Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Physical Optics
Course Code - BOPTO204

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Answer all the questions. Each question carry one mark.

9. 1. Electromagnetic waves are *

Mark only one oval.

- longitudinal
- transverse
- both longitudinal and transverse
- none of the above

10. 2. The separation of white light into its component colours is called *

Mark only one oval.

- dispersion
- refraction
- reflection
- radiation

11. 3. The idea of secondary wavelets for the propagation of a wave was first given by *

Mark only one oval.

- Newton
- Huygens
- Maxwell
- Fresnel

12. 4. Light propagates rectilinearly, due to *

Mark only one oval.

- wave nature
- wavelengths
- velocity
- frequency

13. 5. According to Huygens' principle, light is a form of *

Mark only one oval.

- particle
- rays
- wave
- radiation

14. 6. Why light is said to have a dual nature? *

Mark only one oval.

- it exhibits the properties of wave and particles
- it exhibits the properties of reflection and diffraction
- It has both interference and polarization effect
- none of the above

15. 7. *

The wavenumber of a transition is 2000 cm^{-1}. In what part of the electromagnetic spectrum does this come?

Mark only one oval.

- ultraviolet-visible
- infrared
- microwave
- radio-wave

16. 8. Sun appears red at sun rise and sunset. This is due to scattering of *

Mark only one oval.

- ◯ longer wavelengths
- ◯ shorter wavelengths
- ◯ lower frequencies
- ◯ all frequencies

17. 9. Which of the following are fundamentally different from the others? *

Mark only one oval.

- ◯ Gamma rays
- ◯ radio waves
- ◯ sound waves
- ◯ light waves

18. 10. The number of optic axes in a uniaxial crystal is *

Mark only one oval.

- ◯ 1
- ◯ 2
- ◯ 5
- ◯ 10

19. 11. Which of the following phenomena causes polarization of light? *

Mark only one oval.

- reflection
- refraction
- double Refraction
- none of these

20. 12. A window which can transmit all the incident light without any reflection is called as *

Mark only one oval.

- polarized Window
- Malus Window
- Brewster Window
- non-reflecting window

21. 13.From the polarization of light, one can conclude that *

Mark only one oval.

- light is a transverse wave
- light is a longitudinal wave
- light can bend while facing a sharp edge of an object
- none of these

22. 14. The optic axis is a direction along which *

Mark only one oval.

- the O-ray travels faster than the E-ray
- the E-ray travels faster than the O-ray
- both O-ray and E-ray travel with the same velocity
- none of these

23. 15. In a quarter-wave plate, the path difference between the O-ray and E-ray is *

Mark only one oval.

- Option 1: $\frac{\lambda}{4}$
- Option 2: 0
- Option 3: $\frac{\lambda}{2}$
- Option 4: 2λ

24. 16. *

If θ_p be the angle of polarization, then the refractive index μ of the material is given by

Mark only one oval.

$sin\ \theta_p$

Option 1

$cos\ \theta_p$

Option 2

$tan\ \theta_p$

Option 3

$sec\ \theta_p$

Option 4

25. 17. When light is reflected from glass at the polarizing angle, *

Mark only one oval.

- the reflected and refracted rays are parallel
- the reflected and refracted rays are perpendicular
- the electric vector is perpendicular to the reflecting plane
- none of these

26. 18. When angle of incidence is greater than Brewester angle, the reflected ray suffers a phase change of *

Mark only one oval.

- Option 1: π
- Option 2: $\frac{\pi}{2}$
- Option 3: 0
- Option 4: $3\pi/2$

27. 19. Polaroid sunglasses decrease glare on a sunny day because *

Mark only one oval.

- block a portion of light
- refract the light
- have a special colour
- completely absorb the light

28. 20. Interference phenomena indicated *

Mark only one oval.

- light is electromagnetic wave
- rectilinear propagation of light
- the wave nature of light
- none of these

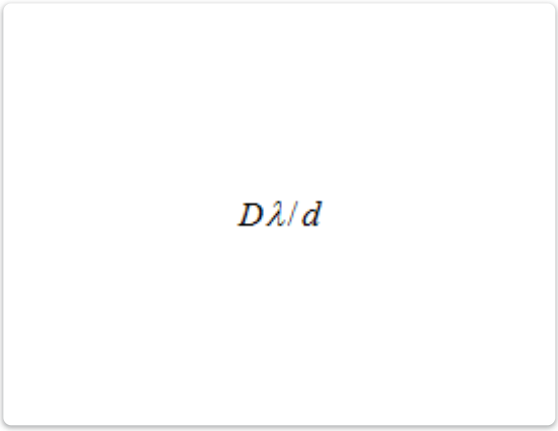
29. 21. For constructive interference, the phase difference is an even multiple of *

Mark only one oval.

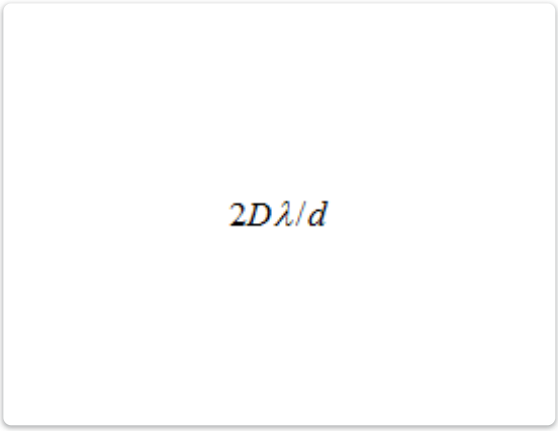
- Option 1: $\frac{\lambda}{2}$
- Option 2: $\frac{\lambda}{4}$
- Option 3: π
- Option 4: None of these

30. 22. The fringe width of interference pattern of Young's double slit experiment is (2d is the distance between the two coherent sources) *

Mark only one oval.



Option 1



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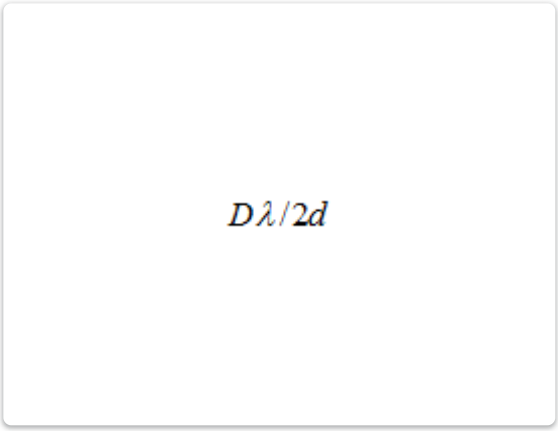

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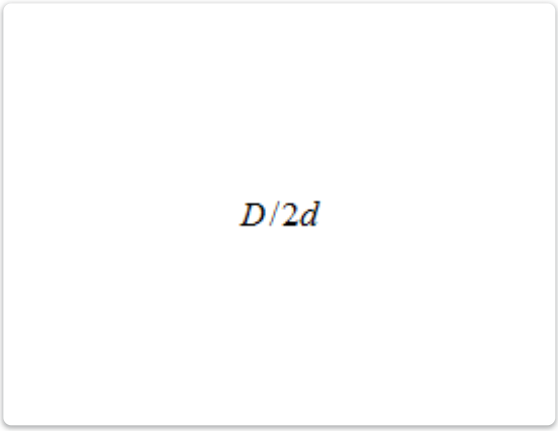

Option 4

31. 23.In Newton's ring experiment, coherent waves are produced by means of *

Mark only one oval.

- division of wavefront
- diffraction
- division of amplitude
- none of these

32. 24. The center of the Newton's rings for the reflected system of a monochromatic source of light is *

Mark only one oval.

- dark
- bright
- partially dark
- none of these

33. 25. Radii of Newton's rings are proportional to *

Mark only one oval.

- square root of natural number
- square of natural number
- natural number
- none of these

34. 26. If white light is used in Newton's rings experiment, then *

Mark only one oval.

- a number of coloured rings will be observed
- no rings will be observed
- black and white rings will be observed
- none of these

35. 27. If Young's double slit experiment with one source of light and two slits be performed in water instead of air *

Mark only one oval.

- the fringes will be smaller in number
- the fringes will be narrower
- the fringes will be broader
- no fringes will be obtained

36. 28. Two waves having intensities in the ratio of 9:1 produce interference. The ratio of maximum to minimum intensity is equal to *

Mark only one oval.

- 10 : 8
- 9 : 1
- 4 : 1
- 2 : 1

37. 29. When compact disk is illuminated by a source of white light, coloured lines are observed. This is due to *

Mark only one oval.

- dispersion
- diffraction
- interference
- refraction

38. 30. The phenomenon of interference is based on *

Mark only one oval.

- conservation of momentum
- conservation of energy
- conservation of momentum and energy
- quantum nature of light

39. 31. Two waves with phase difference 180° have resultant of amplitude *

Mark only one oval.

- one
- zero
- same as the single wave
- doubles the single wave

40. 32. Extra distance travelled by one of waves compared with other is called *

Mark only one oval.

- path
- displacement
- phase difference
- path difference

41. 33. Fraunhofer diffraction arises when the source of light and screen is effectively at *

Mark only one oval.

- finite distance
- infinite
- semi-infinite
- none of these

42. 34. In Fraunhofer diffraction minima are *

Mark only one oval.

- all perfectly dark
- never perfectly dark
- perfectly bright
- none of these

43. 35. The intensity of central maximum due to double slit diffraction pattern is ----------times greater than that of single slit pattern. *

Mark only one oval.

- 2
- 3
- 4
- 8

44. 36. The resolving power of a grating, having N number of total rulings, in nth order is *

Mark only one oval.

- n/N
- nN
- N/n
- none of these

45. 37. The nature of the wave front due to a point source of light is *

Mark only one oval.

- spherical
- plane
- cylindrical
- none of these

46. 38. A diffraction pattern is obtained using a beam of red light. What happen if the red light is replaced by blue light *

Mark only one oval.

- bands disappear
- bands become broader and farther apart
- no change
- diffraction bands became narrower and crowded

47. 39. Resolving power of telescope can be increased by increasing *

Mark only one oval.

- the wavelength
- the diameter of objective
- the diameter of eyepiece
- the focal length of eyepiece

48. 40. Resolving power of microscope depends upon *

Mark only one oval.

- wavelength of light used (directly proportional)
- wavelength of light used (inversely proportional)
- frequency of light used
- focal length of objective

49. 41. The radius of the half period zone is proportional to _____ ? *

Mark only one oval.

- the wavelength of light
- the square root of the frequency of light
- the square root of the wavelength light
- the frequency of light

50. 42. Light of 600 nm is incident on a circular hole and is received on a screen 50 cm away. What is the radius of the hole, if the intensity of light on the screen is 4 times the intensity without the hole? *

Mark only one oval.

- 0.0258 cm
- 0.0478 cm
- 0.0548 cm
- 0.0898 cm

51. 43. Tyndall effect is the scattering of the light by *

Mark only one oval.

- air particles
- solid particles
- liquid particles
- colloidal particles

52. 44. Raman Effect supports *

Mark only one oval.

- corpuscular theory
- wave theory
- quantum theory
- electromagnetic theory

53. 45. Why red light is at the top while violet at the bottom of the spectrum? *

Mark only one oval.

- violet light has the medium speed so it is refracted the least.
- violet light has the highest speed so it is refracted the least
- red light has the slowest speed so it is refracted the least
- red light has the highest speed so it is refracted the least.

54. 46. Luminescence is because of *

Mark only one oval.

- photons emitted while excited electrons drops down
- knocking out of electrons by photons
- photons stimulated by photons
- all

55. 47. Which photon processes are dominant in the context of diagnostic radiology? *

Mark only one oval.

- Compton scattering and photoelectric effect
- Photoelectric effect and pair production
- Compton scattering and pair production
- Compton and Rayleigh scattering

56. 48. Flocculation refers to *

Mark only one oval.

- purification of colloidal solution
- neutralization of charge on colloidal particles
- separating the particles of colloidal solution
- movement of colloidal particles

57. 49.Emission without a change in spin multiplicity *

Mark only one oval.

- is called phosphorescence
- is called fluorescence
- is spin forbidden
- involves an intersystem crossing

58. 50. If the absorption of electromagnetic radiation by matter results in the emission of radiation of the same or longer wavelengths for a long time, the phenomenon is termed as which of the following? *

Mark only one oval.

- Luminescence
- Fluorescence
- Phosphorescence
- Spontaneous emission

59. 51. The measurement of intensity of fluorescent X-rays provide a simple and _____ way of _____ analysis *

Mark only one oval.

- destructive, quantitative
- non-destructive, quantitative
- destructive, qualitative
- Non-destructive, quantitative

60. 52. The energy of the emitted X-rays depends upon the _____ of the atom and their intensity depends upon the _____ *

Mark only one oval.

- Atomic number, amount of sample
- Mass number, amount of sample
- Mass number, concentration of atoms
- atomic number, concentration of atoms

61. 53.The fluorescence intensity increases with all of the following except *

Mark only one oval.

- rigidity
- planarity
- No. of rings
- dissolved oxygen

62. 54. Heavy atom effect is not more with *

Mark only one oval.

- F
- Cl
- Br
- all have equal effect and it depends on valency

63. 55. Which of the following is a line source in fluorometry *

Mark only one oval.

- Mercury vapor lamp
- Xenon discharge lamp
- Deuterium lamp
- Lasers

64. 56. In He-Ne laser neon atoms get energy *

Mark only one oval.

- on collision with He atoms
- from chemical reactions
- from electrical pumping
- from optical pumping

65. 57. In lasing action, the spontaneous emission does not depend on *

Mark only one oval.

- the number of atoms present in the excited state
- the intensity of the incident light
- both intensity and number of atoms
- none of these

66. 58. The wavelength of of He-Ne laser is *

Mark only one oval.

- 632.8 nm
- 600 nm
- 532.8 nm
- 500 nm

67. 59. For laser action to occur, the medium used must have at least *

Mark only one oval.

- 4 energy levels
- 2 energy levels
- 3 energy levels
- 5 energy levels

68. 60. A three level laser system will be *

Mark only one oval.

- always pulsed
- either CW or pulse
- always CW
- none of these