KUMARAGURU
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B.E DEGREE EXAMINATIONS: MAY 2017

(Regulation 2015)

Forth Semester

COMPUTER SCIENCE AND ENGINEERING

U15CST404**:** Computer Graphics

COURSE OUTCOMES

CO1: Explain computer graphics hardware & software and the concepts of 2D primitives.
CO2: Illustrate the various 2D geometric transformations and viewing concepts.
CO3: Explain the various 3D geometric transformations.
CO4: Outline the various 3D object viewing and representations.
CO5: Summarize various color models and conversion among the models.
CO6: Outline various concepts of computer animation.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching type item with multiple choice code   CO6 [K2]

List I	List II
A) Dynamic motion	i) Positions, velocities and accelerations
B) Kinematic motion	ii) Outline of the action
C) Key frames	iii) Force acting on the objects in a scene
D) Story board	iv) Details of the object motion

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	iv	ii

2. The interactive computer graphics involves _____ way communication between   CO1   [K1]
   computer and the user

   a) One   b) Three

   c) Two   d) Four

3. A point (4,8) is on a circle that has center at the origin. Which of the following point/s is/are also on circle?   CO2 [K2]

   (i) (4,-8)

   (ii) (-4,8)

   (iii)(8,-4)

   (iv)(-8,4)

a) (i), (ii) and (iii)   b) (i), (iii) and (iv)

c) (i),(ii),(iii) and (iv)   d) (ii), (iii) and (i)

4. Which of the following statements are true?   CO3 [K2]

i) An inverse rotation matrix is formed by replacing the rotation angle θ by $-\theta$

ii) Scaling and rotational transformations in general are commutative pair of operations

If the two color sources combine to produce white light, they are referred to as complementary colors.

a) I & III   b) I & II

c) II & III   d) I, II & III

5. Assertion (A): Given the vertex positions at the key frames, we can fit the positions with linear and non-linear paths.   CO6 [K2]

Reason (R): Curve fitting techniques are used to specify the animation paths between key frames

a) Both A and R are Individually true and R is the correct explanation of A   b) Both A and R are Individually true but R is not the correct explanation of A

c) A is true but R is false   d) A is false but R is true

6. _____ systems allow object-motion characteristics to be specified as part of the object definitions   CO6 [K2]

a) Non-parameterized   b) Object Oriented

c) Rough   d) Parameterized

7. A three dimensional point (x,y,z) when rotated with the axes of rotation as 'Y', then   CO4 [K2]

a) 'x' value remains constant   b) 'y' value remains constant

c) 'z' value remains constant   d) All x,y &,z value changes depending on the angle of rotation

8. In a _____, parallel lines in a scene that are not parallel to the display plane are projected into converging lines. CO5 [K2]

    a) Perspective projection   b) Surface identification

    c) Depth cueing   d) Parallel projection

9. Assertion (A): The parallel projection method used in drafting to produce scale drawing of three dimensional objects. CO3 [K2]

   Reason(R): A parallel projection does not preserve relative proportions of objects

    a) Both A and R are Individually true and   b) Both A and R are Individually true but
       R is the correct explanation of A   R is not the correct explanation of A

    c) A is true but R is false   d) A is false but R is true

10. A transformation that distorts the shape of an object is _____ CO3 [K2]

    a) Scaling   b) Shear

    c) Reflection   d) Translation

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

11.	Distinguish between raster scan and random scan displays.	CO1	[K2]
12.	Give the properties of circle	CO1	[K2]
13.	"Line clipping algorithm can be used to clip a polygon" Yes or No Justify	CO2	[K3]
14.	Differentiate between window and viewport	CO2	[K2]
15.	Give the matrix representations for 3-dimensional rotation.	CO3	[K2]
16.	What is an affine transformation?	CO3	[K2]
17.	Give an example of a quadric surface	CO4	[K2]
18.	What are Bezier curves?	CO4	[K2]
19.	List down the Steps in Designing the Animation Sequence	CO6	[K2]
20.	Name a few computer animation languages	CO6	[K2]

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. (i) Explain in detail the three dimensional rotation transformation giving their matrix representations. (7) CO3 [K2]

    (ii) What is composite transformation? Illustrate the advantages using a simple example. (7) CO3 [K2]

22.	(i) Explain the working of a Cathode Ray Tube with neat diagram	(7)	CO1 [K2]
	(ii) Discuss about the attributes of graphics primitives.	(7)	

23. Rotate the triangle ABC with its coordinates A(0,0), B(0,4) & C(2,4) by an angle 180 degrees and perform scaling on the resultant with scaling factors Sx = 1 and Sy=0.5. Comment on the resultant triangle

CO2 [K4]

24. Illustrate with necessary diagrams, the different types of projections for 3 Dimensional objects

CO4 [K2]

25. (i) Compare RGB and YIQ color models (7) — CO5 [K2]
    (ii) Explain about the CIE chromaticity diagram (7) — CO5 [K2]

26. Explain Cohen-Sutherland Line clipping algorithm in detail

CO2 [K2]

27. Does 2-D Scaling and Rotation form a commutative pair of operations for any given values of scaling factors and an angle of rotation? Justify

CO2 [K4]

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