Comprehensive Exam Spring 2010 - CS450 (Computer Graphics)

1. Using the Phong reflection model, the amount of *ambient* light reflected from a surface is dependent upon
   (a) the angle between the surface normal and the vector in the direction of the light source
   (b) the angle between the surface normal and the vector in the direction of the viewer
   (c) both a and b
   (d) none of the above

2. When *vertex lists* are used, the vertices of an object are
   (a) interpolated to produce smoother shading of the surface.
   (b) specified indirectly as an index into the structure which holds the vertex values.
   (c) used to compute the COP, center of projection.
   (d) stored in the Z-buffer.
   (e) none of the above

3. Graphics objects are often created at the origin because
   (a) it ensures that they will be visible with respect to the camera position and orientation.
   (b) it simplifies the computation required for anti-aliasing.
   (c) it simplifies object definition and subsequent transformations of the object.
   (d) all of the above
   (e) none of the above

4. A *specular* surface may be described as
   (a) translucent, allowing some light to penetrate the surface
   (b) matte, scattering reflected light in all directions
   (c) shiny, scattering reflected light in a narrow range of angles
   (d) transparent, allowing all light to pass through the surface
   (e) none of the above

5. A vector which is *normal* to a polygon
   (a) describes its roughness.
   (b) is parallel to the plane in which the polygon lies.
   (c) can be computed by taking the cross product of two vectors along its edges.
   (d) all of the above
   (e) none of the above

6. Which of the following techniques determines the shading by interpolating the normal at the vertex where several polygons meet?
   (a) flat shading
   (b) Gouraud shading
   (c) Phong shading
   (d) none of the above

7. Consider a polygon with ordered vertices (3,5), (5,5), (5,1), (3,1). What would be the resulting location of the vertices if the object was rotated 90 degrees counter clockwise with fixed point at the origin of the coordinate system?

   (a) (5,3), (5,5), (1,5), (1,3)
   (b) (6,4), (6,2), (2,2), (2,4)
   (c) (5,-3), (5,-5), (1,-5), (1,-3)
   (d) (-5,3), (-5,5), (-5,1), (-3,1)
   (e) none of the above

8. *Environment maps* give detail to smooth surfaces by

   (a) distorting the shape of the surface to create the appearance of surface texture.
   (b) painting pictures or patterns onto them to create the appearance of surface texture.
   (c) creating an appearance of a mirror-like quality, reflecting the objects that surround them.
   (d) producing an estimation of the light transmitted by the surface.
   (e) none of the above

9. The dot product of the following two vectors v1=(1,1,6), v2=(0,-2,2) is:

   (a) (-2, 14, -2)
   (b) (14, 22, -4)
   (c) (4, -2, 12)
   (d) (14, 22, -6)
   (e) none of the above

10. Which of the following transformations is described by the matrix below?

```
t = 3  0  0  0
    0  1  0  0
    0  0  1  0
    0  0  0  1
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   (a) rotation around the x axis by 3 degrees
   (b) translation by 3 in y
   (c) translation by 3 in x
   (d) uniform scaling by 3
   (e) scaling by 3 in x