BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : VI**
BRANCH: IT **SESSION : SP/2024**

SUBJECT: CS431 COMPUTER GRAPHICS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Consider three different raster systems with resolutions of 640 X 480,1280 X 1024 and 2560 X 2048. What size of frame buffer is needed for each of these systems to store 12 bits per pixel? How much storage is required for each system if 24 bits per pixel are to be stored? How much memory is required for each system if 16 gray levels are used?	[5]	1	3
Q.1(b)	What is Scan Conversion? Explain the use of Scan Conversion in CG and write an algorithm for Scan Conversion of a Circle.	[5]	2	2
Q.2(a)	Derive the general form of a scaling matrix with respect to a fixed-point P(h,k).	[5]	1	3
Q.2(b)	Is clipping an integral part in the graphics pipeline? Write an algorithm for line clipping and explain with examples.	[5]	2	2
Q.3(a)	For the given matrix $\begin{bmatrix} 2 & 0 & 1 & 0 \\ 1 & 3 & 0 & 0 \\ 4 & 0 & 1 & 0 \\ 0 & 3 & 6 & 1 \end{bmatrix}$. First apply a rotation of 45^0 about the Y-Axis followed by a rotation of 30^0 about X-Axis. Write the result matrix with all intermediate steps.	[5]	3	3
Q.3(b)	Explain the procedure for a 3D view of an object and write an algorithm for 3D clipping and explain with examples.	[5]	3	2
Q.4(a)	Discuss perspective anomalies. What do you think these anomalies will enhance or not enhance the views? Derive a general matrix for perspective projection.	[5]	4	2
Q.4(b)	A unit cube is projected onto the XY plane. Find the coordinates of projected cube with respect to perspective projection of d=1 and d=10, where d is distance from the view plane.	[5]	4	3
Q.5(a)	List the requirements for Curve design. Explain the representation of a polygon net model through examples. Discuss the role of Blending function in Curve design.	[5]	5	2
Q.5(b)	Why are hidden surface algorithms needed? What two steps are required to determine any given point obscures the other point? Write an algorithm for removing hidden surfaces.	[5]	5	3

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