

**Name:**

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1. What are the main differences between Bounding Volume Hierarchy and Kd-Trees as acceleration structures for ray tracing. In which cases one is preferred over the other. Shortly describe ideas of both methods.
2. Write BRDF function for diffuse reflection. What is required for BRDF function to be physically sound (energy preserving). Give a definition of BRDF function.
3. What sampling methods do you know? Describe three methods writing Monte Carlo estimators. Write method for uniform hemisphere sampling.
4. For one spherical light source with given radius  $R$  and power  $P$  write rendering equation for radiance due to the direct lighting. Consider two monte Carlo methods: one sampling uniformly the spherical light and the other uniformly sampling the flat disc of the same radius  $R$  approximating the sphere (the disc normal is in the direction of calculated point, emitted radiance should be the same in both cases). Write radiance estimate for one sample method in each case. Argue which solution is better and why.
5. What is the definition of GRDF (global reflectance. . . ) function and what it is used for. Describe shortly one derived rendering method and its good points.