Quiz Questions in Optical Design

Part 1
1. What is the difference between ray and wavefront?
2. What are RMS radius and geometric radius?
3. What is the f-number of an optical system?
4. What is the total internal reflection?
5. What is Optical Path Length (OPL)?
6. What is the Abbe number?
7. What is an afocal optical system? Give example application.
8. What is a focal optical system? Give example application.
9. What is finite-finite optical system? Give example app.
10. What is the role of a beam expander?

Part 2
1. What are the roles of pupils in an imaging system?
2. How can you find the size and position of pupils?
3. What are the principle planes?

Part 3
1. What is the diffraction limited optical system?
2. What is Airy Pattern?
3. What is the Airy disk?
4. What is PSF?
6. What is OPD?
7. What is the Rayleigh criterion for OPD?
8. What is depth of focus?
9. What is MTF and OTF?
10. How can you measure MTF?

Part 4
1. What is the spherical aberration? How can you reduce it?
2. What is the coma? How can you reduce it?
3. What is the field curvature? How can you reduce it?
4. What is the distortion? How can you reduce it?
5. What is the astigmatism? How can you reduce it?
6. What is the chromatic aberration? How can you reduce it?
7. What are the Seidel aberration coefficients?
8. What are aspherical surface and conic constant?
9. What are the Zernike Polynomials?

Part 5
1. What is tolerancing analysis?
2. What is ISO 10110 drawing standard?
3. What is thermal analysis?
4. What is athermalization in optical systems? Discuss methods to make an optical system athermal.

Part 6
1. What are the fundamental objective design forms?
2. What are the fundamental reflective design forms used in telescopes?
3. What are the fundamental eyepiece design forms?
4. How can you design a focal zoom system including three lenses? What are the design specifications?
5. How can you design an afocal zoom system including three lenses? What are the design specifications?