END OF SEMESTER EXAMINATIONS, APRIL / MAY – 2017
OPTICS SPECTROSCOPY AND FIBRE OPTICS
SUBJECT CODE : 12UAPH06

MAJOR : B.Sc (Physics) / Physics.cA   SEMESTER : V
TIME : 3 HOURS   MAX. MARKS: 75

SECTION – A (10 X 1 = 10)

Answer the Following:

Choose the best Answer:

1. If the path difference between the two waves is λ, when the phase difference is equal to _____.

   a) π b) 2π c) 3π d) $\dfrac{\pi}{2}$

2. In Michelson interferometer, when M_1 and M_2 are equidistant from the glass plate, the field of view will be _____.

   a) Circular fringe   b) Localized fringes   c) White light fringe   d) perfectly dark

3. The area of each half period zone is equal to

   a) $\pi^2 b\lambda$ b) $\pi b\lambda$ c) $\pi b^2\lambda$ d) $\pi b\lambda^2$

4. In Fraunhofer diffraction at double slit, the angular separation between any two consecutive minima (or) maxima is equal to _____.

   a) $\dfrac{\lambda}{a+b}$ b) $\lambda(a+b)$ c) $\dfrac{\lambda^2}{(a+b)}$ d) $\dfrac{(a+b)^2}{\lambda}$

5. The double refraction is absent when light is allowed to enter to the crystal along _____.

   a) the slit   b) the top surface   c) the bottom surface   d) the optic axis

6. A half wave plate rotates the azimuth of a beam of plane polarized light by

   a) $30°$ b) $60°$ c) $90°$ d) $180°$

7. The critical potential difference at which the appearance of line spectra is _____.

   a) constant for different target   b) different for different target

   c) due to less target response   d) due to scattering

8. The frequency of a spectral line in x – ray spectrum varies

   a) Z b) A c) Z^2 d) $A - Z$

9. The propagation of light in an optical fibre from one of its ends to the other end is based on the principle.

   a) Interference   b) diffraction   c) polarization   d) total internal reflection

10. Applying _____ to the launching face of the fibre.

    a) Lambert's law   b) Len's law   c) Snell's law   d) Tangent law

SECTION – B (5 X 4 = 20)

Answer the Following:

11. a) Explain about constructive interference and destructive interference take place due to reflected light in the thin films.

    [OR]

    b) Obtain equation for radius of the Newton's rings by reflected light.

12. a) Discuss about Fresnel's diffraction at a sharp edge with a neat diagram.

[OR]

b) How will you determine the resolving power of a grating?

13. a) Discuss about Huygen's explanation of double refraction in uniaxial crystals.

[OR]

b) What is optical activity? Explain.

14. a) Discuss about main features of continuous x – ray spectrum.

[OR]

b) Describe an experimental arrangement for studying Raman Effect.

15. a) Discuss about the term acceptance angle.

[OR]

b) Give a note on Avalanche photo diode.

SECTION – C (5 X 9 = 45)

Answer the Following:

16. a) Describe the interference phenomenon of Fresnel's Biprism. How the wavelength of light and distance between two virtual sources are determined?

[OR]

b) Explain the working of michelson interferrometer. Also explain how to determine wavelength using Michelson interferrometer.

17. a) Describe about the Fresnel's explanation for rectilinear propagation of light.

[OR]

b) Explain Fraunhofer diffraction at a double slit with a neat diagram. Also discuss about interference maxima and minima as well as diffraction maxima and minima.

18. a) Describe about the optic axis in the plane of incidence along inclined and parallel to the crystal surface.

[OR]

b) Explain the theory of production and detection of plane, circularly and elliptically polarized light.

19. a) Explain the theory of Mosley's law and give explanation according to Bhor's theory. Give its significance.

[OR]

b) Describe the theory of the origin of pure rotational spectrum of a molecule.

20. a) Describe the structure and characteristics of optical fibres in detail .

[OR]

b) Explain the following:

      (i) Light emiting diode

      (ii) Laser diode

      (iii) PIN photo diode

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