University of Mumbai
Examination 2020 under cluster __ (Lead College: _____)
Examinations Commencing from 10th April 2021 to 17th April 2021

Program: **Computer Engineering**
Curriculum Scheme: Rev2019
Examination: SE Semester III(for Direct Second Year-DSE)
Course Code: CSC305 and Course Name: Computer Graphics

Time: 2 hour   Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which one of the following is the primarily used input device?
Option A:	Keyboard
Option B:	Scanner
Option C:	Monitor
Option D:	Speaker
2.	The midpoint ellipse drawing algorithm uses ----------- to find the pixel points along the ellipse path
Option A:	8-way symmetry
Option B:	4-way symmetry
Option C:	2- way symmetry
Option D:	6 – way symmetry
3.	Quality of the picture is
Option A:	directly proportional to the density of pixels on the screen.
Option B:	dependent on the size of a screen
Option C:	not proportional to the density of pixels on the screen
Option D:	not dependent on the number of pixels
4.	The aliasing effect can be minimized by
Option A:	decreasing resolution of the raster display
Option B:	By increasing slope of the line
Option C:	increasing resolution of the raster display.
Option D:	By decreasing slope of the line
5.	In DDA algorithm, if slope of the line is less than or equal to one (m<=1) then the next pixel point along the line path is calculated by
Option A:	Taking unit steps along the positive x direction and adding slope value to the previous y coordinate value
Option B:	Adding and subtracting slope value from the previous x and y coordinate value
Option C:	Taking unit steps along the positive x direction and y direction
Option D:	Taking unit steps along the positive x direction and subtracting slope value to the previous y coordinate value
6.	Which of the following is the correct representation to define 2D point using homogeneous coordinate [Hint: - (Xw, Yw, w)]
Option A:	(0,0,0)

Option B:	(4,4,0)
Option C:	(0,0,1)
Option D:	(1.5,1.8,0)
7.	If the scaling factors values of Sx and Sy = 1 then
Option A:	Size of an object remains same
Option B:	Size of an object is increased
Option C:	Size of an object is reduced
Option D:	It slants the shape of an object
8.	The negative values of 'θ' gives
Option A:	Anticlockwise Rotation
Option B:	Clockwise Rotation
Option C:	Shearing Transformation
Option D:	Reflection
9.	When the 3D point (x, y, z) is reflected about the XY plane then new coordinates of the point are given by
Option A:	(-x, -y, z)
Option B:	(x, -y, z)
Option C:	(y, x, z)
Option D:	(x, y, -z)
10.	In Cohen Sutherland line clipping algorithm, if Bit code for two endpoints of the line segment is 0101 and 1001 respectively then line is
Option A:	Partially visible
Option B:	Completely visible
Option C:	Completely Inside the clipping boundary
Option D:	Completely Outside the clipping boundary
11.	---------------------is known as generalized line clipping algorithm
Option A:	Liang Barsky line clipping algorithm
Option B:	Cohen Sutherland line clipping algorithm
Option C:	Digital Differential Analyzer algorithm
Option D:	Bresenham's line drawing algorithm
12.	---------------------------- defines where the object will be displayed on computer screen
Option A:	Window
Option B:	Viewport
Option C:	Frame buffer
Option D:	World coordinate system
13.	It is the process of changing position of an object along the circular path from one coordinate location to other
Option A:	Translation
Option B:	Rotation
Option C:	Scaling
Option D:	Reflection

14.	In 3 D translation, translation factors Tx, Ty, Tz are ------------- in to the original coordinates of the polygon
Option A:	Added
Option B:	Subtracted
Option C:	Multiplied
Option D:	Divided
15.	In 3D rotation about z- axis, the value of the z coordinate of new object
Option A:	is doubled
Option B:	zero
Option C:	remains same
Option D:	decreases
16.	The Surfaces of an object which are oriented away from the viewer are called as
Option A:	Back surfaces
Option B:	Front surfaces
Option C:	Top surfaces
Option D:	Side surfaces
17.	Consider equation of the plane, Ax + By+ Cz + D = 0 If Ax + By +Cz + D > 0, then point (x, y, z)
Option A:	lies in the background
Option B:	lies in the foreground
Option C:	lies anywhere
Option D:	lies on the plane
18.	In Z buffer algorithm ------------------------is used I. Z buffer II. Frame buffer III. Vector refresh buffer
Option A:	Only I
Option B:	Only II
Option C:	Only III
Option D:	Both I and II
19.	---------------------- figures are manipulated to appear as moving images
Option A:	Animation
Option B:	Rotation
Option C:	Translation
Option D:	Scaling
20.	It is a process that are applied in the animation evaluation and do not make permanent changes to the original object
Option A:	Facial animation
Option B:	Motion capture
Option C:	Deformation
Option D:	Character animation

Q2. (20 Marks)	
A	**Solve any Two** **5 marks each**
i.	Rasterize the line segment using DDA line drawing algorithm. The two endpoint coordinates of the line segment are P1(0,0) and P2(5, 2)
ii.	Scale the square ABCD with coordinates A (0,0), B (5,0), C (5,5), D (0,5) by 3 units in x direction and 4 units in y direction

iii.	Define the following terms with example
	    a) Scan Conversion
	    b) Frame buffer

B	**Solve any One** **10 mark each**
i.	Clip the line segment using Cohen Sutherland Line clipping Algorithm, The Coordinates of the line segment are P1(-1, 5) and P2(3, 8) and coordinates of the window boundaries are (Xwmin, Ywmin) = (-3, 1) and (Xwmax, Ywmax) = (2, 6)
ii.	What is visible surface detection? Explain Area subdivision method with example

Q3. (20 Marks)	
A	**Solve any Two** **5 marks each**
i.	What is homogeneous transformation matrix for 2D. Write homogeneous transformation matrix for Translation, Rotation and Scaling in terms of P'=P*T (Where P= Original object matrix, and P'=New object matrix and T= 2D transformation matrix)
ii.	What is an Animation? Write and explain principles of animation?
iii.	A point has coordinates in the x, y, z direction i.e., P (4, 5, 6). The translation is done in the x-direction and y direction by 2 units and 5 units in the z- direction. Shift the point and find the new coordinates of the point.
B	**Solve any One** **10 mark each**
i.	What is World Coordinate System (WCS) and Physical Device Coordinate System (PDCS)? Obtain viewing transformation matrix to map WCS on to PDSCS
ii.	Derive and explain midpoint ellipse drawing algorithm

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Question Number	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	A
Q2.	B
Q3.	A
Q4	C
Q5	A
Q6	C
Q7	A
Q8.	B
Q9.	D
Q10.	D
Q11.	A
Q12.	B
Q13.	B
Q14.	A
Q15.	C
Q16.	A
Q17.	B
Q18.	D
Q19.	A
Q20.	C

Q. 2 A – i

The coordinates of pixel points on the line segment are

P1(0,0), (1, 0), (2, 1), (3, 1), (4, 2), P2(5, 2)

Q. 2 A – ii   The new coordinates of the square ABCD after scaling operation are

A'(0, 0), B'(15, 0), C'(15, 20), D'(0, 20)

Q. 2 B – i   The clipping coordinates of the line segment are P1' (1, 5) and P2' (1/3, 6)

Q. 3 A – iii   The new coordinates of the point after translation are P'(6, 7, 11)