First Year B.Sc Optometry Degree Regular/Supplementary Examinations January 2022
Paper III – Physical & Geometrical Optics

(2016 Scheme)

Time: 3 hrs   **Max marks: 80**

- *Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers*
- *Indicate the question number correctly for the answer in the margin space*
- *Answer all parts of a single question together • Leave sufficient space between answers • Draw table/diagrams/flow charts wherever necessary*

Essay: **(2x15=30)**

1. What do you understand by principal points, principal planes, nodal points and nodal planes of a thick lens. Explain their properties. Derive corresponding Newton's formula.
2. Discuss the diffraction due to a circular aperture. What is Airy's disc. State Raleigh's criterion for resolution. Obtain the resolving power of a telescope

Short notes   **(5x5=25)**

3. Explain image formation by a cylindrical lens.
4. Explain the terms aperture stop and pupils with reference to controlling image brightness in an optical system.
5. With the help of a neat ray diagram explain the formation of image in a compound microscope. Write an expression for the magnification.
6. Explain chromatic aberration and how it can be removed
7. Describe how plane polarized light is produced by reflection and refraction

Answer briefly   **(10x2=20)**

8. Explain myopia and how it can be corrected
9. Draw Gullstrand's simplified schematic eye.
10. A real object is located 100 cm in front of a +5.5D lens. Where is the image formed. What is the nature of the image. Use vergence method.
11. A prism material has an index of 1.5 and an apex of 5 degree .What is the angle of deviation of the prism ?.
12. An object is placed between the pole and focal point of a concave mirror. Show with a ray diagram where the image is formed and what is its nature.
13. State Huygens' principle.
14. A light bulb emitting 100W of radiant power is positioned 2m from a surface. Calculate irradiance at the surface.
15. What do you understand by dispersive power of a prism.
16. Two thin lenses of focal lengths 20 cm and 40cm are placed 20 cm apart. Find the effective focal length of the optical system.
17. Why population inversion is necessary for laser operation

Fill in the blanks   **(5x1=5)**

18. Two waves of equal amplitude 'A' interfere. At the regions of constructive interference , the intensity is proportional to ....
19. In a grating spectrum of a particular order …………………. color is least deviated.
20. The minimum length of a mirror that is needed for a person of height 6 feet to see his entire reflection is …………………...
21. Speed of light in vacuum is ……………………..
22. The phenomenon of polarization is exhibited by ………………. waves.

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