PHYSICS

BOOKS - TARGET PHYSICS (HINGLISH)

WAVE THEORY OF LIGHT

Classical Thinking

1. According to corpuscular theory of light, the different colours of light are due to

A. the wavelength.

B. The frequency of the wave

C. The speed of corpuscles

D. the size of the corpuscles.

Answer: D

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2. According to Newton's corpuscular theory, the speed of light is

A. less

B. more

C. sometimes less sometimes more

D. zero

Answer: A

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3. Newton's corpusclar theory of light failed to explain

A. reflection

B. refraction `

C. rectilinear propagation of light

D. interference of light

Answer: D

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4. Newton postulated his corpuscular theory on the basis of

A. Newton's ringhs

B. rectilinear propagation of light.

C. thin film colous.

D. despersion of white light into various colous.

Answer: D

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5. According to Newton's corpuscular theory of light, the corpuscles are

A. heavy mass particles.

B. quanta

C. material particles

D. photons

Answer: C

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6. In a medium,different colours of light travel with

A. same speeds.

B. different speeds.

C. continuously increasing speeds.

D. continuously decreasing speeds.

Answer: A

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7. Which of the following is not a property of light?

A. It requires a material medium for propagantion,

B. It can traval through vacuum

C. It involves transportation of energy

D. It has finite speed.

Answer: C

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8. The wave theory of light was given by

A. Maxwell

B. Planck

C. Huygens

D. Young

Answer: B

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9. From wave theory of light, defferent colours of light are due to

A. same wavelenght

B. different wavelengths.

C. `different frequencies

D. different speeds.

Answer: B

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10. In a isotropic medium,

A. Speed of light changes.

B. speed of light remains constant

C. direction of propagation of light changes.

D. wavelength of light changes.

Answer: B

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11. The properties assigned to luminiferous ether are

A. very low density and rigidity

B. zero density and elasticity

C. very hight density and elasticity

D. very high density and rigidity

Answer: B

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12. A ray of light travels from water to glass. Which one of the following statements is true ?

A. wavelenght increases

B. wavelenth decreases

C. frequency in creases

D. velocity increases.

Answer: B

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13. Monochromatic light has

A. same wavelength

B. different wavelength

C. same speed

D. different speeds.

Answer: A

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14. A wavefront is an imaginary surface where

A. phase changes with constant rate in all directions alsong the surface.

B. phyase changes with rthe same rate per unit length in all directions along the surface

C. constant phase difference is always maintained.

D. phase is always the same for all points.

Answer: D

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15. A wavafront is

A. a surface perpendicular to the direction of propagation of light

B. a surface paralel to the direction propagation of light

C. a surface without any specific orientation with direction of propagation of light

D. a surface which has nothing to do with intensity of light

Answer: A

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16. Wavefront is the locus of all points, where the particles of the medium vibrate with the same

A. with same frequency

B. with same amplitude

C. with same frequency, amlitude and defferent phase

D. in same phase

Answer: D

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17. Wave normal is a direction which is

A. normal at every point on the wavefront

B. tangantial to every point on the wavefront.

C. directed at every point of the wavefront

D. independent of wavefront

Answer: A

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18. What is the nature of the wavefron associated with a parallel beam of light ?

A. Plane

B. Spherical

C. Elliptical

D. Parabolic

Answer: A

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19. The wavefron obtained fron a sourece of light is cylindrical at time t, When the source of light is

A. a point source at finite distance

B. a point source at infinite distance

C. a thin linear sourcel

D. of a large size and of any shape

Answer: C

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20. When wavefronts pass form denser medium to rarer medium the width of the wavefront

A. increases

B. may increases or decreases

C. decreases

D. remains unchanged

Answer: A

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21. When wavefront strikes a reflecting surface.

A. it comes to rest

B. it pernetrates the reflecting surface.

C. the surface bends.

D. The points on the surface become source of secondary wavelets.

Answer: D

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22. Huygen's priciple of secondary wavelets may be used to

A. find the valocity of ligth

B. find the new position of wavefront

C. explain the polarisation

D. explain the refraction

Answer: B

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23. Hugens' concept of secondary waves is useful in

A. explaining polarisation

B. determining focal length of lens.

C. geometrical reconstruction of a wavefront

D. none of these

Answer: C

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24. According to Huygens' construction, tangential envelope which touches all the secondary spaheres is the position of

A. original wavefront

B. secondary wavefront

C. geometrrical wavefront

D. extended wavefront

Answer: B

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25. Plane wavefront can be obtained form

A. any point source os light

B. point source placced at focus of convexd lend'

C. linear source of light

D. co-axial source

Answer: B

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26. A plane wavefront is incident with zero angle of incidence f a plance separating two media. The wavefront is

A. perpendicular to the surface

B. parallel to the surface

C. inclined at an angle of 45^2 with the surface

D. inclined at an angle of 60° with the surface

Answer: B

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27. The wavefront due to a source situated at infinity is

A. spherrical

B. cylindrical

C. planar

D. none of these

Answer: C

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28. During the reflectio of ligth from plane mirror, the incident ray, normal and reflected ray lie

A. paralel to eacch other

B. perpendicular to each other

C. in same plane

D. in different plane

Answer: C

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29. The laws of reflection of light are valid for

A. plane mirror only

B. concave mirror only

C. convex mirror only

D. all reflecting surfaces.

Answer: D

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30. A monochromatic light of wavelength λ is incident ofn plane reflecting surface. After reflection, its wavelength will be

A. doubled

B. reduced to half

C. same

D. quadrupled

Answer: C

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31. When light enters from air to water, then its

A. frequency increases and speed decreases.

B. frequency is same but the wavelength is smaller in water in air.

C. frequency is same but the wavength in water is grater than in air.

D. frequency decreases and wavelength is smaller in water than in air.

Answer: B

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32. A monochromatic beam of light passes from a denser medium into a rarer medium. As a result

A. its velocity increases.

B. its velocity deccreases.

C. its frequency deceases

D. its wavelength decreases.

Answer: A

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33. Which one of the following statements is correct ?

The refractive index of a given piece of glass is

A. less for violet than for red light

B. more for blue than for green light

C. less for green than for yellow light

D. the same for all colours of light

Answer: B

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34. Light of a certain wavelength has a wave number $\bar{v}$ in vacum. Its wave number in a medium of refractive index n is

A. $\frac{n}{\bar{v}}$

B. $\frac{\bar{v}}{n}$

C. $n\bar{v}$

D. $\frac{1}{n\bar{v}}$

Answer: C

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35. A ray of light travelling in air haves wavelength λ, frequency n, velocity v and intensity I. If this ray enters into water then

these parameter are λ', n' , v' and I' respectively. Which relation is correct

A. $\lambda = \lambda'$

B. $n = n'$

C. $v = v'$

D. $I = I'$

Answer: B

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36. A ray of light is incident on a glass slab making an angle of 30° with the surface. The angle of refraction in glass, if the refractive index of flass is 1.6 , is

A. 28°

B. 33°

C. 12°

D. 15°

Answer: B

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37. Green light of wavelength 5460Å is incident on an air glass interface. If the refractive index of glass is 1.5, the wavelength of light in glass would be $\left(C = 3 \times 10^8 ms^{-1}\right)$ n

A. 3640 Å

B. 5460 Å

C. 4861 Å

D. 3460 Å

Answer: A

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38. Light travels with a speed of $2 \times 10^8 ms^{-1}$ in crown glass of refractive index 1.5. What is the speed of light in dense flint glass of refractive index 1.8 ?

A. $1.33 \times 10^8 \mathrm{m/s}$

B. $1.67 \times 10^8 \mathrm{m/s}$

C. $2.0 \times 10^8 \mathrm{m/s}$

D. $3.0 \times 10^8 \mathrm{m/s}$

Answer: B

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39. If th wavelength of light changes form 4000 Å to 5000 Å on entering another medium then its frequncy changes by

A. $1.5 \times 10^{14} Hz$

B. zero

C. $4 \times 10^{14} Hz$

D. $10^{14} Hz$

Answer: B

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40. If the speed of light in glass and water are 2×10^8 m/s and 2.25×10^8 m/s repsectively, then the refrectve index of the water with respect to the glass is

A. 1.125

B. 1.25

C. 1.5

D. 0.89

Answer: D

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41. Light is

A. transverse wave

B. sometimes longitudinal and sometimes transverse wave

C. neither transverse wave nor longitudinal wave

D. longitudinal wave.

Answer: A

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42. Longitudinal waves do not xhibit

A. refraction

B. reflection

C. differection

D. polarisation

Answer: D

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43. The polarisation of an electromagnetic wave is determined by

A. the electric fiel only

B. the magnetic field only

C. both the electric and magnetic fields.

D. the direction of propagation of aelelctromagnetic waves

Answer: A

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44. In case of linearly polarised light, the magnitude of the electric field vector

A. does nto change with time

B. varies periodically with time

C. increases and decreases linearly with time

D. is parallel to the direction of propagation.

Answer: B

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45. Assertion: The electromagnetic waves of all wavelengths can be polarised.

Reaseon : Polarisationo is independent of the wavelegths of electromagnetic waves.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: A

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46. Unpolarised light consists of electric field vectors in

A. any one plane

B. plane of paper

C. perpendicular to plane of paper

D. all posible planes

Answer: D

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47. Phase difference between incident and reflected rays is 180° in

A. air from glass

B. water from glass

C. glass from diamond

D. glass from air

Answer: A

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48. The device used to produce plane polarised light is

A. a crystal

B. a biprism

C. a grating

D. nicol prism

Answer: D

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49. In a plane polarised electromagnetic wave, the angle between the planes of bivration and polarisation is

A. 0°

B. 30°

C. 60°

D. 90°

Answer: D

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50. Refractive index of material is equal to tangent of polarising angle. It is called

A. Brewaster's waw

B. Lambert's law

C. Malus's law

D. Bragg's law

Answer: A

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51. The relation between the polarising angle (i_p) and the refractive index (n) of the medium is given by

A. $\sin i_p$

B. $\frac{\sin i_p}{\cos i_p}$

C. $\cos i_p$

D. $\cot i_p$

Answer: B

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52. If the refractive index of glass is $\sqrt{3}$, then its polarising angle will be

A. 30°

B. 45°

C. 60°

D. 90°

Answer: C

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53. When unpolarised light beam is incident from air onto glass (n = 1.5) at the polarising angle

A. reflected beam is polarised 100 percent

B. reflected and refracted beams are partially polarised.`

C. almost all the light is refected

D. the light is refracted.

Answer: A

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54. A ray of light is incident on the surface of a glass plate at an angle of incidence equal to Brewster's angle ϕ. If μ represents the refractive index of glass with respect to air, then the angle between reflected and refracted rays is

A. $90 + \phi$

B. $\sin^{-1}(\mu \cos \phi)$

C. 90°

D. $90^\circ - \sin^{-1}(\sin \phi / \mu)$

Answer: C

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55. Polarods are used to control the intensity of light coming through windows of

A. trans and aeroplanes

B. four wheelers

C. rooms

D. theatres

Answer: A

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56. Which of the following polaroid is formed by stretching polyvinyl alcohol by the stress ?

A. P- polaroid

B. H- polaroid

C. K-polaroid

D. N-polaroid

Answer: B

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57. Sum glasses are polaroid because

A. they are cheap

B. they are good in colour

C. they reduce intensity of light

D. they increase intensity of light

Answer: C

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58. Which of the following possesses dichroism ?

A. Turmaline

B. Quinine

C. Crown crystal

D. Nickel

Answer: A

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59. Which of the follwing is NOT the use of polaroid ?

A. LCD screen

B. Colour constrast

C. Control amount of light in aeroplne window

D. Vehicle side mirror

Answer: D

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60. Which of the is not an aplicatinoof of polaroid ?

A. Sun glasses

B. Study of optical activity

C. Determining the resolving power of an optical device

D. 3-D movies

Answer: C

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61. When a polaroid is rotated, the intensity of light is not found to vary. The incident light may be

A. completely plane polarsed

B. partialy plane polarised

C. unpolarised

D. completely diffrected

Answer: C

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62. If a source of light is moving away from a stationary observer, then the frequency of light wave appears to change because of

A. Dopplar effect

B. Interference

C. Diffraction

D. Polarisation

Answer: A

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63. Two point A and B are situated at the same distance from the phase difference between the light waves passing throught A and B will be

A. zero

B. $\pi / 2$

C. π

D. $2\pi / 3$

Answer: A

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64. The velocity of light emitted by a source S observed by an observer O , who is at rest with respect to S is c . If the observer moves towards S with velocity v , the velocity of light as observed will be

A. $c + v$

B. $c - v$

C. c

D. $\sqrt{1 - \frac{V^2}{C^2}}$

Answer: C

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65. If a star is moving towards the earth, then the lines are shifted towards

A. Red

B. Infra-red

C. Blue

D. Green

Answer: C

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66. A star is emitting yollow light. If it is accelerated towards earth, then to to an observer on earth, it will appear

A. shinning yellow

B. graduly changing to violet

C. gradually changing to red

D. unchanged

Answer: B

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67. When a source of light is receding away from an observer, then the spectral lines will get displaced towards

A. violet region

B. red region

C. ultraviolet region

D. blue region

Answer: B

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68. Fro which of the following waves is the Doppler efferct not applicatble ?

A. Shock waves

B. Ultrasonic waves

C. Sonic waves

D. Electromagnitic waves

Answer: A

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69. Which of the following is not the use of Deppler effect ?

A. Discovery of twin stars

B. To determine the velocity of milky way

C. To determine the redius of earth

D. To determine the velocity of submarine.

Answer: C

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70. When the light source is moving towards an observer,

A. wavelength of light decreases.

B. wavelength of light increases.

C. wavelength of light remains unchanged

D. velocity of light increases

Answer: A

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71. In the context of Doppler effect in light, the term red shift signifies

A. decease in frequency

B. increase in frequency

C. decrease in intensity

D. increase in intensity

Answer: A

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72. The sun is rotating about its own axis. The spectral lines imitted from the two ends of its equator, for an bserver on the earth will show

A. shift towards red end

B. shift towards violet end

C. no shift

D. shift towards red form one end and shilft towards violet from other end

Answer: D

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73. The redius of curvature of a plane wavefront

A. is less than that of a spherical vwavefront

B. is infinity

C. is equal to the radius of curvature of a reversing wavefront.

D. is slightly more than that of a cylindrical wavefront

Answer: B

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74. What will be the value of R.I. (μ) for completely transparent meterial medium to be invisible ?

A. Unity

B. More than one unit

C. Less than unity

D. Equal to 1.33

Answer: A

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75. Select the WRONG statement.

A. According to Huygens' principle, every point on a given wavefront is regarded as a secondary source.

B. The new disturbance from secondary source travels in all directions with the

velcity of light is called secondary wavelets.

C. The surface of tangency to secondary wavelets in forward derection only gives new wavefront.

D. Huygens could explanin rectilinear propagation of light.

Answer: D

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76. Statement-1 : Light travels faster in glass than in air.

Statement-2 : Because air is rarer than glass.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: D

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77. Assertion L A spherical wavefront is produced by a point source of light .

Reason : It is because, the locus of al points, which are equidistant from the point source, is a sphere.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: A

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Critical Thinking

1. According to Huygens, medium through which light waves travel is

A. vacuum only

B. luminiferous ether

C. liquid only

D. solid only

Answer: B

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2. Whch of the following propertiy is trun in case of eather ?

A. Very high elasticity of volume

B. Very high elasicity of shape

C. Very low elasticity of volume

D. Very low elasticity of shape

Answer: A

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3. The wave theory of light does not explain

A. interfernce

B. refraction

C. Compton effect

D. diffraction

Answer: C

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4. If light travals from vacuum to water, its wavelength

A. increass

B. remains constant

C. decreases

D. may increases or decreases

Answer: C

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5. A sperical wavefront propagating in a medium changes into

A. circular wavefront

B. cylindrical wavefront

C. plane wavefront

D. elliptical wavefront

Answer: C

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6. A light wave in air enters a medium of refractive index $\frac{4}{3}$. If the wwave number of light in air is 3×10^6 /m, then the wave number of light in themedium is

A. 4×10^6/m

B. 2.22×10^6/m

C. 3.33×10^6/m

D. 4.44×10^6/m

Answer: A

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7. Light passes from air into a liquid. The angle of incidence is 60°. The deviation produced is 15°. The refractive inded of the liquied is

A. 1.5

B. 1.33

C. 1.22

D. 1.63

Answer: C

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8. Time taken by sunlight to pass through a window of thickness $4mm$ whose refraactive index is $\frac{3}{2}$, is

A. $2 \times 10^{-8}s$

B. $2 \times 10^{8}s$

C. $2 \times 10^{-11}s$

D. $2 \times 10^{11}s$

Answer: C

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9. The time taken bhy the sunlight to penetrate 3 mm glass slab is ($\mu = 1.5$)

A. $1.5 \times 10^{-11} s$

B. $3 \times 10^{-19} s$

C. $3 \times 10^{-16} s$

D. $1.5 \times 10^{-7} s$

Answer: A

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10. The sistance travelled by light in a medium of R.I. 3/2 in a nano second is

A. 45 cm

B. 40 cm

C. 30 cm

D. 20 cm

Answer: D

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11. The velocity of light in vacuum is $3 \times 10^8 m/s$. Therefore the velocity of light in m/s in a medium of R.I. 1.25 is

A. 3.75×10^8

B. 4.25×10^8

C. 1.75×10^8

D. 2.4×10^8

Answer: D

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12. The refractive index of a piece of glass of 1.5 and it accommodates as many waves as are accommodated in $18cm$ width of water column.If the refractive index of water 1.33 then the thickness of glass piece will be-

A. 20 cm

B. 10 cm

C. 12 cm

D. 16 cm

Answer: D

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13. A glass slab of thickness 4 cm contains the same number of waves as X cm of water column when both aretransvarsed by the same monochomatic light, If the refractive indeces of glass and water (for that light) are 5/3 and 4/3 respectively, the value of X will be

A. 9/20 cm

B. 20/9 cm

C. 5/4 cm

D. 5 cm

Answer: D

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14. Red light of wavelength 6400 Å in air has a wavelength of 4000 Å in glass. If the wavelength of violet light in air is 4400 Å, then the wavelength in glass is

A. 2570 Å

B. 2750 Å

C. 1600 Å

D. 2560 Å

Answer: B

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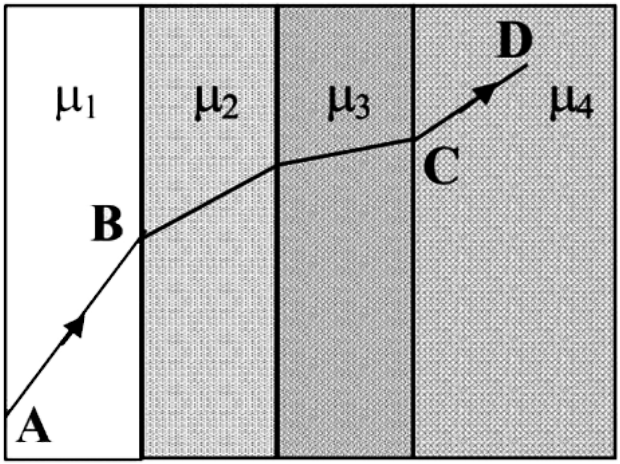
15. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_4 as shown in the figure. The surfaces

of all media are parallel. If the emergent ray CD is parallel to the incident ray AB, we must have



A. $\mu_1 = \mu_2$

B. $\mu_2 = \mu_3$

C. $\mu_3 = \mu_4$

D. $\mu_4 = \mu_1$

Answer: D

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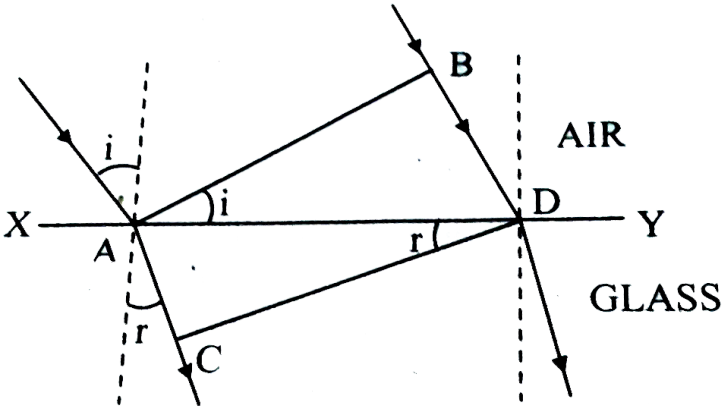
16. In the given figure, a wavefront AB moving in air is incident on a plane glass surface XY, Its position CD after refraction through a glass slab is showin in gigure. The ratio of width of

wavefront AB to the refracted wavefront CD is



A. $\frac{\cos i}{\cos r}$

B. $\frac{\cos r}{\cos i}$

C. $\frac{\sin i}{\sin r}$

D. $\frac{\sin r}{\sin i}$

Answer: A

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17. A ray of light travels from air to glass. It is found that the angle of refraction is half the angle of incidence. The the angle of incidence is given by

A. $2\cos^{-1}\left(\frac{\mu}{2}\right)$

B. $2\sin^{-1}\left(\frac{\mu}{2}\right)$

C. $2\tan^{-1}\left(\frac{\mu}{2}\right)$

D. $\cos^{-1}\left(\frac{\mu}{2}\right)$

Answer: A

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18. A glass slabn of thickness 8 cm contains the same number of waves as 10 cm of water, when the same monochrom0atic light transaverses both. If the refractive index of water is 4/3, then the refractive indexd of glass is

A. $\frac{5}{3}$

B. $\frac{5}{4}$

C. $\frac{16}{15}$

D. $\frac{3}{2}$

Answer: A

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19. Volocity of light in diamond is $\left(\frac{5}{12}\right)^{th}$ that in air. Velocity of light in water is $\left(\frac{3}{4}\right)^{th}$ that in air. The angle of incidence of a ray of

light taranvelling from water to diamond $(r = 30^\circ)$ is

A. $\sin^{-1}(9/10)$

B. $\sin^{-1}(3/4)$

C. $\sin^{-1}(5/12)$

D. $\sin^{-1}(9/5)$

Answer: A

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20. A ray of light strikes a glass slab of thickness t. It emergens on the opposite face, parallel to the incident ray but laterally displaced. The lateral displacement, Δx is

A. $\Delta x = 0$

B. $\Delta \mathrm{x} = \mathrm{t} \sin(\mathrm{I} - \mathrm{r}) \cos \mathrm{r}$

C. $\Delta x = \dfrac{\mathrm{t} \sin \mathrm{I}}{\cos \mathrm{r}}$

D. $\Delta x = \dfrac{\mathrm{t} \sin(\mathrm{I} - \mathrm{r})}{\cos \mathrm{r}}$

Answer: D

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21. The velofity of light in glass 2×10^8m/s. If refractive index of glass with respect to water is 9/8, then the velocity of light in water is

A. 1.6×10^8 m/s

B. 1.33×10^8 m/s

C. 3×10^8 m/s

D. 2.25×10^8 m/s

Answer: D

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22. Unpolarised light falls on two polarizing sheets placed one on top of the other. What must be the angle between the characteristic directions of the sheets if the intensity of the final transmitted light is one-third the maximum intensity of the first transmitted beam?

A. 75°

B. 55°

C. 35°

D. 15°

Answer: B

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23. A beam of light is partially reflected and partially refracted from a surface. The angle between reflected and refracted light ray is 90°. If the angle of refraction is 30°, the angle of incidence is

A. 50°

B. 60°

C. 78°

D. 75°

Answer: B

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24. When the angle of incidence on a material is 60°, the reflected light is completely

polarized. The velocity of the refracted ray inside the material is (in ms^{-1})

A. 3×10^8

B. $\left(\frac{3}{\sqrt{2}}\right) \times 10^8$

C. $\sqrt{3} \times 10^8$

D. 0.5×10^8

Answer: C

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25. A ray of light is incident on the surface of a glass plate of index of refraction 1.55 at the polarizing angle. Calculate the angle of refraction.

A. 0°

B. $147^\circ 11'$

C. $32^\circ 49'$

D. $57^\circ 10'$

Answer: C

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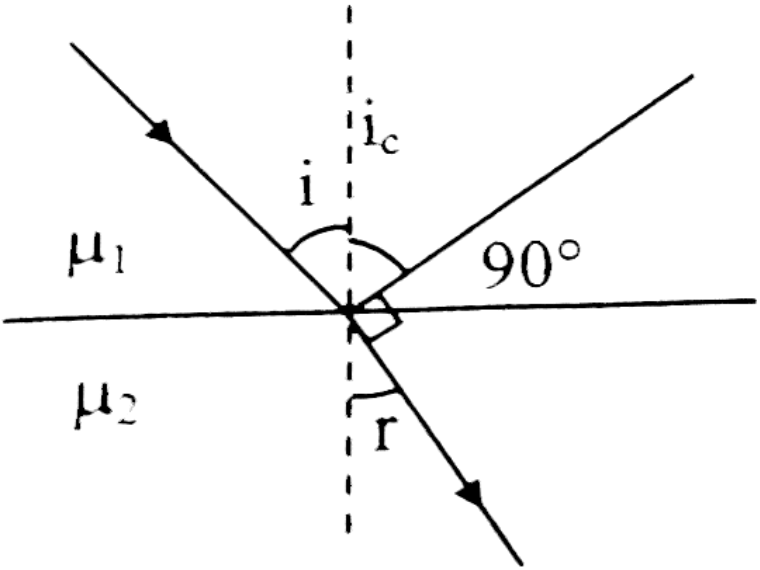
26. The correct relation for the diagram shown below is



A. $\sin I = \frac{\mu_2}{\mu_1}$

B. $\tan I = \frac{\mu_1}{\mu_2}$

C. $\sin i_c = \cot i$

D. $\sin i_c = \text{cosec I}$

Answer: C

Watch Video Solution

27. When unpolarised light is incident on a plane glass plate at Brewster's angle, then which of the following statements is correct?

A. Reflected and refracted rays are completely poolarised withyy their planes of polarisation parallel to each other.

B. Reflected and refracted rasy are completely polarised with their planes of polarisation perpendicular to each other.

C. Reflected light is plane polarised but transmitted light is plane polarised but transmitted light is partially polarised.

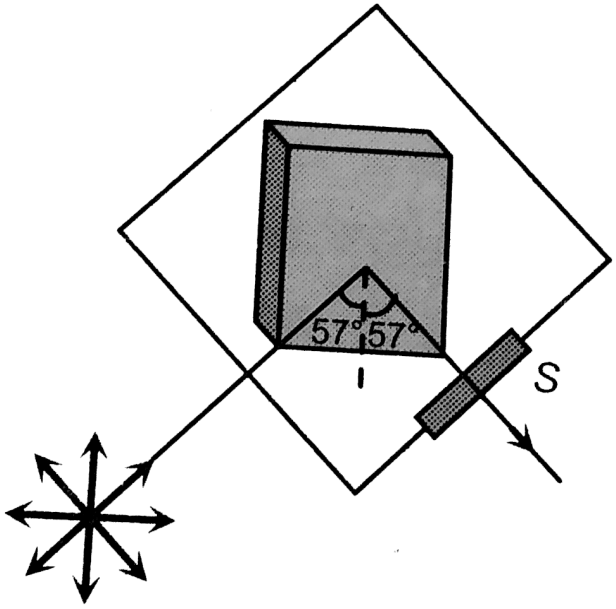
D. Reflected light is partially polarised but refracted light is plane polarised.

Answer: C

Watch Video Solution

28. Figure represents a glass plate placed vertically on a horizontal table with a beam of unpolarised light falling on its surface at the polarising angle of 57° with the normal. The electric vector in the reflected light on screen

S will vibrate with respect to the plane of incidence in a



A. vertical plane

B. horizontal plane

C. plane making an angle of 45° with the vertical

D. plane meking an angle of 57° with the horizontal .

Answer: A

Watch Video Solution

29. Dichroism is the property whhere

A. unequal absorption of O-ray and E - ray takes place.

B. equal absorption of O - ray and E - ray takes place.

C. plane of polarisation rotates.

D. unequal reflection of O - ray and E - ray takes place

Answer: A

 Watch Video Solution

30. In double refraction .

A. only the O - ray is polarised

B. only the E - ray is polarised

C. both O - ray and E ray are polarised.

D. neither O - ray nor E - ray is polarised.

Answer: C

 Watch Video Solution

31. The observed wavelength of light coming form a distant galaxy is found to be increased

by 0.5% as compared with that coming form a terrestrial source. The galaxy is

A. stationary with repsect to the earth

B. approacthing the eath with velocity of light

C. recending form the earth with the velocity of light

D. receding form the earth eith a velocity equal to 1.5×10^6 m/s.

Answer: D

Watch Video Solution

32. A star producing light of wavelenght 6000 Å moves away from the earth with a speed of 5 km/s. Due to Doppler effect, the shift in wavelength will be ($c = 3 \times 10^8$m/s)

A. 0.1 Å

B. 0.05 Å

C. 0.2 Å

D. 1 Å

Answer: A

Watch Video Solution

33. A rocket is moving away from the earth at a speed of $6 \times 10^7 m/s$. The rocket has blue light in it. What will be the wavelength of light recorded by an observer on the earth (wavelength of blue light $= 4600\text{Å}$)

A. 4600 Å

B. 5520 Å

C. 3680 Å

D. 3920 Å

Answer: B

Watch Video Solution

34. The spectral line of wavelength $\lambda = 5000\text{Å}$ in the light coming from a distant star is observed as 5200 Å.Determine the recession velocity of the star.

A. 1.2×10^7 cm/s

B. 1.2×10^7 m/s

C. 1.2×10^7 km/s

D. 1.2km/s

Answer: B

Watch Video Solution

35. A rocket is going away from the earth at a speed 0.2 c , where c = speed of light. It emits a signal of frequency $4 \times 10^7 Hz$. What will be

the frequency observed by an observer on the earth

A. 0.24

B. 1.2

C. 30

D. 3.3

Answer: B

 Watch Video Solution

36. A plane glass slab is placed over various coloured letters. The letter which appears to be raised the least is

A. blue

B. green

C. violet

D. red

Answer: D

Watch Video Solution

37. A ray of light is inciden rormally on a glass slab of refractive index μ of thckness 'd' which is at a distance x from the glass. The ray of light takes same time to reach from source to slab and to reach from sorce to slab and to pass through the slab.

The thickness of the slab is

A. $\frac{\mu}{x}$

B. $\frac{x}{\mu}$

C. μx

D. $(\mu - 1)x$

Answer: B

Watch Video Solution

38. Light entering an air glass $(\mu = 1.5)$ boundary is partly reflected and partly refracted. If the incident and reflected rays are at right angles to each other, the angle of refraction r is given by

A. $\sin r = \frac{\sqrt{2}}{3}$

B. $\sin r = \sqrt{\left(\frac{2}{3}\right)}$

C. none of these

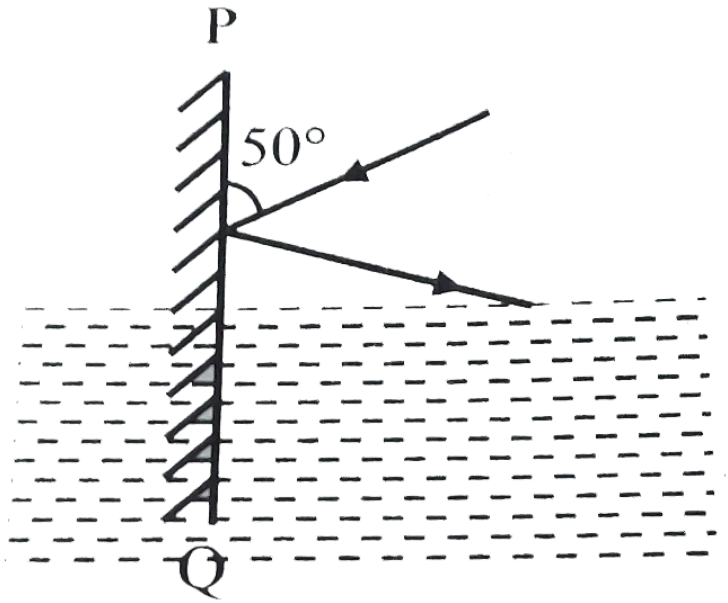
D.

Answer: A

Watch Video Solution

39. A plane mirror PQ is help normally to water surface of refractive idex 1.33. A ray of light is incident at an angle of 50° with the nirror surface. After reflection the ray is refracted

into water. The angle of refraction r is



A. 50°

B. 35°

C. 45°

D. 60°

Answer: B

Watch Video Solution

40. A ray of light is Incident on a glass plate at 60°. The reflected and refracted rays are found to be mutually perpe:ndiwlar. The refractive index of the glass is

A. $\frac{\sqrt{3}}{2}$

B. $\frac{3}{2}$

C. $\frac{1}{2}$

D. $\sqrt{3}$

Answer: D

 Watch Video Solution

41. A light source approaches the observer with velocfity 0.8 c. The Doppler shift for the light of wavelength 5000 Å is

A. 4400 Å

B. 1833 Å

C. 3667 Å

D. 7333 Å

Answer: C

Watch Video Solution

42. Assertion : Contribution of the wavelets lhying on back on a wavefront is zero.

Reason : The contribution of a wavelet in any direction making angle θ with the wavelet is

proportional to $\frac{1}{2}(1+\cos\theta)$. In the case, $\theta = 180^\circ$.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: A

Watch Video Solution

43. Assertion : The colour of thelight can be assessed from the wavelength of light waves.

Reason : Intensite = $(\mathrm{Amplitude})^2$

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: B

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Competitive Thinking

1. When light is refracted form a surface, which of its following physical parameters does not change ?

A. Velocity

B. Amplitude

C. Frequency

D. Wavelength

Answer: C

Watch Video Solution

2. By Huygen's wave theroy of light, we cannot explain the phenomenon of

A. Interference

B. Diffrection

C. Photoelectric effect

D. Polarisation

Answer: C

Watch Video Solution

3. Light appears to travel in straight lines since

A. in is not absorbed by the atmoshpere.

B. it is reflected by the atmoshere.

C. its wavelength is very small.

D. its velocity is very large.

Answer: C

Watch Video Solution

4. The rectilinear propagation of light in medium is due to its

A. High Velocity

B. Large Wavelength

C. High frequency

D. Source

Answer: C

Watch Video Solution

5. Which of the following generates a plane wavefront?

A. $\alpha -$ rays

B. $\beta -$ rays

C. $\gamma -$ rays

D. none of these

Answer: D

Watch Video Solution

6. Wavefront of a wave has direction with wave motion

A. parallel

B. perpendicular

C. opposite

D. at any angle

Answer: B

Watch Video Solution

7. According to Huygens' principle, during rafraction of light from air to a denser medium

A. wavelength decreases but speed increeases.

B. iwavelength increaases but speed decreaases.

C. wavelength and speed increases

D. wavelength and speed decrease.

Answer: D

Watch Video Solution

8. Which one of the following phenomena is not explained by Huygens construction of wavefront?

A. Refraction

B. Reflection

C. Diffraction

D. Origin of spectra

Answer: D

Watch Video Solution

9. In Huygen's wave theory, the locus of all points in the same state of vibration is called :

A. a half period zone

B. oscillator

C. a wavefront

D. a ray

Answer: C

 Watch Video Solution

10. Wavefront is the locus of all points, where the particles of the medium vibrate with the same

A. phase

B. Amplitude

C. frequency

D. period

Answer: A

 Watch Video Solution

11. When a ray of light is incident normally on a surface, then

A. total internal reflection takes place

B. it passes undeviated.

C. it undergoes dispersion

D. it gets absorbed by the surface

Answer: B

Watch Video Solution

12. Rays diverging from a point source from a ..... wavefront.

A. Cylindrical

B. Spherical

C. Plane

D. Cubical

Answer: B

Watch Video Solution

13. For the same angle of incidence the angles fo refreaction in media P,Q ,R and S are

$50^\circ, 40^\circ, 30^\circ, 20^\circ$ respectively the speed of lights is minimum in medium

A. P

B. Q

C. R

D. S

Answer: D

Watch Video Solution

14. A ray of light is incident on the surface of seperation of a medium at an angle 45° and is refracted in the medium at an angle 30°. What will be the velocity of light in the medium?

A. 1.96×10^8m/s

B. 2.12×10^8 m/s

C. 3.18×10^8m/s

D. 3.33×10^8 m/s

Answer: B

Watch Video Solution

15. A light is travelling from air a medium the velocity of light in a medium is reduced to to 0.75 times the velocity n air assume that angle of incidence I is very small the deviation of the ray is

A. i

B. $\frac{i}{3}$

C. $\frac{i}{4}$

D. $\frac{3i}{4}$

Answer: C

Watch Video Solution

16. A ray of light travelling through rarer medium is incident at very small angle i on a glass slab and after refraction its velocity is reduced by 20%. The angle of deviation

A. $\frac{i}{8}$

B. $\frac{i}{5}$

C. $\frac{i}{2}$

D. $\frac{4i}{5}$

Answer: B

Watch Video Solution

17. The refractive indices of water and galss w.r.t. air are 1.3 and 1.5 respectively. What will be the refractive index of galss with respect to water ?

A. $\frac{1.5}{1.3}$

B. $\frac{1.3}{1.5}$

C. $\frac{1.5}{2.6}$

D. $\frac{2.6}{1.5}$

Answer: A

Watch Video Solution

18. A ray of light is icident on a glass plate of refractive index 1.5. The angle between the reflected and refracted rays is 90°. What is the

ratio of wavelengtth of reflected t refracted rays ?

A. 2.1

B. 1.5

C. 1.6

D. none of these

Answer: B

Watch Video Solution

19. A wave of light having frequency 4×10^{14} Hz. And speed of light 3×10^{8} m/s enters glass of R.I. 1.5. Change in wavelength is

A. $2.5x10^{-7}$ m

B. $2.5 \times 10^{-6}m$

C. $2.5 \times 10^{-8}m$

D. 2.5×10^{-9}

Answer: A

Watch Video Solution

20. The change in wavelenght of light of frequency 4×10^{14}Hz. When it pass from air to glass, is $\left(\mu_{\text{glass}} = 1.5\right)$

A. 2500 Å

B. 3500 Å

C. 3000 Å

D. 2000 Å

Answer: A

Watch Video Solution

21. The wavelenth of light is 5000 Å . Find the wave number.

A. 5×10^6

B. 2×10^6

C. 3×10^6

D. 1×10^6

Answer: B

Watch Video Solution

22. If the wavelength of light is 4000Å, then the number of waves in $1mm$ length will be

A. 25

B. 2500

C. 250

D. 25000

Answer: B

Watch Video Solution

23. For a radiation of 8 GHz passing though air. The number of waves passing through I m length is

A. 30

B. 5

C. 20

D. 3

Answer: A

Watch Video Solution

24. A light wave in air enters a medium of refractive index $\frac{4}{3}$. If the wavelength of light in air is 6000Å, then the wave number of light in the medium is

A. 1.1×10^6

B. 4.4×10^6

C. 2.2×10^6

D. 6×10^6

Answer: C

Watch Video Solution

25. A light passes through glass slabv of refractive index 1.5 and thickness 2 mm. How much time ray will take to pass through the glass slab ?

A. $10^{-16}s$

B. $10^{-11}s$

C. $10^{-16}s$

D. $10^{-10}s$

Answer: B

Watch Video Solution

26. Light passess through glass of refractive index 1.5 . What is the time required for light to travel 4×10^8 m in glass ?

A. $4s$

B. $\frac{1}{4}s$

C. $\frac{1}{2}s$

D. $2s$

Answer: D

 Watch Video Solution

27. The ratio of velocities of light in glass that in whater is (refractive inde of glaass = 1.5 and refractive index of water = 1. 33)

A. 0.8803 : I

B. 0.8989 : I

C. 0.8867 : I

D. 0.8504 : I

Answer: C

Watch Video Solution

28. Time taken by the light ot travel through 5 cm orf glass is same is 1.5, then x cm of air. Irf R.I. of glass is 1.5, then x is

A. 7.5 cm

B. 1.33 cm

C. 9 cm

D. 6 cm

Answer: A

 Watch Video Solution

29. A ray of light is incident normally on a glass slab of thickness 5 cm and refractive index 1.6. The time taken to travel by a ray from source to surface of slab is same as to travel through glass slab. The distance of source from the surface is

A. 4 cm

B. 8 cm

C. 12 c m

D. 16 cm

Answer: B

Watch Video Solution

30. A paralel beam of monochromatic light is incident on a glass slab at an angle of incidentce 45°. Find the ratio of width of

beam in glass to that in air (If refractive index of glass is 1.5).

A. $\frac{1}{1.2475}$

B. $\frac{1}{1.4134}$

C. $\frac{1}{1.732}$

D. 1

Answer: A

Watch Video Solution

31. Light travels through a glass plate of thickness t and refractive index μ. If c is the speed of light in vacuum, the time taken by light to travel this thickness of glass is

A. $t\mu c$

B. $\frac{tc}{\mu}$

C. $\frac{t}{\mu c}$

D. $\frac{t\mu}{c}$

Answer: D

Watch Video Solution

Watch Video Solution

32. The time taken by the sunlight to reach the bottom of a tank of depth 4.5 m filled completely with water is ..... Ns. The refractive index of water is $\frac{4}{3}$.

A. 2

B. 20

C. 1.5

D. 200

Answer: B

 Watch Video Solution

33. When the same monochromatic ray of light travels through glass slab and through water, the number of waves in glass slab of thickness 6 cm is same as in water column of height 7 cm. If refractive index of glass is 1.5, then refractive index of water is

A. 1.258

B. 1.269

C. 1.286

D. 1.31

Answer: C

Watch Video Solution

34. V_0 and V_E represent the velocities, m0 and mE the refractive indices of ordinary and extraordinary rays for a doubly refracting crystal. Then

A. $V_o \geq V_E, \mu_o \leq \mu_E$ if the crystal is calcite.

B. $V_0 \leq V_E, \mu_0 \leq \mu_E$ if the crystal is quartz.

C. $V_0 \leq V_E, \mu_0 \geq \mu_E$ if the crystal is calcite.

D. $v_0 \geq V_E, \mu_0 \geq \mu_E$ if the crystal is quartz.

Answer: C

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35. Through which character we can distiguish the light waves from sound waves

A. Interferrnce

B. Refracftion

C. Polarisation

D. Reflection

Answer: C

Watch Video Solution

36. Which of the following cannot be polarised?

A. Radio waves

B. Ultraviolet rays

C. Infrared rays

D. Unltrasonic waves

Answer: D

Watch Video Solution

37. In the propagation of electromagnetic waves the angle between the direction of propagation and plane of polarisation is

A. 0°

B. 45°

C. 90°

D. 180°

Answer: A

Watch Video Solution

38. When a plane polarised light is passed through an analyser and analyser is rotated through 90°, the intensity of the emerging light

A. varies between a maximum and minimum

B. becomes zero

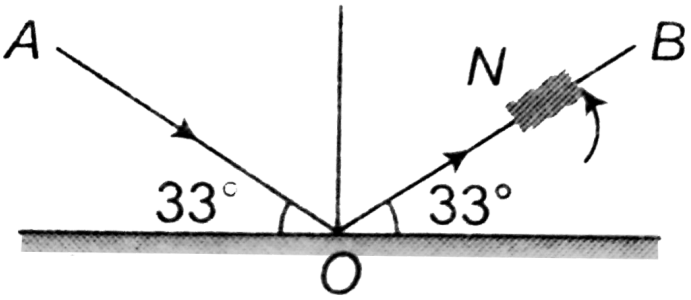
C. does not vary

D. varies between a maximum and zero

Answer: D

Watch Video Solution

39. A beam of light AO is incident on a glass slab $(\mu = 1.54)$ in a direction as shown in figure. The reflected ray OB is passed throught a Nicol prism. On viewinf through a Nicole prism, we find rotating the prism that $\left(\tan^{-1} 1.54 = 57^\circ\right)$



A. the intensity si reduced down to zero and remains zero

B. the intensity raduces down some what and aganin.

C. There is not change in intensity.

D. The intensity gradually reduces to zero and then again increases.

Answer: D

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40. An optically active compound

A. rotates the plane polarised light

B. changes the direction of polarised light

C. does not allow plane polarised ligth to pass thorugh

D. none of the above

Answer: A

Watch Video Solution

41. From Brewster's law, except for polished metallic surfaces, the polarising angle

A. depens on wavelength and is different for different colours

B. independent of wavelength and different colours.

C. independent of wavelength and is same for different colours colours

D. depends on wavelength and is same for defferent colours

Answer: A

Watch Video Solution

42. Unpolarised light is incident from air on a plane surface of a material of refractive index μ. At a particular angle of incidence i, it is found that the reflected and refracted rays are perpendicular to each other. Which of the following options is correct for this situation?

A. Reflected light is polarised with its electric vector parallel to theplane of incidence

B. Reflected light is polarised with its eletric vector perpendicular to the plane of incidence

C. $I = \sin^{-1}\left(\frac{1}{\mu}\right)$

D. $I = \tan^{-1}\left(\frac{1}{\mu}\right)$

Answer: B

Watch Video Solution

43. The deviation produced when light wave is incident on a denser medium with an sngle of incidence equal to polarising angle is 24°. The angle of incidence is

A. 24°

B. 33°

C. 57°

D. 81°

Answer: C

Watch Video Solution

44. The polarising angle of glass is 57° . A ray of light which is incident at this light which is incident at this angle will have an angle of refraction as

A. 43°

B. 25°

C. 38°

D. 33°

Answer: D

Watch Video Solution

45. The Brwster angle of the glass-air interface is 54.74°. If a ray of light going from air to glass strikes at an angle of incidence 45°, then the angle of refraction is

A. 60°

B. 30°

C. 25°

D. 54.74°

Answer: B

Watch Video Solution

46. A ray of lighyt is incident at an angle I on a glass slab of refractive index μ. The angle between reflected and refracted light is 90° Then the relationship between I and μ is

A. $i = \tan^{-1}\left(\frac{1}{\mu}\right)$

B. $\tan I = \mu$

C. $\sin I = \mu$

D. $\cos I = \mu$

Answer: B

Watch Video Solution

47. The polarising angle the transparent medium is $'\theta'$ and 'v' is the speed of light in that medium. Then the relation between $'\theta'$

and 'v' is

(c = velocity of light in air)

A. $\theta = \tan^{-1}\left(\frac{v}{c}\right)$

B. $\theta = \cot^{-1}\left(\frac{v}{c}\right)$

C. $\theta = \sin^{-1}\left(\frac{v}{c}\right)$

D. $\theta = \cos^{-1}\left(\frac{v}{c}\right)$

Answer: B

Watch Video Solution

48. Light is incident at an angle i on a glass slab. The reflected ray is completely polarished . The angle of refraction is

A. $90 - i$

B. $180 - i$

C. $90 - i$

D. i

Answer: A

Watch Video Solution

49. The angle of incidence at which reflected light is totally polarized for reflection form air to glass (refraction index μ) is

A. $\sin^{-1}(\mu)$

B. $\sin^{-1}\left(\frac{1}{\mu}\right)$

C. $\tan^{-1}\left(\frac{1}{\mu}\right)$

D. $\tan^{-1}(\mu)$

Answer: D

Watch Video Solution

50. The ralation between the polarising angle and the critical angle is

A. $i_p = \tan^{-1}(\text{cosec}\theta_c)$

B. $i_p = \tan^{-1}(\text{cosec}\,\sin_c)$

C. $i_p = \cot^{-1}(\sin\theta_c)$

D. $i_p = \cot^{-1}(\text{cosec}\theta_c)$

Answer: A

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51. The angle of polarisation for any medium is 60°. What will be critical angle for this?

A. $\sin^{-1}\sqrt{3}$

B. $\tan^{-1}\sqrt{3}$

C. $\cot^{-1}\sqrt{3}$

D. $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

Answer: D

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52. A ray of light travelling in impure water is incident on a glass plate immersed in it. When the angle of incidence is 51° , the refractive index of impure water is 1.4. The refravtive idex galss shold be..... $(\tan 51^\circ = 1.235)$

A. 1.64

B. 1.34

C. 1.53

D. 1.73

Answer: D

Watch Video Solution

53. If the shift of wavelength of light emitted by a star is towards violet, then this shows that star is

A. stationary

B. moving towards earth.

C. moving away from earth

D. informatino is incomplete.

Answer: B

Watch Video Solution

54. A star is moving away form the earth with a velocvity of 100 km/s. then the shift of its spectral line of wavelength 5700 Å due to Doppler effect will be

A. 0.63 Å

B. 1.90 Å

C. 3.80 Å

D. 5.70 Å

Answer: B

Watch Video Solution

55. The velocity of a moving galaxy is 300 km s^{-1} and the apparent change in wavelengtth of a spectral line emitted form the glalxy is observed as 0.5 nm. Then, the actual wavelength of the spectral line is

A. 3000 Å

B. 5000Å

C. 6000 Å

D. 4500 Å

Answer: B

 Watch Video Solution

56. The 6563 Å line emitted by hydrogen atom in a star is found to be red shifted by 5 Å. The speed with which the star is receding form the earth is

A. $17.29 \times 10^9 m/s$

B. $4.29 \times 10^7 m/s$

C. $3.39 \times 10^5 m/s$

D. $2.29 \times 10^5 m/s$

Answer: D

Watch Video Solution

57. An observer is moving with half the speed of light towards a stationary microwave source emitting waves at frequency 10 GHz.

What by theobserver ? (Speed of light $= 3 \times 10^8 ms^{-1}$)

A. 17.3 GHz

B. 15.3 GHz

C. 10.1 GHz

D. 12.1 GHz

Answer: A

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58. On a hot summer night, the refractive index of air is smallest near the ground and increases with height from the ground. When a light beam is directed horizontally, the Huygens` principal leads us to conclude that as it travels, the light beam:

A. becomes narrower.

B. goes horizontally without any deflection.

C. bends upwards.

D.

Answer: D

Watch Video Solution

59. A light has amplitude A and angle between analyser and polariser is 60°. Light is reflected by analyser has amplitude

A. $A\sqrt{2}$

B. $A/\sqrt{2}$

C. $\sqrt{3}A/2$

D. $A/2$

Answer: D

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60. The refractive index of glass w.t.r. a medium is $\frac{4}{3}$. If $v_m - m_E = 6.25 \times 10^7$m/s. then the velocity oflight in the medim will be

A. $2.15 \times 10^8 m/s$

B. $2.5 \times \times 10^8 m/s$

C. $2.25 \times 10^8 m/s$

D. $1.5 \times 10^8 m/s$

Answer: B

Watch Video Solution

61. Light enters from air into a medium of R.I. 1.5. What is the percentage change in its wavelength?

A. 0.6666

B. 0.5

C. 0.3333

D. 0.25

Answer: C

Watch Video Solution

62. The angle of incedence is fornd to be twice the angle of reraction when a ray of light passes form vacum into a medium of R.I. μ. The angle of incidece will be

A. $\cos^{-1}(\mu/2)$

B. $2\cos^{-1}(\mu/2)$

C. $\sin^{-1}(\mu/2)$

D. $2\sin^{-1}(\mu/2)$

Answer: B

Watch Video Solution

63. How fast a person should drive his car so that the red signal fo light apperas green ? (Wavelength for red colour = 6200 Å and wavelength for green colour = 5400 Å)

A. $1.5 \times 10^8 m/s$

B. $7 \times 10^7 m/s$

C. $3.9 \times 10^7 m/s$

D. $2 \times 10^8 m/s$

Answer: C

Watch Video Solution

Evaluation Test

1. λ_a and λ_m are the wavelengths of light in air and medium respectively. If i_p is the polarising

angle, the correct relation between λ_a, λ_m and i_p is

A. $\lambda_a = \lambda_m \tan^2 i_p$

B. $\lambda_m = \lambda_a \tan^2 i_p$

C. $\lambda_m = \lambda_a \tan i_p$

D. $\lambda_a = \lambda_m \tan i_p$

Answer: D

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2. A clear sheet of polaroid is placed on top of a similar sheet so that axews make an angle of $\sin^{-1}\left(\frac{4}{5}\right)$ with each other. The ratio of intensity of the emergent light to that of polarised light is

A. $16:25$

B. $9:25$

C. $4:5$

D. $8:25$

Answer: B

Watch Video Solution

3. Unpolarised light of internsity $32Wm^{-2}$ passes through three polarisers such that the transmission axis of the last polariser is crossed with the first. If the intensity of emerging light is $2Wm^{-2}$, the angle between the transmission axes o the first two polarisers is

A. 22.5°

B. 32.5°

C. 42.5°

D. 62.5°

Answer: A

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4. With what speed should a glaxy move with respect to us so that a certain line at 674 nm is observed at 674.4 nm ?

A. 342 kms^{-1}

B. 471 kms^{-1}

C. 532 kms^{-1}

D. 178 kms^{-1}

Answer: D

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5. A beam of unpolarised light having flux 10^{-2} watt falls normally on a polariser of cross sectional area $3 \times 10^{-4} m^2$. The polariser rotates with an angular frequency of

π rad/s. The energy of liggt passing through the polariser per revolution will be

A. 10^{-4} joule

B. 10^{-3} joule

C. 10^{-2} joule

D. 10^{-1} joule

Answer: C

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6. Assertion : If light is polarised by reflection, then the angle between reflected and refracted ray is 180°.

Reason : Brewester's law : $\mu = \tan i_p$.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: D

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7. The speactral line emitted by a star, has a wavelength of 6800 Å when observed form a Speed of star in the line of light relative to earth for receding or approach is given by

A. $2.42 \times 10^5 ms^{-1}$ receding

B. $4.64 \times 10^6 ms^{-1}$ receding

C. $6.86 \times 10^6 ms^{-1}$ receding

D. $8.70 \times 10^5 ms^{-1}$ receding

Answer: D

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8. A cylindrical wavefront spreads form a line source which is comparable to a long and narrow slit. The wavefront is at a distance d form source then th amplitude of wave is proportional to

A. $\frac{1}{d}$

B. $\frac{1}{d^2}$

C. $\frac{1}{d^3}$

D. $\frac{1}{d^{1/2}}$

Answer: D

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9. A lens of focal length f gives diffraction pattern of Fraunhoffer type of a slit having width a. If wavelength of light is λ, the

distance of first dark band and next bright band from axis is given by

A. $\frac{a}{\lambda} f$

B. $\frac{\lambda}{a} f$

C. $\frac{\lambda}{af}$

D. $a\lambda f$

Answer: B

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10. A parallel beam of monochromatic light is incident on a glass slab at an angle of 35°. The ratio of width of beam in glass to that in air is [$\mu_g = 1.5$]

A. 1.07

B. 1.13

C. 3.21

D. 4.28

Answer: B

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11. For passage of monochromatic beam of light in a medium of refractive index 1.5, the plane wavefront makes an andlge of 60° with the refracting surface. The width of beam in medium to that in air is

A. $1:2$

B. $1:1$

C. $1:5$

D. $2:0$

Answer: B

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12. Velocity of light in deamond is $\left(\frac{2}{5}\right)^{th}$ that in air. Velocity of light in water is $\left(\frac{3}{4}\right)^{th}$ that in air. The angle of incidence of a ray of light travelling form water to diamond ($r = 30^\circ$) is

A. $\sin^{-1}\left(\frac{15}{16}\right)$

B. $\sin^{-1}\left(\frac{3}{4}\right)$

C. $\sin^{-1}\left(\frac{2}{5}\right)$

D. $\sin^{-1}\left(\frac{9}{5}\right)$

Answer: A

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13. For navigatio purpose, in polar regions

A. magnetic compass is used.

B. electric compass in used

C. wind direction used

D. the polarisation of sunlight by scattering is used.

Answer: D

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14. When a plane wavefront is incident on a double convex lens, the refracted wavefront is

A. a plane wavefront

B. a cylinderical wavefron

C. a spherical wavefront which is diverging.

D. a spherical wavefront wavefront which is converging.

Answer: D

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15. As a spherical wavefront propagates, the amplitude (a) of a spherical wavefront varies with the distance r of the source

A. inversely as $\sqrt{r}$ i.r., a $\propto \frac{1}{\sqrt{r}}$

B. inversely as r i.r., a $\propto \frac{1}{r}$

C. directly as r i.r., $a \propto r$

D. directly as $\sqrt{r}$ i.e., $\propto \sqrt{r}$

Answer: B

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16. Assertion: Speed of light in glass is indep[endent of the colour of light.

Reason : the violet colour travels faster than the red light in a glass prism.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: D

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17. Assertion : Stars are often photographed with the help of telescope fitted with a blue filter.

Reason : Blue filter transmits blue light. Which has shorter wavelength. Therefor, resolving power of telescope increases.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: A

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18. Assertion : If θ is the angle between the planes of transmission of two analysers then the intensity of emergent light is proportional

to $\cos^{\circ}\theta$.

Reason : In the propagation of electromagnetic waves, the angle between the direction of propogation and plane of polarisation is $\frac{\pi}{2}$.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion

C. Assertion is True, Reasonis False

D. Assertion is False, Reason is True

Answer: C

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19. Ordinary light incident on a glass slab at the polarising angle suffers a deviation of 34° . The velue of the angle of refraction in glass in this case is

A. 28°

B. 42°

C. 56°

D. 68°

Answer: A

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20. A mixture of plane polarised and unpolarised light falls normally on a polarising sheet. On rotating the polarising sheet about ther direction of the incident beam, the transmitted intensity varies by a factor of 3. The ratio of intensities I_p and I_p of the

polarised and unpolarised components in the incident beam is

A. $1:1$

B. $1:2$

C. $2:3$

D. $3:4$

Answer: A

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