1. Definitions [20 points]

[5 pts] Name an image-space shadow method (explain why you chose this)

*Shadow map*, uses an image from the light's point of view. All comparisons are done with fragment's the image.

[5 pts] When does the stencil operation take place with respect to the fragment shader?

*After*

[5 pts] Name an object space shadow method (explain why you chose this)

*Shadow volumes* - create shadow quads in object space as object seem

[5 pts] What frustum should be used for creating an environment map and why?

*90 Deg*
2a. [5 pts] What is the difference between a skybox and an environment map?

skybox is an environment that appears infinitely far from the viewer and always in relation to the camera, typically a cube map. An env-map is a cube map/sphere map used to minimize reflections.

2b. [5 pts] What sized frustum is needed to create a cube map?

90° frustum to eliminate seams. The size should be square in the # of pixels and a power of 2.
2c. [5 pts] How many passes does the scene have to be rendered to create a cube map (describe the passes in detail)?

6 - each with 90° degree frustum:
  front back left right top bottom

  centered camera or object to reflect


no, it assumes it is reflecting other objects/scene.
3. [20 pts] Describe two aliasing artifacts with Shadow Maps

- Self-Shadowing / bias
- dåbling {frostra
  when the surface to be shadowed
  is nearly or theponal to the light (bias nightmare)
- poor resolution for shadow map
4. [20 pts] Give the OpenGL code that would leave the non-intersecting pixels of two
filled polygons in the stencil buffer, represented as a value of ‘1’ with all other locations
having a value of zero. (hint: write out the steps involved, then write the OpenGL calls to
achieve those steps.
Assume:
The ModelView and Projection matrix are appropriately set (no viewing calls are required).
The stencil buffer and depth buffer are cleared.
There are two routines: DrawPolygonA(), DrawPolygonB()
You must set all other necessary state.
You must use appropriate stencilling calls (glStencilFunc and glStencilOp)
glStencilFunc( GLenum func, GLint ref, GLuint mask )
glStencilOp( GLenum fail, GLenum zfail, GLenum zpass )
5a. [10 pts]: Which is more fill bound and why: shadow maps or shadow volumes

Shadow volumes: due to rendering shadow guards

5b. [10 pts] We discussed image-space silhouette computations with the stencil buffer. Silhouettes can be approximated in image space in a fragment shader. Describe how you would do this and what would need to be varying/interpolated across the polygon to the fragment to accomplish it.

Silhouette is when a fragment's normal is nearly orthogonal to the viewpoint. Therefore, using a threshold to test for this.

Not a silhouette