

1. In perspective projection, the line of projection are not parallel, instead, they all coverage at a single point called?
   a) Center of projection
   b) Projection reference point
   c) Center of projection or projection reference point
   d) Interaction point

2. The types of projection are
   a) Parallel projection and perspective projection
   b) Perpendicular and perspective projection
   c) Parallel projection and Perpendicular projection
   d) None of these

3. If point are expressed in homogeneous coordinates then the pair of (x, y) is represented as
   a) (x', y', z')   **c) (x', y', w)**
   b) (x, y, z)   d) (x', y', w')

4. After rotating a triangle having A(0,0),B(6,0),C(3,3) by 90° about origin in anticlockwise direction, then result in triangle will be_____.
   a) A(0,0),B(3,-3),C(0,6)   c) A(0,0),B(0,-6),C(3,-3)
   b) A(0,0),B(-3,3),C(0,6)   **d) A(0,0),B(0,6),C(-3,3)**

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5. After performing X-shear on triangle having A(2,1),B(4,3)C(2,3) with the constant value as 2,the resultant triangle will be_____.
   a) A(2,5),B(4,1),C(2,7)
   b) A(10,3),B(4,5),C(4,1)
   c) A(4,1),B(10,3),C(4,3)
   d) A(5,2),B(4,11),C(7,2)

6. Which of the following represents shearing
   a) $(x, y) \rightarrow (x+a, y+b)$
   b) $(x, y) \rightarrow (ax, by)$
   c) $(x, y) \rightarrow (x \cos(\theta)+y \sin(\theta),-x \sin(\theta)+y \cos(\theta))$
   d) $(x, y) \rightarrow (x+ay, y+bx)$

7. We translate a two-dimensional point by adding
   a) Translation distances
   b) Translation difference
   c) X and Y
   d) Only a

8. If the scaling factors values sx and sy are assigned to the same value then
   a) Uniform rotation is produced
   b) Uniform scaling is produced
   c) Scaling cannot be done
   d) Scaling can be done or cannot be done

9. A A point (x,y) becomes (-x,y) in_____transformation.
   a) Reflection at X axis
   b) Reflection at Y axis
   c) Reflection at origin
   d) Reflection about line Y=X

10. The front view of a cube, when it resting on HP on one of its faces and one other face is parallel to VP, is
    a) Square
    b) Rectangle
    c) Parallelogram
    d) Triangle

11. In perspective projection, all lines of sight start at a _____ point.
    a) double
    b) Triple
    c) Multiple
    d) single

12. It is a vertical projection plane used to obtain the object's Perspective is_____
    a) orthographic plane
    b) vertical plane
    c) perspective picture plane
    d) horizontal plane

13. Projection line is
    a) Continuous thick line
    b) Chain thin line
    c) Continuous thin line
    d) Dashed line

14. A three dimensional graphics has
   a) Two axes
   b) Three axes
   c) Both a & b
   d) None of these

15. _____as the most commonly used boundary presentation for a 3-D graphics object.
   a) Data polygon
   b) Surface polygon
   c) System polygon
   d) None of these

16. Reflection of a point about x-axis, followed by a counter-clockwise rotation of 90° is equivalent to reflection about the line _____
   a) X=-Y
   b) Y=-X
   c) X=Y
   d) X+Y=1

17. For the cavalier projection, the direction of projection makes a _____ angle with the view plane.
   a) 40 degree
   b) 45 degree
   c) 63 degree
   d) 63.4 Degree

18. A translation is applied to an object by
   a) Repositioning it along with straight line path
   b) Repositioning it along with circular path
   c) Only b
   d) All of the mentioned

19. We translate a two-dimensional point by adding
   a) Translation distances
   b) Translation difference
   c) X and Y
   d) Only a

20. The translation distances (dx, dy) is called as
   a) Translation vector
   b) Shift vector
   c) Both a and b
   d) Neither a nor b

21. 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

22. _____ is a rigid body transformation that moves objects without deformation.
   a) Rotation
   b) Scaling
   c) Translation
   d) All of the mentioned

23. The basic geometric transformations are
   a) Translation
   b) Rotation
   c) Scaling
   d) All of the mentioned

**24.** We translate a two-dimensional point by adding**:**

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   a) Translation distances   **c)** Both A & B

   b) Translation difference   **d)** None of these

25. If we multiply any matrix with___matrix then we get the original matrix A__.

   a) A Scaling matrix   **c) Identity matrix**

   b) Translation matrix   d) Opposite matrix

26. A _____ transformation alters the size of an object.

   a) Scaling   c) Translation

   b) Rotation   d) Shear

27. The matrix representation for translation in homogeneous coordinates is

   a) P'=T+P   c) P'=R*P

   b) P'=S*P   **d) P'=T*P**

28. The matrix representation for scaling in homogeneous coordinates is

   a) P'=S*P   c) P'=dx+dy

   b) P'=R*P   d) P'=S*S

29. What is the use of homogeneous coordinates and matrix representation?

   a) To treat all 3 transformations in a consistent way

   b) To scale

   c) To rotate

   d) To shear the object

30. If point are expressed in homogeneous coordinates then the pair of (x, y) is represented as

   a) (x', y', z')   c) (x', y', w)

   b) (x, y, z)   **d) (x', y', w)**

31. For 2D transformation the value of third coordinate i.e. w=?

   a) 1   c) -1

   b) 0   d) Any value

32. The general homogeneous coordinate representation can also be written as

   a) (h.x, h.y, h.z)   c) (x, y, h.z)

   b) (h.x, h.y, h)   d) (x,y,z)

33. Which of the co-ordinate represents Z co-ordinate in (6,8,9)?

   a) 6   **c) 9**

   b) 8   d) 0

34. _____ and _____ are two types of transformations.

   a) quadratic, cubic   c) linear, quadratic

   b) variable, affine   **d) linear, affine**

35. The rotation axis that is perpendicular to the xy plane and passes through the pivot point is known as

   a) Rotation   c) Scaling

   b) Translation   d) Shearing

36. _____ is the rigid body transformation that moves object without deformation.

a) Translation   **c) Rotation**

b) Scaling   d) Shearing

37. In perspective projection, all lines of sight start at a _____ point.

a) double   c) multiple

b) triple   **d) single**

38. It is a vertical projection plane used to obtain the object's Perspective is _____

a) orthographic plane   **c) perspective picture plane**

b) vertical plane   d) horizontal plane

39. It is a point at which the eyes of the observer are located. S and S' indicated respectively the TV and FV of S is _____

a) station point   c) exit point

b) piercing point   d) vanishing point

40. The figure below represents _____ of a rectangular prism with one face in PPP.
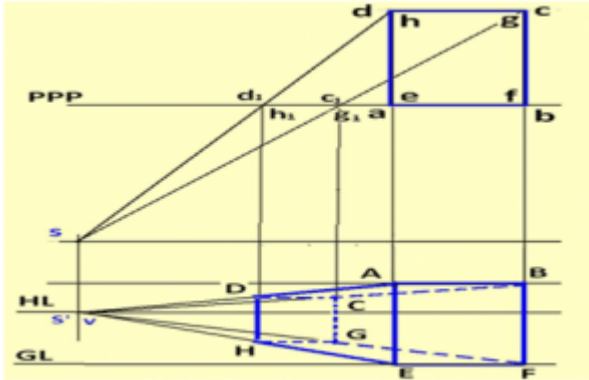
a) 2- point perspective view   c) 3- point perspective view

b) 1-point perspective view   d) 4- point perspective view

41. In Y-shear transformation point (x,y) becomes_____.

a) x+yb,xa+y   **c) x,xa+y**

b) x+yb,y   d) None of these

42. Reflection about X-axis followed by reflection about Y-axis is equivalent to_____.

a) Reflection about line Y= X   c) Reflection about line Y=-X

b) Reflection about origin   d) Reflection about Y-axis

43. Two consecutive scaling transformation are always commutative_____.

a) TRUE   c) Not always

b) FALSE   d) None of these

44. The transformation that changes the co-ordinate positions of an object along a circular path is called_____.

a) Translation   **c) Rotation**

b) Scaling   d) Reflection

45. If we take mirror reflection of a points(x,y) along x-axis then the point becomes_____.

a) (x,-y)   c) (-x,y)

b) (-x,-y)   d) (y,x)

46. Shear transformation can be formed by scaling and rotation,justify True or False .
   a) TRUE   c) Not always
   b) FALSE   d) None of these

47. If we translate the square ABCD whose co-ordinate are A(0,0), B(3,0), C(3,3) and D(0,3) by 2 units in both directions then the new coordinates of ABCD will be_____.
   a) A(2,2) , B(3,2), C(5,5), D(0,5)   c) A(2,2) , B(5,2), C(3,3), D(2,5)
   b) A(2,2) , B(5,2), C(5,5), D(2,5)   d) A(2,2) , B(3,2), C(5,5), D(2,5)

48. In 3D viewing, mismatch between 3D objects and 2D displays is compensated by introducing_____.
   a) Transformation   c) Rotation
   b) Projection   d) Translation

49. Three types of axonometric projections are _____, _____, _____
   a) Serial , Parallel, isometric   **c) Isometric, dimetric, trimetric**
   b) Paralle, Perspective , Isometric   d) None of these

50. The orthographic projection can display more that one face of an object, such an orthographic projection is called_____ orthographic projection.
   a) Axonometric   c) Parallel
   b) Isometric   d) Perspective

51. _____ projection preserves relative proportions of the objects but does not produce the realistic views.
   a) Serial   **c) Parallel**
   b) Perspective   d) Any

52. In perspective projection, the lines of projection converge at a single point called ___.
   a) Center of projection   **c) A & B**
   b) projection reference point   d) None of these

53. When the direction of the projection is normal to the view plane, we have an _____ parallel projection.
   a) Serial
   b) Orthographic
   c) Oblique
   d) None of these

54. For the cavalier projection, the direction of projection makes a _____ angle with the view plane
   a) 40 degree
   b) 45 degree
   c) 63 degree
   d) 63.4 degree

4. Windowing and clipping

Position in Question Paper   Total Marks-18

Q.2. d) 4-Marks.
Q.3. c) 4-Marks.
Q.4. d) 4-Marks.
Q.6. c) 6-Marks.

Descriptive Question

1) Explain different types of text clipping in brief
2) Write down Cohen-Sutherland line clipping algorithm
3) Use Cohen-Sutherland algorithm to clip two lines PI (40, 15) -- P2 (75. 45) and P3 (70, 20) — P4 (100, 10) against a window A (50, 10), B (80, 10). C(80, 40) & D(50,40)
4) Write down Cyrus-Beck line clipping algorithm.
5) Explain midpoint subdivision algorithm for line clipping.
6) Describe Sutherland-Hodgeman algorithm for polygon clipping.
7) Use Cohen-Sutherland out code algorithm to clip line PI (40, 15) -- P2 (75. 45) against a window A (50, 10), B (80, 10). C (80, 40) & D (50, 40).
8) Apply the Liang-Barsky algorithm to the line with co-ordinate (30,60) & (60,25) against the window: (Xmin, Ymin) = (10.10) & (Xmax,Ymax) = (50,50)
9) What is homogeneous co-ordinate? Why is it required?
10)   Write the midpoint subdivision algorithm for line clipping.
11)   Write down Liang-Barsky line clipping algorithm.
12)   Disadvantages of Cohen-Sutherland algorithm
13)   Explain window to view port transformation with diagram
14)   Define window and viewport

MCQ Question

(Total number of Question=Marks*3=14*3=42)

1. Cohen Sutherland clipping algorithm computes _____ number of intersections than NLN line clipping.
   - **a) More**
   - b) Less
   - c) Same
   - d) can't be predicted

2. Liang-Barsky clipping algorithm computes _____ number of intersections than NLN line clipping.
   - **a) More**
   - b) Less
   - c) Same
   - d) can't be predicted

3. In line clipping, the portion of line which is _____ of window is cut and the portion that is _____ the window is kept.
   - **a) outside, inside**
   - b) inside, outside
   - c) exact copy, different
   - d) different, an exact copy

4. The region code of a point within the window is ....
   - **a) 0000**
   - b) 1000
   - c) 0001
   - d) 1110

5. The .... algorithm divides a 2D space into 9 regions, of which only the middle part (viewport) is visible.
   - **a) Cohen-Sutherland**
   - b) Liang Barsky
   - c) Sutherland Hodegeman
   - d) N-L-N

6. A rectangle is bound by the lines x = 0; y = 0; x = 5 and y = 3.
   The line segment joining (-1, 0) and (4, 5), if clipped against this window will connect the points
   - a) (0, 1) and (3,3)
   - **b) (0,1) and (2,3)**
   - c) (0, 1) and (4, 5)
   - d) none of the above

7. A rectangle is bound by the lines x = 0; y = 0; x = 5 and y = 3
   The line 2x - y + 4 = 0, if clipped against this window will connect the points
   - a) (0, 1) and (3,3)
   - b) (0, 1) and (2, 3)
   - c) (1,2) and (3, 4)
   - **d) none of the above**

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8. Perform window to viewport transformation for the point (20, 15). Assume that (X_{wmin}, Y_{wmin}) is (0, 0) $(X_{wmax}, Y_{wmax}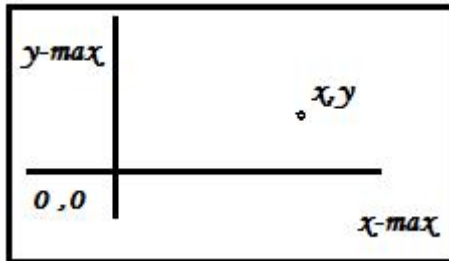)$ is (100, 100); (X_{vmin}, Y_{vmin}) is (5, 5); (X_{vmax}, Y_{vmax}) is (20, 20).The value of x and y in viewport is

   a) x=4,y=4   **c) x=8,y=7.25**

   b) x=3,y=3   d) x=3,y=4

9............. identifies the picture portions that are exterior to the clip window

   a) Interior clipping   c) Extraction

   b) Exterior clipping   d) None of the above

10.According to Cohen-Sutherland algorithm, a line is completely outside the window if ....

   a) The region codes of line endpoints have a '1' in same bit position.

   b) The endpoints region code are nonzero values

   c) If L bit and R bit are nonzero.

   d) The region codes of line endpoints have a '0' in same bit position.

11. Which of the following ports resembles the coordinates from the real-world system?

   a) Window port   c) Universal port

   b) View port   d) None of the above

12. The process of transforming a 2D world-coordinate object to device coordinates is termed as:

   a) Window to viewport transformation

   b) Viewing transformation

   c) Windowing transformation

   d) All of the above

13. The process of deciding and removing the portion of the object which is outside the clipping window is called_____

   a) Windowing   b) Viewing

   c) Clipping   d) None of the above

14. "The viewport is an area expressed in rendering device specific coordinates e.g. pixels for screen coordinates ,in which the objects of interest are going to be rendered."Based upon the above statement, determine whether it is true or false.

   a) True   b) False

15. Which of the following are true with respect to the window port in computer graphics?

   a) It represents real world coordinate system.
   b) A window port can be defined with the help of a GWINDOW statement.
   c) Window port is the coordinate area specially selected for the display.
   d) All of the above

16. Can we represent multiple scenes from a real-world coordinate system on the viewport? If yes,how?

   a) By using multiple viewports
   b) By using multiple window ports
   c) Both a and b
   d) No,we cannot represent multiple scenes from a real-world coordinates system on the viewport

17. An area on display device to which is mapped is called_____.

   a) Window   **c) Viewport**
   b) Clipping window   d) None of the above

18. What is primary use of clipping in computer graphics?

   a) Adding graphics   c) Zooming
   b) Removing objects and lines   d) Copying

19. A polygon can be clipped using clipping operations.

   a) True   b) False

20. Which vertex of the polygon is clipped first in polygon clipping?

   a) Top right   c) Bottom left
   b) Bottom right   **d) Top left**

21. Which of the following is line clipping algorithm?

   a) Cohen-Sutherland   c) None of the above
   b) Midpoint subdivision   **d) Both a and b**

22. The Cohen-Sutherland algorithm divides the region into ___number of spaces.

a) 8   c) 7

b) 6   **d) 9**

23. Which of the following is not an advantage of cohen-sutherland algorithm?

    a) It is easy to understand

    b) Simple to implement

    c) Computation of t-intersections is cheap

    d) It can easily be extended for 3D line clipping

24. What is the name of the small integer which holds a bit for the result of every plane test?

    a) setcode   c) incode

    b) outcode   d) bitcode

25. Which of the following technique is used in midpoint subdivision algorithm?

    a) Linear search   c) Heap sort

    b) Binary search   d) Bubble sort

26. Which of the following algorithm follows the divide and conquer strategy?

    a) 4-bit algorithm   c) Cyrus break algorithm

    b) Midpoint algorithm   d) Cohen-sutherland algorithm

27. The area around the clipping window is divided into a number of different_____

    a) Pixels   **c) Areas**

    b) Squares   d) Lines

28. The idea of the liang-barsky algorithm are the same with which algorithm?

    a) Cyrus beck algorithm   c) Cohen Sutherland algorithm

    b) liam-chopsky algorithm   d) All have the same

29. Liang Barsky algorithm can be used to clip 3-D lines.

    a) True   b) False

30. When the line is parallel to the boundaries then what is the value of p_k?

    a) $p_k < 0$ **c) $p_k = 0$**

    b) $p_k > 0$ d) $p_k = 1$

31. When pk<0,then the line is_____

    a) Parallel to boundaries   c) Bounded inside the boundaries

    b) Exceeding the boundaries   d) Can't say

32. Which algorithm is known as "Parametric line clipping algorithm"?

a) **Cyrus-Beck**   c) Midpoint subdivision

b) Cohen-sutherland   d) Liang-Barsky

33. Advantages of Cyrus-beck line clipping algorithm is/are?

 a) Computation of t-intersections is cheap

 b) Computation of (x,y) clip points is only done once

 c) Both a and b

 d) None of the above

34. How many methods of text clipping are there?

 a) 5   **c) 3**

 b) 4   d) 2

35. In line clipping ,the portion of line which is ____of window is cut and the portion that is____the window is kept.

 a) outside,inside   c) exat copy,different

 b) inside,outside   d) different,an exat copy

36. Sutherland-Hodgeman clipping is an example of_____algorithm.

 a) line clipping   c) text clipping

 b) polygon clipping   d) curve clipping

37. The process of converting a polygon to a set of trianglesis known as tessellation.

 a) True   b) False

38. How many methods of text clipping are there?

 a) 5   **c) 3**

 b) 4   d) 2

39. The cohen-sutherland algorithm can be only be used on a rectangular clip window.

 a) True   b) False

40. Types of text clipping are_____

 a) All or none string clipping c) Individual character clipping

 b) All or none character clipping **d) All of the above**

41. Outcode is a_____bit number.

 a) 3   c) 2

 b) 4   d) 5

42. The world coordinate area which is selected for display is called_____.

a) Window

b) Viewport

c) None of the above

d) Both a and b

5. Introduction to curve

Position in Question Paper   Total Marks-14

Q.3. d) 4-Marks.
Q.4. e) 4-Marks.
Q.5. c) 6-Marks.

Descriptive Question

1) Explain Koch curve with diagram.
2) Explain curve generation using Interpolation technique.
3) obtain the curve parameters for drawing a smooth Bezier curve for the following points A(0,10), B(10,50), C(70,40) &D(70,-20)
4) Given the vertices of Bezier Polygon as P0(1, 1), P1(2,3), P2(4,3), P3(3,1), determine five points on Bezier Curve.
5) What is interpolation? Describe the Lagrangian Interpolation method.
6) Write a program in 'C' to generate Hilbert's curve.
7) Given the vertices of Bezier polygon as P0 (1, 1), P1 (2, 3), P2 (4, 3) & P3 (3, 1), determine five points on Bezier curves.
8) What is interpolation? Describe the Lagrangian interpolation method.
9) Write a program in 'C' to generate Hilbert's curve.
10)   Define spline, Cubic Spline, B-spline
11)   State application of Bezier Spline
12)   State properties of B-spline curve
13)   write a program in 'C' to generate Koch curve.
14) write a program in 'C' to generate Bezier curve.

MCQ Question

(Total number of Question=Marks*3=12*3=36)

1. **Fractals deals with curves that are?**
   a) irregularly irregular   **b) regularly irregular**

   c) irregularly regular   d) regularly regular

2. A process with the help of which images or picture can be produced in a more realistic way is called
   a) Fractals   **c) Rendering**
   b) Quad-tree   d) None of these

3. A Bezier cubic curve with control points Po, Pi' P2, P3 is defined by the equation

   $$f(u) = \sum_{i=0}^{3} P_i B_i^3(u)$$ **B3$_2$ is**

   a) $(1-u)^3$ c) $3u(1-u)^2$
   b) U^3 **d) $3u^3(1-u)$**

4. Which of the following curves are symmetric about the line x = y?
   a) $1 + x + y = 0$ c) $y=x^3$
   b) $|x| + |y| = 9$ **d) Both (a) & (b)**

5. If the magnitude of the curve slope is lesser than 1, then
   a) We can plot horizontal spans   **c) Only b**
   b) We can plot vertical spans   d) All of the mentioned

6. One of the method for displaying thick curves is
   a) Curve slope   c) Curve cap
   b) Curve width   d) Only c

7. The curves displayed with a rectangular pen will be
   a) Thinner
   b) Thicker and magnitude slope is 1
   c) Thicker and magnitude slope >1
   d) B or C

8. The basic parameter to curved sttributes are…
   a) Type   c) color
   b) Width   **d) all of above**

9. Raster curves of various width can be displayed using
   a) Horizontol or vertical spans   c) vertical spans
   b) Horizontal spans   d) horizontal and vertical spans

10. If the magnitude of the curve slope is lesser than 1,then
    a) we can plot horizontal spans   b) we can plot vertical spans

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c) only b   d) all of above

11. If the slope magnitude is 1,then circles,ellipse and other curves will appear….

a) thick   c)big

b) thinnest   d)rough

12. One of the method for displaying thick curves is …

a) curve slope   c)curve cap

b) curve width   d)only c

13. We can generate the dashesh in the various octants and the cicles path with vertical path using

a)circles   c)circle symmetry

b)circle symmetry   d)curve slope

14. The curves displayed with a rectangular pen will be…

a) thinner

b) thicker and magnitude slope is 1

c) thicker and magnitude slope >1

d) B or C

15. Which of the following does not represent the classification of the curve?

a) Simple   c) Complex

b) Compound   d) Reverse

16. Releation between radius and degree of curvature can be approximetly given as.

a)R=5370/D   c)R=5770/D

b)R=7530/D   **d)R=5730/D**

17. The releation of radius and degree of curvature cannot be applied for small radius.

a) True   b) False

18. The maximum curvature provided for a highway is about…

a) 10 degree   c) 30 degree

b) 20 degree   d) 50 degree

19. Length of the curve depends on the criteria used for difing the degree of the curve.

a) true   b)false

20. Mid ordinate is also known as….

a) cosine of curve   b)sine of curve

c)versed cosine of curve   d)versed sine of curve

21. The curve is defined as the locus of a point moving with ….degree of freedom.
    a)0   c)3
    b)1   d)2

22. Which is one of the following does not belong to the family of conics?
    a) hyperbola   c) ellipse
    b) parabola   **d) line**

23. The shape of the Bezier curve is controlled by…
    a) control points   c) end points
    b) knots   d) all

24. Which of the following is not a method to describe a curve mathematically
    a) explicit form   c) implicit form
    b) laplace form   d) parametric form

25. The function of the pixel mask is ….
    a)To display dashes and inter dash spaces according to the slope
    b) to display curved attribute
    c) to display the thick curves
    d) none

26. ……..curve is one of the sp line approximation methods
    a) Bezier   c) shearing
    b) Ellipsoid   d) none

27. A Bezier curve is a polynomial of degree…the no of control points used..
    a) one more than   c) two less than
    b) one less than   d) none of these

28. Which of the following does not represent the classification of the curve?
    a) simple   **c) complex**
    b) compound   d) reverse

29. Which of following is not a type of horizontal curve?
    a) simple circular   **c) summit**
    b) reverse   d) none of above

30. Which of the following are vertical curves?
    a) sag curve   **c) both a and b**
    b) summit curve   d) none

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31. A…curve consist of a single arc of circle having uniform radius……

   a) simple circular   c)combined

   b)compound   d)transition

32. The basic parameter to curved attribute are?

   a) width   c) type

   b) color   **d) all of above**

33. Raster curves of various widths can be displayed using?

   a) horizontal and vertical spans   c) horizontal spans

   b) vertical spans   **d) horizontal or vertical spans**

34. If the magnitude of the curve slpoe is lesser than 1,then?

   a)we can plot horizontal spans   **c)both a and b**

   b)we can plot vertical splan   d)none

35. One of the method for displaying thick curves is?

   a) curve cap   c) curve width

   b) curve slope   d) none

36. If the slope magnitude is 1, the circles ,ellipse and other curves will appear?

   a) rough   **c) thinnest**

   b) big   d) thick