### 1. **Answer question 1 and any FOUR questions from 2 to 7.**

**Time: 3 Hours**

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<th>Time: 3 Hours</th>
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#### 1. Explain the relationship between the translations $T_{tx,ty}$, $T_{-tx,-ty}$ and $(T_{tx,ty})^{-1}$.

#### 2. Distinguish between parallel and perspective projections.


#### 4. Discuss the generation of solid objects using sweep method.

#### 5. Explain how inverse kinematics works in computer based animation.

#### 6. When is a shadow mask used? Justify.

#### 7. Explain the Euler angle representation.

(7x4)

#### 2. Perform a 45° rotation of triangle A(0,0), B(1,1) and C(5,2) about P(-1,-1).

#### 3. Describe the Cyrus-Back line clipping algorithm.

(6+12)

#### 3. What is solid modeling? Explain the octrees representation of solid modeling.

#### 4. Show that the Bezier form of the curve segment is

$$Q(t) = (1-t)^3 P_1 + 3t(1-t)^2 P_2 + 3t^2 (1-t) P_3 + t^3 P_4$$

where the coefficients are Bernstein polynomials.

(9+9)

#### 4. Explain the visible surface ray tracing.

#### 5. Describe the technique of Gouraud shading. How does it differ from Phong Shading?

#### 6. Describe an anti-aliasing method that can be applied on the filled circle.

(6+6+6)

#### 5. Describe the 2D object warping.

#### 6. Explain the flocking behavior with regards to computer animation technology.

(9+9)

#### 6. Explain the following:

- Collision detection
- Particle systems.
- Animation production

(6+6+6)

#### 7. Write short notes on any two of the following:

- Parametric bicubic surfaces
- Illumination models
- BSP tree

(9+9)