PHYSICS

BOOKS - NIKITA PHYSICS (HINGLISH)

WAVE THEORY OF LIGHT

Multiple Choice Questions

1. Corpuscular theory of light was proposed by

A. Newton

B. Huygen

C. Maxwell

D. Planck

Answer: A

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2. Newton's corpuscular theory of light was introduced in

A. 1675

B. 1678

C. 1875

D. 1900

Answer: A

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3. Newton postulated his corpuscular theory on the basis of

A. Newton's rings

B. rectilinear propagation of light

C. colour through thin films

D. dispersion of white light into colours.

Answer: B

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4. According to Newton's corpuscular theory of light, light is propagated in the form of

A. corpuscles

B. waves

C. photons

D. electrons

Answer: A

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5. According to Newton's theory of light the rectilinear propagation of light is due to

A. different masses of the corpuscles

B. invisible property of corpuscles

C. weightless property of corpuscles

D. high speed of corpuscles

Answer: D

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6. Light appears to travel in straight lines since

A. it consists of small particles

B. the velocity of light is very large

C. wavelength of light is very small

D. light is reflected by surroundings

Answer: B

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7. Application of Newton's theory to refraction concludes that, velocity of light in air medium is

A. equal to velocity of light in denser

B. less than velocity of light in denser

C. greater than velocity of light in denser

D. cannot predicated

Answer: B

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

A. interference of light

B. diffraction of light

C. polarisation of light

D. all of these

Answer: D

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9. The different sizes and masses of the corpuscles is responsible for

A. colour of light

B. frequency of light

C. velocity of light

D. intensity of light

Answer: A

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10. Newton's corpuscular theory of light successfully explains the phenomenon of

A. reflection and refraction of light

B. reactilinear propagation of light

C. partial reflection and partial refraction from transparent surfaces

D. all of these

Answer: B

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11. The direction of motion of the corpuscles is unaffected by the force of gravity due to

A. high speeds of corpuscles

B. negligible mass of corpuscles

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: C

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12. To explain nature of light, Huygen proposed

A. Corpuscular theory of light

B. wave theory of light

C. classical theory of light

D. quantum theory of light

Answer: B

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13. Wave theory of light was proposed by Huygen in

A. 1675

B. 1678

C. 1900

D. 1987

Answer: B

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14. According to Huygen light is propagated in the form of

A. corpuscles

B. waves

C. photons

D. electrons

Answer: B

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15. According to wave theory, different colours of light is due to

A. different wavelengths of light waves

B. different frequencies of light waves

C. different amplitudes of light waves

D. none of these

Answer: A

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16. To explain propagation of light concept of luminiferous ether was introduced by

A. Newton

B. Huygen

C. Maxwell

D. Planck

Answer: B

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17. According to Huygen, undetectability of ether is due to

A. zero density

B. perfect transparency

C. perfect elasticity

D. all of these

Answer: D

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18. Huygens wave theory is used

A. to determine the velocity of light

B. to find the position of a wavefront

C. to determine the wavelength of light

D. to find the focal length of a lens

Answer: B

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19. Light has the following wave property

A. transverse

B. sometimes transverse, sometimes longitudinal

C. neither transverse nor longitudinal

D. longitudinal

Answer: A

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20. Light waves are transverse in nature. This is indicated by

A. polarisation of light

B. interference of light

C. disperson of light

D. photoelectric effect

Answer: A

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21. Which of the following does not support the wave nature of light ?

A. Interference

B. Diffraction

C. Polarisation

D. photoelectric effect

Answer: D

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

A. diffraction

B. interference

C. polarisation

D. photoelectric effect

Answer: D

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23. Wave theory of light only can explain

A. photoelectric effect

B. diffraction

C. compton effect

D. black body radiation

Answer: B

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24. According to wave theory of light, velocity of light in rarer medium is

A. equal to velocity of light in denser

B. less than velocity of light in denser

C. greater than velocity of light in denser

D. cannot predicated

Answer: C

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25. Huygen's wave theory of light could not explain

A. reflection

B. refraction

C. diffraction

D. none of these

Answer: D

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26. Propagation of light is correctly described in the form of

A. longitudinal waves

B. electromagnetic waves

C. transverse electromagnetic waves

D. stationary waves

Answer: C

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27. Rectilinear propagation of light cannot be explained on the basis of

A. Corpuscular theory of light

B. wave theory of light

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: B

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28. In vacuum the speed of light depends upon

A. wavelengths

B. frequency

C. amplitude

D. none of these

Answer: D

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29. Quantum nature of light is not supported by the phenomenon of

A. compton effect

B. photoelectric effect

C. emission and absroption of light

D. interference of light

Answer: D

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30. Which of the following phenomenon can be explained by quantum theory to explain wave nature of light?

A. photoelectric effect

B. diffraction

C. compton effect

D. black body radiation

Answer: B

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31. The locus of all points of the medium having the same phase for particles of light is called

A. wavelengths

B. wavefront

C. amplitude

D. displacement

Answer: B

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32. The wavefront originating from the point source of light at finite distance is

A. spherical wavefront

B. plane wavefront

C. cylindrical wavefront

D. circular wavefront

Answer: A

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33. Which of the following produces a plane wavefront ?

A. Point source

B. Line source

C. Extended source

D. None of these

Answer: D

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34. As source of light is at the focus of convex lens. The outcoming light through the lens will be in the form of

A. spherical wavefront

B. plane wavefront

C. cylindrical wavefront

D. all of these

Answer: B

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35. 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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36. The wavefront originating from extended source of light is

A. spherical wavefront

B. plane wavefront

C. cylindrical wavefront

D. all of these

Answer: C

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

A. with same frequency

B. in same phase

C. with same phase

D. can not be predicted

Answer: B

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38. As a plane wavefront propagates, its radius of curvature

A. decreases

B. increases

C. first increases and then decreases

D. remains infinity

Answer: D

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39. A plane wavefront is propagating in a medium. Which of the following is true?

A. It propagates parallel to itself

B. It can not propagate in the medium

C. It changes to spherical wavefront

D. It changes to cyclindrical wavefront

Answer: A

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40. Light from distant star will be reaching on earth's surface in the form of

A. spherical wavefront

B. plane wavefront

C. cylindrical wavefront

D. all of these

Answer: B

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41. A perpendicular drawn to the wavefront in the direction of propagation of light is

A. wave normal

B. ray of light

C. arc of circle

D. chord of circle

Answer: A

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42. The direction of wave normal along which light travels is

A. ray of light

B. reflection of light

C. refraction of light

D. interference of light

Answer: A

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43. The rays of light corresponding to spherical wavefront are

A. converging in nature

B. diverging in nature

C. parallel in nature

D. coaxial

Answer: A,B

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44. The rays of light which are parallel in nature will form

A. spherical wavefront

B. plane wavefront

C. cylindrical wavefront

D. circular wavefront

Answer: B

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45. Wavefronts will always moves

A. perpendicular to wave normal

B. parallel to each other

C. perpendicular to each other

D. both 'a' and 'b'

Answer: D

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46. A wavefront and a ray of light are

A. perpendicular to each other

B. parallel to each other

C. convergent towards each other

D. divergent from each other

Answer: A

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47. Which of the following is a correct statement ? The ray of light

A. is tangential to the wavefront

B. is always normal to the wavefront

C. does not exist in the Huygen's principle

D. may be tangential or normal to the wavefront

Answer: B

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48. 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

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49. Huygen's principle of secondary waves

A. allows us to find focal length of lens

B. gives us the magnifying power of lens

C. is a geometrical method to find the position of a wavefront

D. is used to determine velocity of light

Answer: C

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50. Huygen's principle is used to

A. obtain the new position of wavefront geometrically

B. explain principle of superposition of waves

C. explain interference of light

D. explain polarisation of light

Answer: A

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51. In 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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52. Huygen's principle states that

A. wave is transverse wave

B. each point of the wavefront is in different phase

C. each point of the wavefront acts as secondary source

D. all of these

Answer: C

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53. Which of the following method is used to determine the position of given wavefront after some instant of time ?

A. Rayleigh's criterion

B. Huygen's principle

C. Huygen's construction

D. Newton's construction

Answer: C

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54. Each and every point of the wavefront acts as

A. primary source of light

B. secondary source of light

C. centre of light

D. ray of light

Answer: B

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55. According to Huygen's construction which of the following wavefront does not exists?

A. forward wavefront

B. backward wavefront

C. cylindrical wavefront

D. can not be predicted

Answer: B

56. According to Huygen's construction , tangential envelope which touches all the secondary spheres is the position of

A. original wavefront

B. secondary wavefront

C. geometrical wavefront

D. extended wavefront

Answer: B

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57. Huygen's construction is used to determine the position of new

A. spherical wavefront

B. plane wavefront

C. cylindrical wavefront

D. all of these

Answer: D

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58. According to Huygen's construction, each point of secondary wavefront will emit the light waves of

A. increases velocity

B. decreased velocity

C. same velocity

D. can not be predicted

Answer: C

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59. The phenomenon of bouncing back of the light energy from the surface of the mirror is

A. reflection

B. refraction

C. diffraction

D. interference

Answer: A

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60. The angle made by incident ray of light with the reflecting surface is called

A. angle of incidence

B. angle of reflection

C. angle of refraction

D. glancing angle

Answer: D

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61. The angle made by incident ray of light with the reflecting surface is called

A. angle of incidence

B. angle of reflection

C. angle of refraction

D. angle of emergence

Answer: A

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62. The angle between reflected ray and normal to the reflecting surface is

A. angle of deviation

B. angle of incidence

C. angle of refraction

D. angle of reflection

Answer: D

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63. The angle between of the original direction of incident ray and reflected ray is

A. angle of deviation due to reflection

B. angle of emergence

C. angle of reflection

D. angle of refraction

Answer: A

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64. The angle of incidence is equal to angle of reflection is the statement of law of

A. reflection

B. refraction

C. gravitation

D. length

Answer: A

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65. Which of the following statement is true in case of reflection of light ?

A. Angle of incidence = Angle of reflection

B. Incident ray, reflected ray and normal lie in same plane

C. Incident ray and reflected ray lie on opposite side of normal

D. All of these

Answer: C

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66. When the light is reflected from the surface of the mirror, its speed and wavelength will

A. increases

B. decreases

C. remains same

D. may increase or may decrease

Answer: D

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67. The incident ray, the reflected ray and normal to the reflecting surface lie in same plane. This statement is

A. first law of reflection

B. second law of reflection

C. third law of reflection

D. none of these

Answer: B

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68. The phase difference between incident ray and reflected ray of light is

A. 90°

B. 120°

C. 150°

D. 180°

Answer: D

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69. We can see object due to

A. reflection of light from it

B. refraction of light through it

C. diffraction

D. interference of light

Answer: A

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70. The wavefronts of light coming from a distant source of unknown shape are nearly

A. spherical

B. plane

C. cylindrical

D. elliptical

Answer: B

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71. The nature of visible light waves is similar to

A. gamma rays

B. cathode rays

C. β-rays

D. alpha rays

Answer: A

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72. Maxwell's electromagnetic theory of light suggests that light consists of oscillations of

A. magnetic vector alone

B. electric vector alone

C. electric and magnetic vectors perpendicular to each other

D. electric and magnetic vectors parallel to each other

Answer: C

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73. A plane mirrorr is approaching you at a speed of $10cm\,/\,\mathrm{sec}$.You can see your image in it. At what speed will your image approach you

A. 10 cm/sec

B. 5 cm/sec

C. 20 cm/sec

D. 15 cm/sec

Answer: C

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74. A man is 180 cm tall and his eyes are 10 cm below the top of his head. In order to see his entire height right from tow to head, he uses a plane mirror kept at a distance of 1 m from him. The minimum height of the plane mirror required is

A. 180 cm

B. 90 cm

C. 85 cm

D. 170 cm

Answer: B

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75. A ray of light is incident on a plane mirror at an angle of incidence of 30°. The deviation produced by the mirror is

A. 30°

B. 60°

C. 90°

D. 120°

Answer: D

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76. A ray of light is incident normally on a plane mirrorr. The angle of reflection will be

A. 0°

B. 90°

C. will not be reflected

D. none of these

Answer: A

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77. The nature of visible light waves is similar to

A. alpha rays

B. β-rays

C. X-rays

D. cathode rays

Answer: C

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78. For a certain light, there are 2×10^3 waves in 1.5 mm in air. The wavelength of light is

A. 750 nm

B. 75Å

C. 750Å

D. $75 \times 10^{7} m$

Answer: A

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79. Which of the following is an ascending order of frequency ?

A. Red, green, yellow, blue

B. Blue, green, yellow, red

C. Red, yellow, green, blue

D. Red, green, blue, yellow

Answer: C

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80. The wavelength of light visible to eye is of the order of

A. 10^{-2}m

B. $10^{-10}m$

C. 1m

D. $6 \times 10^{-7} m$

Answer: D

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81. Blue colour of water in sea is due to

A. reflection of light and scattering of light from water particles

B. bottom of sea is blue

C. large depth of sea water

D. sea water is saltish

Answer: A

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82. Our eye is most sensitive for which of following wavelength

A. 4500 Å

B. 5500 Å

C. 6500 Å

D. equally sensitive for all wavelengths of visible spectrum

Answer: B

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83. Signals of danger are made red, because

A. our eye is most sensitive for red colour

B. scattering is minimum for red colour

C. scattering is maximum for red colour

D. red colour is internationally accepted colour for danger

Answer: B

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84. The reason for shining of air bubble in water is

A. total internal reflection

B. diffraction

C. disperson of light

D. interference

Answer: A

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85. At noon, the overhead sun is of normal size. It is due to

A. reflection of light

B. interference of light

C. polarisation of light

D. normal incidence of light through atmosphere for which angle of refraction is zero

Answer: D

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86. What will be the colour of sky as seen from the earth, if there were no atmosphere

A. Black

B. Blue

C. Organe

D. Red

Answer: A

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87. When mirror is rotated through an angle θ, a reflected ray from it moves through an angle of

A. 0°

B. θ°

C. $2\theta^\circ$

D. $3\theta^\circ$

Answer: C

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88. Visible radiation has wavelength

A. $\lambda > 8000 \text{Å}$

B. $\lambda = 1$ millimeter

C. $\lambda = 4000 \text{Å}$ to 8000 Å

D. $\lambda < 4000 \text{Å}$

Answer: C

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89. The frequency of visible range spectrum is of the order of

A. $8 \times 10^{10} Hz$

B. $5 \times 10^{14} Hz$

C. $3 \times 10^{16} Hz$

D. $5 \times 10^{3} Hz$

Answer: B

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90. The angle of deviation is the angle between the

A. incident ray and refracted rays

B. incident ray and the normal

C. refracted ray and the normal

D. incident and emergent ray

Answer: D

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91. The laws of reflection of light are valid for

A. plane mirror only

B. concave mirrors only

C. convex mirror only

D. all reflecting surfaces only

Answer: D

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92. During sunrise and sunset, sun appears reddish-orange because

A. the sun is colder at sunrise or at setting times

B. diffraction sends red rays to the earth at these times

C. refraction is responsible for it

D. scattering due to dust particles and air molecules is responsible for it

Answer: D

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93. When a man and plane mirror both move towards each other at the rate of 10 m/s. At what rate the image approach the man ?

A. 10 m/s

B. 20 m/s

C. 30 m/s

D. 40 m/s

Answer: C

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94. The phenomenon of change in path of ray of light when it passes from one medium to another medium is

A. reflection of light

B. refraction of light

C. interference of light

D. diffraction of light

Answer: B

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95. The angle of deviation produced in the direction of light when it is refracted from the refracting surface is

A. $90^\circ - 1$

B. i-r

C. 90 - r

D. $180^\circ - 2i$

Answer: B

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96. The ratio of sine of angle of incidence in one medium to sine of angle of refraction in other medium is

A. refractive index

B. dielectric constant

C. critical angle

D. dispersive power

Answer: A

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97. When a ray of light passes from air medium to denser medium then the refractive index is

A. relative refractive index

B. absolute refractive index

C. disperson

D. none of these

Answer: B

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98. When a ray of light passes from air medium to denser medium then its speed and wavelength

A. decreases

B. increases

C. remains same

D. may increase or may decrease

Answer: A

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99. When a ray of light passes from air medium to denser medium then its speed and wavelength

A. decreases

B. increases

C. remains same

D. may increase or may decrease

Answer: B

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100. When light passes from one medium to other medium then the frequency of light

A. decreases

B. increases

C. remains same

D. may increase or may decrease

Answer: C

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101. If a ray of light goes from a rarer medium to a denser medium, will it bend towards the normal or away from it?

A. away from normal

B. towards normal

C. away from refracting surface

D. none of these

Answer: B

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102. if a ray of light goes from a denser medium to a rarer medium, will it bend towards the normal or away form the normal?

A. away from normal

B. towards normal

C. remains parallel to refracting surface

D. none of these

Answer: A

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103. State the factors on which refractive index of a medium depend ?

A. nature of pair of medium

B. wave length or speed of light

C. temperature or speed of light

D. all of these

Answer: D

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104. Refractive index of a medium is inversely proportional to

A. colour of light

B. speed of light

C. temperature

D. all of these

Answer: D

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105. Refractive index of a medium

A. is dependent of temperature

B. decreases as temperature increases

C. increases as temperature decreases

D. both 'b' and 'c'

Answer: D

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106. In case of refraction of light for normal incidence, there is no deviation because

A. $i = 90^\circ$ then r = 0

B. i = 0 then r = 0

C. i = 0 then r = 90

D. none of these

Answer: B

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107. The ratio of sine of angle of incidence in one medium to sine of angle of refraction in other medium is

A. Ohm's law

B. Snell's law

C. Laplace's law

D. Ampere's law

Answer: B

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108. For which of the following colour, refractive index is maximum ?

A. Red

B. Green

C. Yellow

D. Violet

Answer: D

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109. Light travels through a glass plate of thickness t, having refractive index μ. If c is the velocity of light in vaccum, then the time taken by light to travel this thicness of glass is

A. $x\mu v$

B. xv / μ

C. $x / \mu v$

D. $\mu x / v$

Answer: D

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

A. unity

B. more than unity

C. less than unity

D. equal to 1.5

Answer: A

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111. For which medium is refractive index maximum ?

A. water

B. ice

C. glass

D. diamond

Answer: D

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112. For which of the following colour, refractive index is least ?

A. violet

B. red

C. green

D. organe

Answer: B

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113. The angle of incidence corresponding to which the angle of refraction is a right angle is called as _____

A. critical angle

B. refracting angle

C. angle of deviation

D. all of these

Answer: A

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114. In vacuum the speed of light depends upon

A. wavelength

B. frequency

C. intensity of light

D. none of these

Answer: D

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115. The lateral shift produced due to parallel sided glass slab depends on

A. angle of incidence

B. thickness of the glass slab

C. the refarctive index of the material of the slab

D. all of these

Answer: D

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116. If $._{i}\ \mu_{j}$ represents refractive index when a light ray goes from mefium i to medium j, then the product $._{2}\ \mu_{1} \times ._{3}\ \mu_{2} \times ._{4}\ \mu_{3}$ is equal to

A. $._{3}\ \mu_{1}$

B. $._{3}\ \mu_{2}$

C. $._{4}\ \mu_{1}$

D. $._{4}\ \mu_{2}$

Answer: C

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117. The twinkling of star is due to

A. periodic bursts of light from the star

B. interference between light from the sun and star

C. partial absorption of light in the atmosphere

D. refractive index fluctuation in the atmospheric

Answer: D

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118. Sun is visible a little before the actual sunrise and until a little after a actual sunset. This is due to

A. scattering of light

B. diffraction of light

C. refraction of light

D. dispersion of light

Answer: C

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119. When a rays of light enters a glass slab from water

A. its wavelength increases

B. its frequency increases

C. its wavelength decreases

D. its velocity increases

Answer: C

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120. The shape of sun is oval like when it is at horizon. It is due to

A. more refraction of light rays through atmosphere from lower edge of sun than from its upper edge

B. dispersion of light

C. diffraction of light

D. interference of light

Answer: A

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121. The bottom of vessel filled with transparent liquid appears to be concave when viewed obliquely from above. It is due to

A. more and more raising of marginal portions of the bottom than central part due to refraction of light coming from bottom.

B. total internal reflections

C. variations of water due to temperature

D. none of these

Answer: A

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122. The critical angle depends on the

A. refractive indices of the two media

B. colour of light

C. temperature of light

D. all of these

Answer: D

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123. The critical angle increases with

A. increases in wavelength

B. decreases in refractive index

C. increase in temperature

D. all of these

Answer: D

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124. When a monochromatic light passes from vacuum to a denser medium and vice versa. Which of the following characteristics of the light beam does not change ?

A. Velocity

B. Intensity

C. Wavelength

D. Frequency

Answer: D

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125. The ratio of the refractive index of red light to blue light in air is

A. less than unity

B. equal to unity

C. greater than unity

D. less as well as greater than unity dependings

Answer: B

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126. The refractive index of a certain glass is 1.5 for light whose wavelength in vacuum is 6000 Å. The wavelength of this light when it passes through glass is

A. 4000 Å

B. 6000 Å

C. 9000 Å

D. 15000 Å

Answer: A

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127. Velocity of light in glass whose refractive index with respect to air is 1.5 is $2 \times 10^8 m/s$ and in certain liquid the velocity of light found to be 2.5×10^8 m/s . The refractive index of the liquid with respect to air is

A. 0.64

B. 0.8

C. 1.2

D. 1.44

Answer: C

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128. A light wave has a frequency of $4 \times 10^{14} Hz$ and a wavelength of 5×10^{-7} meters in a medium. The refractive index of the medium is

A. 1.5

B. 1.33

C. 1.0

D. 0.66

Answer: A

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129. The refractive indices of glass and water w.r.t . air are 3/2 and 4/3 respectively. The refractive index of glass w.r.t. water will be

A. $\frac{8}{9}$

B. $\frac{9}{8}$

C. $\frac{7}{6}$

D. 1.5

Answer: B

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130. A beam of monochromatic blue light of wavelength 4200 Å in air travels in water $(\mu = 4/3)$. It's wavelengths in water will be

A. 2800 Å

B. 5600 Å

C. 3150 Å

D. 4000 Å

Answer: C

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131. The refractive index of water is 1.33. What will be the speed of light in water

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

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

C. $3 \times 10^8 m/s$

D. $4 \times 10^8 m/s$

Answer: B

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132. A light wave enters from air into a medium of refractive index 1.5. The speed of light in the medium will be

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

B. $4.5 \times 10^8 m / s$

C. $9 \times 10^8 m / s$

D. $(330 / 1.5) \times 10^8 m / s$

Answer: A

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133. 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. 75°

D. 78°

Answer: B

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134. The refractive index of water is 4 / 3 and that of glass is 5/3. What will be the critical angle for the ray of light entering water from the glass

A. $\sin^{-1}(4/5)$

B. $\sin^{-1}(5/4)$

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

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

Answer: A

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135. A ray of light is incident on a glass slab of refractive index 1.5, making an angle of 40° with the surface. The angle of refraction in glass is

A. 40°

B. $30^{\circ}42'$

C. 50°

D. 60°

Answer: B

Watch Video Solution

136. The wavelength of green light in air and in glass is 5300 Å and 3533 Å. The refractive index of glass is

A. 1

B. 1.5

C. 2

D. 2.4

Answer: B

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137. A ray of light is incident on denser medium making an angle of 40° with the surface. After refraction, it is deviation by 12° from its initial path. The refractive index of denser medium will be

A. 1.6

B. 1.4

C. 1.244

D. 2.4

Answer: C

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138. A glass slab of thickness $4cm$ contains the same number of waves as $5cm$ of water, when both are traversed by the same monochromatic light. If the refractive index of water is $4/3$, then refractive index of glass is

A. 43955

B. 1.5

C. 43954

D. 16/15

Answer: C

Watch Video Solution

139. The wavelength of a monochromatic light in vacuum is 4000 Å. It's wave number in glass of refractive index 1.6 is

A. $1 \times 10^6 m^{-1}$

B. $2 \times 10^6 m^{-1}$

C. $3 \times 10^6 m^{-1}$

D. $4 \times 10^6 m^{-1}$

Answer: D

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140. A light wave has a frequency of $4.8 \times 10^{14} Hz$ in a medium of R.I. 1.5 is

A. $4.8 \times 10^{14} Hz$

B. $9.6 \times 10^{14} Hz$

C. $2.4 \times 10^{14} Hz$

D. $1.2 \times 10^{14} Hz$

Answer: A

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141. The number of wavelengths of electromagnetic radiation of wavelength 6000 Å in a path of 2 cm in vacuum is

A. 3.334×10^4

B. 2×10^4

C. 4×10^4

D. 8×10^4

Answer: A

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

A. 2×10^{-1} sec

B. 2×10^{8} sec

C. 2×10^{-11} sec

D. 2×10^{11} sec

Answer: C

Watch Video Solution

143. Refractive index of glass is $\frac{3}{2}$ and refractive index of water is $\frac{4}{3}$. If the speed of light in glass is 2.00×10^8 m/s, the speed in water will be

A. 1.5×10^8

B. 1.78×10^8

C. 2.25×10^8

D. 2.67×10^8

Answer: C

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144. The refractive index of water, glass and diamond are 1.33, 1.50, 2.40 respectively. The refractive index of diamond relative to water and of glass relative of diamond, respectively are nearly

A. 1.804, 0.605

B. 0.554, 0.625

C. 1.8, 1.6

D. 0.554, 1.6

Answer: A

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145. One cannot cannot see through fog, because

A. fog absorbs light

B. light is scattered by the droplets in fog

C. light suffers total reflection at the droplets in fog

D. the refractive index of fog is infinity

Answer: B

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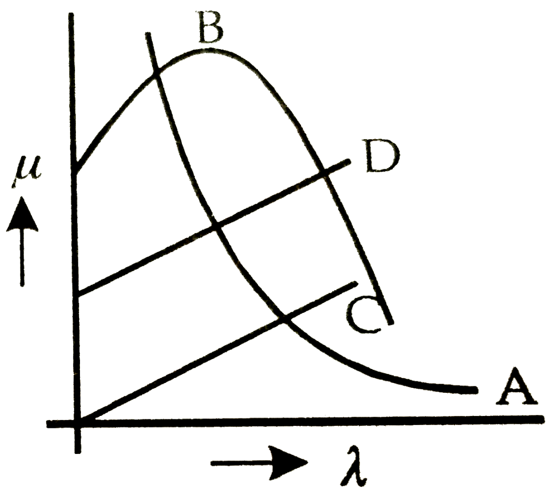
146. The correct curve between refractive index μ and wavelength λ will be



A. A

B. B

C. C

D. D

Answer: A

Watch Video Solution

147. When light suffers reflection at the interface between water and glass, the change of phase in the reflected wave is

A. zero

B. π

C. $\pi / 2$

D. 2π

Answer: B

Watch Video Solution

148. Light appears to travel in straight lines since

A. it is not absorbed by the atmosphere

B. it is reflected by the atmosphere

C. its wavelength is very small

D. its velocity is very large

Answer: C

Watch Video Solution

149. When light travels from an optically rarer medium to an optically denser medium, the velocity decreases because of change in

A. wavelength

B. frequency

C. amplitude

D. phase

Answer: A

Watch Video Solution

150. A ray of light of wavelength λ is incident on mirror at an angle of incidence 60°. The wavelength of light after reflection will be

A. 2λ

B. 3λ

C. $\lambda/2$

D. λ

Answer: D

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

A. Doppler's effect

B. interference

C. diffraction

D. none of these

Answer: A

Watch Video Solution

152. The first successful astronomical determination of speed of light was made by

A. Newton

B. Roemer

C. Galielo

D. Fizeau

Answer: B

Watch Video Solution

153. The first laboratory determination of the speed of light was made by

A. Fizeau

B. Foucault

C. Roemer

D. Michelson

Answer: B

Watch Video Solution

154. Velocity of electromagnetic waves in a medium depends upon

A. thermal properties of medium

B. mechanical and electrical properties of medium

C. electrical and magnetic properties of medium

D. mechanical and magnetic properties of medium

Answer: C

Watch Video Solution

155. A ray is incident at an angle 38° an a mirror. The angle between normal and reflected ray is

A. 38°

B. 52°

C. 90°

D. 76°

Answer: B

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156. Waves that cannot be polarised are

A. longitudinal waves

B. transverse

C. electromagnetic

D. can not be predicted

Answer: A

Watch Video Solution

157. Ordinary light is

A. plane polarised

B. partially polarised

C. circularly polarised

D. unpolarised

Answer: D

Watch Video Solution

158. An unpolarised beam of transverse waves is one whose vibrations

A. are confined to a single plane

B. occur in all directions

C. have not passed through a polarised disc

D. occur in all directions perpendicular to their direction of motion

Answer: D

Watch Video Solution

159. The transverse nature of light is shown by

A. interference of light

B. refraction of light

C. polarisation of light

D. dispersion of light

Answer: C

Watch Video Solution

160. The polarisation of an electromagnetic wave is determined by

A. the electric field only

B. the magnetic field only

C. both the electric and magnetic field

D. the direction of propagation of electromagnetic waves

Answer: B

Watch Video Solution

161. In plane polarised light, plane containing electric vector is called plane of

A. circulation

B. vibration

C. polarisation

D. diffraction

Answer: B

Watch Video Solution

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

A. interference

B. refraction

C. polarisation

D. reflection

Answer: C

Watch Video Solution

163. In which of the following phenomena, colours are not produced, if white light is used ?

A. Dispersion

B. Polarisation

C. Diffraction

D. Interference

Answer: B

Watch Video Solution

164. Light can not be polarised by

A. reflection

B. refraction

C. diffraction

D. scattering

Answer: C

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165. When the analyser is rotated to complete one rotation, one observes

A. one extinction and two brightness

B. one brightness and two extinctions

C. two extinctions and two brightness

D. no change in the brightness

Answer: C

Watch Video Solution

166. A polariser in used to

A. reduce intensity of light

B. increase intensity of light

C. produce polarised light

D. none of these

Answer: C

Watch Video Solution

167. When the polariser and analyser are in the crossed position the intensity of the out coming light is

A. maximum

B. minimum

C. it depends on the type of analyser

D. partially maximum

Answer: B

Watch Video Solution

168. Which of the following can not be polarised ?

A. Radio waves

B. X-rays

C. Ultraviolet rays

D. Ultrasonic waves

Answer: D

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169. Light waves can be polarised as they are

A. have high frequencies

B. have short wavelength

C. are transverse

D. can be reflected

Answer: C

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170. Polarisation of light proves the -

A. corpuscular nature of light

B. quantum nature of light

C. transverse nature of light

D. longitudinal nature of light

Answer: C

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171. Polarisation of light takes place due to many processes. Which of the following will not cause polarisation ?

A. Reflection

B. Double reflection

C. Scattering

D. Diffraction

Answer: D

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172. The phenomenon which does not takes place in sound waves is

A. interference

B. Polarisation

C. diffraction

D. scattering

Answer: B

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173. In the propagation of polarised light waves, the angle between the plane of vibration and the plane of polarization is

A. 0

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

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

D. π

Answer: C

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

A. π

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

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

D. 0

Answer: D

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175. From Brewster's law of polarisation, it follows that the angle of polarisation depends upon

A. the wavelength of light

B. plane of polarisation's orientation

C. plane of vibration's orientation

D. none of the above

Answer: A

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176. 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 polarised with their planes of polarisation parallel to each other

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

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

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

Answer: C

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177. The relation between refractive index of the medium and angle of polarisation is called

A. Brewster's law

B. Malus law

C. Stoke's law

D. Newton's law

Answer: A

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

A. $\mu \sin P = 1$

B. $\mu \cot P = 1$

C. $\mu \tan P = 1$

D. $\mu \cos P = 1$

Answer: B

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179. What do you understand by polarization of light ? What are plane of polarisztion and plane of vibration ?

A. are identical to each other

B. are orthogonal to each light

C. make an angle, which depends on the colour of the light

D. rotate with respect of each other along the path of the beam

Answer: B

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

A. Lambert's law

B. Bragg's law

C. Brewster's law

D. Malus law

Answer: C

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

A. higher refractive index

B. lower refractive index

C. same refractive index

D. none of these

Answer: B

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182. An unpolarised light is incident on a surface separating two transparent media of different optical densities at the polarizing angle. Then the reflected ray and refracted ray are

A. parallel to each other

B. perpendicular to each other

C. inclined to each other making an angle 45°

D. none of these

Answer: B

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183. If the light is polarised by reflection, then the angle between reflected the ray passes from medium to air ?

A. 180°

B. 90°

C. 45°

D. 36°

Answer: B

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184. The polarising angle for a medium is 68°. What is the critical angle id the ray passes from medium to air ?

A. 40°

B. 24°

C. 41.4°

D. 48.3°

Answer: B

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185. The polarising angle for a medium is 68°. What is the critical angle id the ray passes from medium to air ?

A. 30°

B. 45°

C. 90°

D. 60°

Answer: B

Watch Video Solution

186. An unpolarizing beam of light is incident on a group of four palarizing sheets, which are arranaged in such a way that the characteristic direction of each polarizing sheet makes an angle of 30° with that of the preceding sheet. What fraction of incident unpolarized light is transmitted ?

A. 27/54

B. 27/81

C. 27/128

D. 27/112

Answer: C

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187. A glass plate is to be used as a polariser. If the refractive index of glass is 1.54, then the angle of polarisation for it is

A. 30°

B. 40°

C. 57°

D. 60°

Answer: C

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188. A ray of light in incident on a glass plate at an angle of 60°. What is the refractive index of glass if the reflected and refracted rays are perpendicular to each other?

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

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

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

D. 1.732

Answer: D

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189. Two polarising sheets are placed with their planes parallel, so that light intensity transmitted is max. Through what angle must either sheet be turned so that light intensity drops to half the maximum value ?

A. $60^{\circ}, 120^{\circ}$

B. $45^{\circ}, 135^{\circ}$

C. $30^{\circ}, 150^{\circ}$

D. $0^{\circ}, 180^{\circ}$

Answer: D

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190. As polaroid examines two adjacent plane polarised beam A and B whose planes of polarisation are mutually perpendicular. In the first position of the analyser, beam B shows zero intensity. From this position a rotation 30° shows that thebeams have same intensity. The ratio of intensity of the two beam $I_Z \& I_B$

A. $1/2$

B. $1/3$

C. $3/2$

D. 0.83

Answer: B

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191. For given medium, the polarising angle is 60°. What will be the critical angle for this medium ?

A. $35^{\circ}16'$

B. $42^{\circ}22'$

C. 57°

D. 60°

Answer: A

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192. The light reflected from water surface $(\mu = 1.3)$ is completely polarised. The angle of incidence will be

A. 30°

B. 45°

C. 53°

D. 65°

Answer: C

Watch Video Solution

193. A beam of light travelling in water strikes a glass plate, which is also immersed in water. When the angle of incidence is 51°, the reflected beam is found to be plane polarised .

What is the refractive index of glass if the refractive index of water is $\frac{4}{3}$?

$[\tan 51^\circ = 1.235]$

A. 1.647

B. 1.523

C. 1.489

D. none of these

Answer: A

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194. A ray of light strikes a glass plate at an angle of 40°. If the reflected and refracted rays are perpendicular to each other the index of refractive of glass is

A. $1/2$

B. $\sqrt{3/2}$

C. $3/2$

D. 0.83

Answer: D

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195. Two Nicols are oriented with their principal planes making an angle of 60°. The percentage of incident unpolarised light which passes through the system is

A. 0.5

B. 1

C. 12.5%

D. 37.5%

Answer: C

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196. The angle of incidence at which reflected light is totally polarized for reflection from air to glass (refractive index n),

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

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

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

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

Answer: D

Watch Video Solution

197. A beam of light AO is incident a glass slab $(\mu = 1.54)$ in the direction show. The reflected ray OB is passed through a Nicol prism. On viewing through a Nicol prism, we find on rotating the prism that

A. the intensity is reduced to zero and remains zero

B. the intensity reduces somewhat and rises again

C. there is no change in intensity

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

Answer: D

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198. 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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199. Unpolarised light of intensity $32Wm^{-2}$ passes through three polarizer such that the transmission axis of the last polarizer is crossed with that of the first. The intensity of final emerging light is $3Wm^{-2}$. The intensity of light transmitted by first polarizer will be

A. $32Wm^{-2}$

B. $16Wm^{-2}$

C. $8Wm^{-2}$

D. $4Wm^{-2}$

Answer: B

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200. The substance which can rotate the plane of polarisation is called

A. optically active substance

B. inactive substance

C. polarising substance

D. analyzing substance

Answer: A

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201. A beam of natural light falls on a system of 6 polaroids, which are arranged in succession such that each polaroid is turned through 30° with respect to the preceding one. The percentage of incident intensity that passes through the system will be

A. 1

B. 0.5

C. 0.3

D. 0.12

Answer: D

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202. Dichroism is the property whhere

A. unequal absorption of ordinary extraordinary rays

B. equal absorption of ordinary extraordinary rays

C. rotating the plane of polarisation

D. no change in the brightness

Answer: A

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203. H-polarised is made of

A. nitro cellulose

B. polyvinyl alcohol

C. teflon

D. polyvinyl chloride

Answer: B

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204. Which of the following polaroids is developed by Land and Rogger ?

A. P-polaroid

B. H-polaroid

C. K-polaroid

D. D-polaroid

Answer: C

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205. An unpolarised beam of intensity $2A^2$ passes through a thin polaroid. Assuming that no light is absorbed by the polaroid, the amplitue of the emergent beam will be

A. $2A^2$

B. A^2

C. 2A

D. A

Answer: D

Watch Video Solution

206. 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

Watch Video Solution

207. 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. 48°

B. 28.5°

C. 50°

D. 24°

Answer: C

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208. The polariser and analyser are inclined to each other at 60°. The intensity of polarised light emerging from polariser is I. The intensity of the unpolarised light incident on the polariser is

A. I

B. 8I

C. 4I

D. 2I

Answer: B

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209. Two polaroid sheets are placed one over the other with their axes inclied to each other at an angle θ. If only 12.5% of the intensity of the light incident on the first sheet emerges out from the second sheet, the value of θ is

A. 30°

B. 60°

C. 45°

D. 90°

Answer: B

Watch Video Solution

210. Which of the following is used to improve the colour contrast in old paitings?

A. Rectifier

B. Nicol prism

C. Spectrometer

D. Polaroids

Answer: D

Watch Video Solution

211. An upolarised beam of intensity $2a^2$ passes through a thin polarioid. Assuming zero absorption in the polariod, the intensity of emergent plane polarised light is

A. $2a^2$

B. a^2

C. $\sqrt{2}a^2$

D. $\frac{a^2}{\sqrt{2}}$

Answer: B

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212. Two polaroids are crossed to each other. One of them is rotated through 60°, what %

age of incident unpolarised light will pass through the system ?

A. 37.5%

B. 40%

C. 20%

D. 30%

Answer: A

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213. To form K-polaroid polyvinyl alcohol is heated with

A. HCl

B. H_2SO_4

C. NaOH

D. $CuSO_4$

Answer: A

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214. Which of the following is based on the principle of selective absorption ?

A. Nicol prism

B. Polaroids

C. Biprism

D. Plane mirror

Answer: B

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215. Who discovered a synthetic crystalline material iodosulphate of quinine ?

A. W.H. Herapath

B. P.H. Land

C. W. Nicol

D. W. H. Brewster

Answer: A

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216. The property of absorbing O-light and E-light unequally is called as

A. dichroism

B. resistance

C. reflection

D. double refraction

Answer: A

Watch Video Solution

217. Which is a negative crystal from the following ?

A. Quartz

B. Ice

C. Calcite

D. Polaroids

Answer: C

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218. Polarised glass is used in sum glasses because:

A. it reduces the light intensity on account of polarisation

B. it is fashionable

C. it has good colour

D. it is cheaper

Answer: A

Watch Video Solution

219. The device used to produce plane polarised light is

A. nicol prism

B. a mirror

C. a biprism

D. a half wave plate

Answer: A

Watch Video Solution

220. What changes on polarisation of light ?

A. Frequency

B. Wavelength

C. Phase

D. Intensity

Answer: D

Watch Video Solution

221. Which of the following is used to eliminate head light glare in automobiles ?

A. Polaroids

B. Nicol prism

C. Calcite crystal

D. Plane mirror

Answer: A

Watch Video Solution

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

A. trains and aeroplanes

B. nicol prism

C. biprism

D. ammeter

Answer: A

Watch Video Solution

223. Which of the following is used to improve the colour contrast in old paitings?

A. Polaroids

B. Nicol prism

C. Rectifier

D. Polarometer

Answer: A

Watch Video Solution

224. Which of the following phenomenon is used to test and measure the optical activity of crystal like quartz ?

A. Interference

B. Polarisation

C. Diffraction

D. Refraction

Answer: B

Watch Video Solution

225. Which of the following phenomenon is used to form characters in LCDs?

A. Inteference

B. Polarisation

C. Diffraction

D. Refraction

Answer: B

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226. Doppler effect for light is

A. asymmetric

B. symmetric

C. both 'a' and 'b'

D. neither 'a' nor 'b'

Answer: B

Watch Video Solution

227. Doppler effect for light depends is

A. velocity of source

B. velocity of observer

C. relative velocity of source and observer

D. none of these

Answer: C

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228. Due to Doppler effect, a wavelength in the middle of the visible spectrum will be shifted towards red when

A. source and observer move away from each other

B. source and observer more towards each other

C. source and observer are at rest

D. none of these

Answer: A

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229. Due to Doppler effect, a wavelength in the middle of the visible spectrum will be shifted towards blue when

A. source and observer move away from each other

B. source and observer more towards each other

C. source and observer are at rest

D. none of these

Answer: B

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230. The term red shift are used for

A. increase in frequency and increase in wavelength

B. decrease in frequency and decrease in wavelength

C. increase in frequency and decrease in wavelength

D. decrease in frequency and increase in wavelength

Answer: C

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231. The term blue shift is used for

A. increase in frequency and increase in wavelength

B. decrease in frequency and decrease in wavelength

C. increase in frequency and decrease in wavelength

D. decrease in frequency and increase in wavelength

Answer: D

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232. Doppler effect for light is used

A. measurement of velocities of distant galaxies

B. to measure speed of rotation of sun

C. to measure plasma temperature

D. all of these

Answer: D

Watch Video Solution

233. Change in frequency due to Doppler's effect is produced when

A. the source and observer are moving in the same direction

B. the source and the observer are moving in the same direction

C. there is a relative motion between the source and the observer

D. resultant motion between the source and observer

Answer: C

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234. The Doppler effect can be observed in the following case(s) :

A. in the shift of frequency in the light from the two sides of the sun due to rotation

B. in the red shift galaxies

C. in the use of radar

D. all of these

Answer: D

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235. Select the correct statement

A. Doppler effect for sound is symmetrical with respect to the motion of the source and observer

B. There occurs a transverse Doppler shift for sound

C. Doppler effect for light is symmetrical with respect to the motion of the source and observer

D. all of these

Answer: C

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236. 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. $\sqrt{1-\left(c^2/v^2\right)}$

Answer: C

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237. A star emits a light of wavelength I and it is receding from the earth with a velocity v_s. The shift in wavelength of spectral line observed on earth is

A. $c\lambda/v_s$

B. $-c\lambda / v_s$

C. $-v_s\lambda / c$

D. $v_s\lambda / c$

Answer: D

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238. A star is moving away from the earth with a velocity of $100km / s$. If the velocity of light is $3 \times 10^8 m / s$ then the shift of its spectral line of wavelength $5700A$ due to Doppler effect is

A. 0.63Å

B. 1.90Å

C. 3.80Å

D. 5.70Å

Answer: B

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239. Due to Doppler's effect, the shift in wavelength observed is 0.1Å for a star producing wavelength 6000 Å. Velocity of recession of the star will be

A. 2.5 km/s

B. 10 km/s

C. 5 km/s

D. 20 km/s

Answer: C

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240. An astronaut is approacing the moon. He sends a radio wave of frequency $5 \times 10^9 Hz$ towards the moon. The frequency of the radio echo received by him has a frequency $9 \times 10^4 Hz$ more than that of real frequency. The relative velocity of the rocket with respect to the moon is

A. 1.35 km/s

B. 2.70 km/s

C. 4.05 km/s

D. 5.40 km/s

Answer: D

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241. Doppler effect independent of

A. distance of source

B. velocity of source

C. velocity of listener

D. none of these

Answer: A

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242. The velocity of light in glass medium is $2 \times 10^8 m/s$. The refractive index of glass if speed of light in air is $3 \times 10^8 m/s$ is

A. 1.5

B. 1.25

C. 2.5

D. 2.25

Answer: A

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243. The values of velocity of light in media of refractive index 1.41 and 1.8 are respectively

A. $3.127 \times 10^8 m / s, 0.666 \times 10^8 m / s$

B. $1.127 \times 10^8 m / s, 2.666 \times 10^8 m / s$

C. $2.127 \times 10^8 m / s, 1.666 \times 10^8 m / s$

D. $3.127 \times 10^8 m / s, 2.666 \times 10^8 m / s$

Answer: C

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244. The velocities of light in glass and water medium of the refractive index 3/2 and 4/3 respectively are

A. $1 \times 10^8 m / s, 3.25 \times 10^8 m / s$

B. $2 \times 10^8 m / s, 2.25 \times 10^8 m / s$

C. $3 \times 10^8 m / s, 1.25 \times 10^8 m / s$

D. $3 \times 10^8 m / s, 3.25 \times 10^8 m / s$

Answer: B

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245. Find the velocity of light in water, if its velocity in glass of refractive index 1.5 is $2 \times 10^8 m / s$. The refractive index of water is 1.33.

A. $1.25 \times 10^8 m / s$

B. $2.20 \times 10^8 m / s$

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

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

Answer: D

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246. The velocities of light in ice and diamond are $2.3 \times 10^8 m/s$ and $1.25 \times 10^8 m/s$ respectively. The R.I. of diamond with respect to ice is

A. 1.84

B. 2.84

C. 0.84

D. 1.24

Answer: A

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247. The speed of light in air and glass is $3 \times 10^8 m / s$, and $2 \times 10^8 m / s$ respectively. A beam of light falls on a glass at an angle of

30° with the surface. The angle of refraction in glass is

A. $25^{\circ} 16'$

B. $35^{\circ} 16$

C. $15^{\circ} 26$

D. $30^{\circ} 16$

Answer: B

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248. A beam of light is incident on glass slab making an angle of 60° with the surface. The angle of refraction and the velocity of light in glass of R.I. 1.5 are

A. $19^{\circ} 28, 3 \times 10^{8} m / s$

B. $29^{\circ} 28', 2 \times 10^{8} m / s$

C. $19^{\circ} 28', 2 \times 10^{8} m / s$

D. $29^{\circ} 28, 3 \times 10^{8} m / s$

Answer: C

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249. A ray of light is incident on ice slab making an angle of 50° with the normal. The angle of refraction and velocity of light in ice of the refractive index 1.3 are

A. $35^{\circ}6', 2.307 \times 10^{8} m/s$

B. $36^{\circ}6', 2.307 \times 10^{8} m/s$

C. $36^{\circ}6', 3.307 \times 10^{8} m/s$

D. $35^{\circ}6', 3.307 \times 10^{8} m/s$

Answer: B

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250. The diamond has refractive index of 2.4 for sodium light of wavelength 5893 Å in air. The speed and wavelength of this light in diamond are

A. $2.25 \times 10^8 m / s, 2455 Å$

B. $1.25 \times 10^8 m / s, 1455 Å$

C. $1.25 \times 10^8 m / s, 2455 Å$

D. $2.25 \times 10^8 m / s, 2355 \text{Å}$

Answer: C

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251. The wavelength and frequency of beam of light in water of R.I. 4/3 having wavelength 0.48 micron in air are

A. $0.16 \times 10^{-6} m, 6.25 \times 10^{14} Hz$

B. $0.36 \times 10^{-6} m, 6.25 \times 10^{14} Hz$

C. $0.36 \times 10^{-6} m, 3.25 \times 10^{14} Hz$

D. $0.26 \times 10^{-6} m, 6.25 \times 10^{14} Hz$

Answer: B

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252. The change in the wavelength of light when it travels from air to glass of refractive index 1.5 and the frequency of light $4 \times 10^{14} Hz$ is

A. 2500 Å

B. 2000 Å

C. 1500 Å

D. 3500 Å

Answer: A

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253. The critical angle of a certain medium is 40.2°. The speed of light in that medium is

A. $2.936 \times 10^8 m / s$

B. $1.936 \times 10^8 m / s$

C. $1.936 \times 10^8 m / s$

D. $4.936 \times 10^8 m / s$

Answer: C

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254. A beam of light of wavelength 6400 Å is incident normally on a parallel glass plate of 5cm thick and R.I. 1.6. The beam takes the same time to travel from source to incident surface and through the glass plate. The distance of source from incident surface is

A. 7.5 cm

B. 6 cm

C. 10 cm

D. 8 cm

Answer: D

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255. The wavelength of green colour in air and violet colour in water are 5381 Å and 3042 Å respectively. If the wavelength of green colour in water is the same as the wavelength of violet colour in air, find its value. (Assume that refractive index for green and violet colour is approximately same)

A. 4046 Å

B. 3046 Å

C. 3000 Å

D. 2000 Å

Answer: A

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256. The wavelength of a beam of light in air medium is 5200 Å, the wavelength and frequency in glass of R.I. 1.6 are nearly

A. $3500^{\circ}, 5.77 \times 10^{14} Hz$

B. $4000^{\circ}, 5.77 \times 10^{14} Hz$

C. $3250^{\circ}, 5.77 \times 10^{14} Hz$

D. $3300^{\circ}, 5.77 \times 10^{14} Hz$

Answer: C

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257. The refractive indices of alcohol and glass are 1.35 and 1.5 respectively. The refractive index of glass with respect to alcohol is

A. 1.11

B. 2.22

C. 0.11

D. 3.11

Answer: A

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258. For a light wave a certaon frequency, the difference in wavelength in alcohol (R.I = 1.35) and glass (R.I. = 1.5) is 400 Å. Wavelength of light in vacuum is

A. 3400 Å

B. 5400 Å

C. 6400 Å

D. 4400 Å

Answer: B

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259. The wavelength difference of light waves of the wave numbers 2×10^6 per m and 2 25×10^6 per m is

A. $0.556 \times 10^{-6} m$

B. $0.0556 \times 10^6 m$

C. $0.0556 \times 10^{-6} m$

D. $0.556 \times 10^{6} m$

Answer: C

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260. A beam of light is incident on a water surface of angle of incidence 60° and R.I. of water is 4/3. The ratio of width of incident wavefront to refracted wavefront is

A. 0.66

B. 0.16

C. 1.16

D. 2.66

Answer: A

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261. 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. $1.96 \times 10^8 m/s$

B. $2.12 \times 10^8 m/s$

C. $3.18 \times 10^8 m/s$

D. $3.33 \times 10^8 m/s$

Answer: B

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262. 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

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263. The X-ray cannot be diffracted by means of an ordinary grating due to

A. high speed

B. short wavelength

C. large wavelength

D. none of these

Answer: B

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264. The nature of light waves is similar to

A. alpha rays

B. gamma rays

C. cathode rays

D. cosmic rays

Answer: B

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265. If the critical angle for total internal reflection from a medium to vacuum is 30°, the velocity of light in the medium is

A. $6 \times 10^{8} m / \sec$

B. $3 \times 10^{8} m / \sec$

C. $2 \times 10^{8} m / \sec$

D. $1.5 \times 10^{8} m / \sec$

Answer: D

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266. A prism of refracting angle 60° is made with a material of refractive index μ. For a certain wavelength of light, the angle of minimum deviation is 30°. For this, wavelength the value of refractive index of the material is

A. 1.820

B. 1.503

C. 1.414

D. 1.231

Answer: C

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267. A ray of light is incident on a glass plate of refractive index 1.5. The angle between the reflected and refracted rays is 90°. What is the ratio of wavelenth of reflected to refracted rays?

A. 2.1

B. 1.5

C. 1.6

D. 1.7

Answer: B

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268. 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. $2.5 \times 10^{-7} m$

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

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

D. $2.5 \times 10^{-9}m$

Answer: A

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269. A driver can be see the sunset at an angle of

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

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

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

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

Answer: D

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270. 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

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271. According to Newton's corpuscular theory

A. velocity of light in denser medium is less than velocity of light in rarer medium

B. velocity of light in denser medium is greater than velocity of light in rarer medium

C. velocity of light in denser medium is equal than velocity of light in rarer medium

D. velocity of light in independent on medium through which it travelled

Answer: A

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272. 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. 4sec

B. 1/4sec

C. 1/2sec

D. 2 sec

Answer: D

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273. If light travels from vacuum to water, its wavelength

A. increases

B. remains constant

C. decreases

D. may increase or may decreases

Answer: C

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274. A light of wavelength 6000 A travels from rarer medium to denser medium of refractive index 1.5, If its frequncy in rarer medium is 5×10^{14} Hz, then its frequency in denser medium will be

A. $3.3 \times 10^{14} Hz$

B. $5 \times 10^{14} Hz$

C. $2.5 \times 19^{8} Hz$

D. $7.5 \times 10^{14} Hz$

Answer: B

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275. 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. $10^{-8}s$

D. $10^{-17}s$

Answer: B

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276. The ratio of velocities of light in glass to that in water is (refractive index of glass = 1.5 and refactive index of water = 1.33)

A. 0.6803 : 1

B. 0.4989 : 1

C. 0.8867 : 1

D. 0.2505 : 1

Answer: C

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277. 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

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278. Refractive index of glass with respect to medium is $\frac{4}{3}$. If $v_m - v_g = 6.25 \times 10^7$ m/s., then velocity of light in medium is

A. $2.5 \times 10^8 m / \sec$

B. $1.5 \times 10^7 m / \sec$

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

D. $4.5 \times 10^7 m / \sec$

Answer: A

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279. 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. $1.1 \times 10^6 m^{-1}$

B. $4.4 \times 10^6 m^{-1}$

C. $2.2 \times 10^6 m^{-1}$

D. $6 \times 10^6 m^{-1}$

Answer: C

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280. Refractive index of glass w.r.t water is $9/8$. What is the speed of light in water ? Given speed pf light in glass is $2 \times 10^8 m/s$.

A. $1.6 \times 10^8 m/s$

B. $1.33 \times 10^8 m/s$

C. $3 \times 10^8 m/s$

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

Answer: D

Watch Video Solution

281. The wave theory of light does not explain

A. interference

B. refraction

C. photoelectric effect

D. diffraction

Answer: C

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

A. 66.66%

B. 50%

C. 33.33%

D. 25%

Answer: C

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283. Time taken by the light to travel through x cm of air. 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

View Text Solution

284. When a rays of light enters a glass slab from water

A. wavelength remains same

B. wavelength decreases

C. frequency increases

D. wavelength increases

Answer: B

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285. Light is incident on a substance of refractive index $\sqrt{2}$ at an angle of 45°. What is the ratio of width of beam in air to the medium ?

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

B. $1:\sqrt{15}$

C. $1:2\sqrt{2}$

D. $\sqrt{2}:\sqrt{3}$

Answer: D

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

A. reflection

B. refraction

C. interference

D. photoelectric effect

Answer: D

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287. If the polarising angle for a given medium is 60°, then the refractive index of the medium is

A. $\frac{1}{\sqrt{3}}$

B. 1

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

D. $\sqrt{3}$

Answer: D

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288. The refractive indices of glass and diamonf with respect to air are 1.5 and 2.4 respectively. The refractive index of diamond with respect to glass is

A. 0.62

B. 0.9

C. 1.95

D. 1.6

Answer: D

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289. The nature of light waves is similar to

A. alpha rays

B. gamma rays

C. cathode rays

D. cosmic rays

Answer: B

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290. If the critical angle for total internal reflection, from a medium to vacuum is 30°, then velocity of light in the medium is

A. $6 \times 10^8 m / \sec$

B. $3 \times 10^8 m / \sec$

C. $2 \times 10^8 m / \sec$

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

Answer: D

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291. A ray of light is incident on a medium boundry at polarising angle such that its deviation is 24°, then angle of incidence is :

A. 24°

B. 57°

C. 66°

D. 90°

Answer: B

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292. If light travels from vacuum to water, its wavelength

A. increases

B. remains constant

C. decreases

D. may increases or decreases

Answer: C

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293. A light of wavelength 6000 A travels from rarer medium to denser medium of refractive index 1.5, If its frequncy in rarer medium is 5×10^{14} Hz, then its frequency in denser medium will be

A. $3.3 \times 10^{14} Hz$

B. $5 \times 10^{14} Hz$

C. $2.5 \times 10^{7} m$

D. $7.5 \times 10^{14} Hz$

Answer: B

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294. The tourmaline light and transmits

A. absorbs ordinary light and transmits extra ordinary

B. absorbs extra ordinary light and transmits ordinary

C. both absorbs ordinary light and extra ordinary

D. both absorbs ordinary light and extra ordinary

Answer: A

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295. The angle of refraction is found to be half the angle of refraction. Then refractive index of medium is

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

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

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

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

Answer: A

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296. In Nicol Prism Canada balsam acts as an.........medium for the extra ordinary ray

A. optically rarer

B. optically denser

C. opaque

D. none of these

Answer: A

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297. A light ray is travelling from air to medium, c is velocity of light in air and v is velocity of light in medium. The reflected and refracted rays are perpendicular to each other.

The angle of polarisation is

A. $\theta_P = \tan^{-1}(v/c)$

B. $\theta_P = \cos^{-1}(v/c)$

C. $\theta_P = \cot^{-1}(v/c)$

D. $\theta_P = \sin^{-1}(v/c)$

Answer: C

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298. A plano convex lens fits exactly into a plano concave lens. Their plane surfaces are parallel to each other. If the lenses are made of different materials refractive indices μ_1 and μ_2 and R is the radius curvature of the curved surface of the lenses, the focal length of the combination is

A. $\frac{R}{2(\mu_1 - \mu_2)}$

B. $\frac{R}{(\mu_1 - \mu_2)}$

C. $\frac{2R}{2(\mu_1 - \mu_2)}$

D. $\frac{R}{2(\mu_1 + \mu_2)}$

Answer: B

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299. For a normal eye, the cornea of eye provides a converging power of $40D$ and the least converging power of the eye lens behind the cornea is $20D$. Using this information, the distance between the retina and the cornea eye lens can be estimated to be

A. 2.5 cm

B. 1.67 cm

C. 1.5 cm

D. 5 cm

Answer: A

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300. The equiconvex lens has focal length f. If is cut perpendicular to the principal axis passin through optical centre, then focal length of each half is

A. $\frac{f}{2}$

B. f

C. $\frac{3f}{2}$

D. 2f

Answer: D

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301. In vacum, to travel distance d, light takes time t and in medium to travel distance 5d, it takes time T. The critical angle of the medium is

A. $\sin^{-1}\left(\frac{5T}{t}\right)$

B. $\sin^{-1}\left(\frac{5t}{3T}\right)$

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

D. $\sin^{-1}\left(\frac{3t}{5T}\right)$

Answer: C

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302. 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

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303. 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

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