REV-01
BOP/46/51

2025/12

SET B

BACHELOR OF OPTOMETRY
FIRST SEMESTER
PHYSICAL OPTICS
BOP-104

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. Zone Plate is a device used to:
   a. Divert light
   b. Focus light
   c. Reflect light
   d. Reflect light

2. How many types of Scattering are there?
   a. 1
   b. 2
   c. 3
   d. 4

3. Brewester's Law states that tangent of polarization angle is equal to:
   a. Refractive index
   b. Polarization angle
   c. Brewester angle
   d. Angle of incidence

4. Which one of the following is NOT a type of polarization?
   a. Plane Polarization
   b. Circular Polarization
   c. Wave Polarization
   d. Elliptical Polarization

5. Nicole Prism is used to produce and analyze:
   a. Unpolarized light
   b. Polarized light
   c. Laser light
   d. None

6. Quarter Wave Plate is a thin plate of:
   a. Slits
   b. Made of glass
   c. Birefringent
   d. None

7. LASER stands for:
   a. Light amplification by spontaneous emission of radiation
   b. Light amplification by absorption of radiation
   c. Light amplification by emission of radiation
   d. Light amplification by stimulated emission of radiation

8. The basic principle of laser is:
   a. Absorption
   b. Emission
   c. Spontaneous emission
   d. Stimulated emission

9. How many photons are emitted in case of stimulated emission?
   a. 1
   b. 3
   c. 2
   d. 4

10. In order to achieve population inversion what is required?
    a. Pumping
    b. Coherence
    c. Absorption
    d. Emission

11. Photopic and Scotopic Vision is dominated by which cells?
    a. Both Rod cells
    b. Cone cells and Rod cells
    c. Both Cone cells
    d. Rod cells and Cone cells

12. Unit of Luminous Flux is:
    a. Candela
    b. Lux
    c. Lumen/$metre^2$
    d. Lumen

13. Unit of Illuminance is:
    a. Candela
    b. Lux
    c. Lumen/$metre^2$
    d. Lumen

14. Troland is the unit of:
    a. Illuminance
    b. Photometry
    c. Retinal Illumination
    d. Luminous Intensity

15. In Constructive Interference:
    a. Crests overlaps with troughs
    b. Troughs overlaps with crests
    c. Crests overlaps with crests
    d. No overlapping

16. Band width depends on:
    a. Band Gap
    b. Wavelength of light
    c. Band Energy
    d. Band Intensity

17. Concentric Circular fringes produced due to interference is called:
    a. Newton's Ring
    b. Destructive Rings
    c. Dark Fringes
    d. Bright Fringes

18. Air Wedge is formed between:
    a. Two convex mirrors
    b. Two concave mirrors
    c. Two glass mirrors
    d. Two glass plates

19. Diffraction is the:
    a. Reflection and Refraction of light rays
    b. Overlapping of light rays
    c. Bending, spreading or deviation of light rays
    d. Interference of light rays

20. How many types of Diffraction are there?
    a. 2
    b. 3
    c. 4
    d. 5

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Define Young's Double Slit Experiment and deduce the analytical treatment of Intensity. 10

2. What is Photometry and Photometric Units? 5
   Define: 1×5=5
   a) Photopic Vision
   b) Scotopic Vision
   c) Retinal Illumination
   d) Inverse square law
   e) Lamberts law

3. What is Band Width or Fringe Width? Define Constructive and Destructive Interference.Write short notes on: 2+3+5=10
   a) Colors of Thin Flims
   b) Newton's Ring
   c) Air Wedge
   d) Michelson Interferometer

4. Define Fresnel's Diffraction and Fraunhoffer Diffraction. Write its key features and its different types. 10

5. Define resolving power and write about the Rayleigh criteria of resolution. What is reserving power of telescope microscope and prism? What is scattering of light and what are its different types? 1+1+5+3=10

6. Explain polarization of light suitable figure and mention its different types. State Brewster's law with ideal diagram. 2+2=4
   Write short notes on: 1×6=6
   a) Nicolas Prism
   b) Polarizer
   c) Analyzer
   d) Qatar wave plate
   e) Half wave plate
   f) Polaroid

7. Define the term optical activity and write about Fresnel's explanation on optical activity. 5+5=10
   Define the term fluorescence and phosphorescence and write its applications.

8. Define laser and write about its basic characteristics. 5+5=10
   What is population inversion and what are the different types of pumping?

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