

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)

B.Tech.Sem - V MECHANICAL : : SUMMER - 2022

SUBJECT : ADVANCED COMPUTER GRAPHICS & SOLID MODELLING

Day : Wednesday
Date : 01-06-2022

S-13447-2022

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.
- 4) Use of non-programmable calculator is **ALLOWED**.
- 5) Draw a neat and labelled diagram **WHEREVER** necessary.

Q.1 Plot a circle centered at (10, 10) having a radius of 7 units using midpoint algorithm and draw the result on Cartesian graph. **(10)**

OR

Q.1 Explain scan line algorithm with neat sketches. **(10)**

Q.2 Find the position of a triangle PQR $\begin{bmatrix} 2 & 4 & 1 \\ 4 & 6 & 1 \\ 2 & 6 & 1 \end{bmatrix}$ after its reflection about a line **(10)**

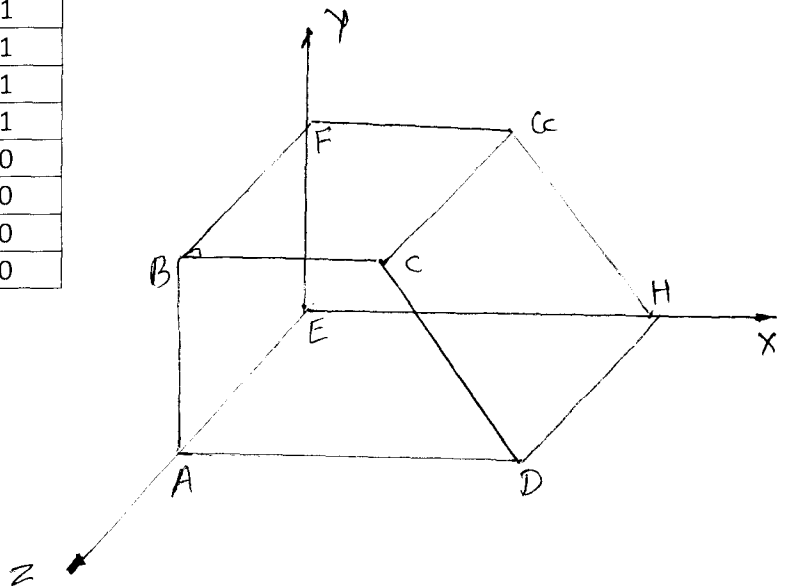
$$x - 2y = -4.$$

OR

Q.2 Show that two successive rotations are commutative. **(10)**

Q.3 Move the following given object 2, 2 and -1 unit along X, Y, Z axis respectively. The object coordinates are given in the table. Represent the transformed object in 3D space. **(10)**

Vertex	X	Y	Z
A	0	0	1
B	0	1	1
C	1	1	1
D	2	0	1
E	0	0	0
F	0	1	0
G	1	1	0
H	2	0	0



OR

Q.3 Rotate the object given in **figure-1** about y axis through -90° and z axis through 90° in counter clockwise direction and represent the transformed object in 3D space. **(10)**

(PTO)

Q.4 Explain general characteristics of B-spline curves. **(10)**

OR

Q.4 A line joins two points (3,4,6) and (5,7,1) find **(10)**

i) Parametric equation of the line.

ii) The tangent vector of the line.

iii) The unit vector in the direction of line.

Q.5 Explain Bezier surface also write the control points on it. **(10)**

OR

Q.5 A circle with radius $r = 5$ units having center located at point (20, 10, 0) is **(10)**

rotated about the x axis by an angle 2π to obtain a surface of revolution.

Calculate the surface point at $\phi = \pi$ and $\theta = \pi$.

Q.6 What is solid modelling? Explain geometry and topology in case of solid modelling. **(10)**

OR

Q.6 What is feature based modelling. Explain different feature operations. **(10)**

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