Chapter 19

DAWN OF MODERN PHYSICS

Each question has four possible answers, tick (✓) the correct answer:

1. The classical physics is based on the laws of:

(a) Quantum mechanics **(b)** Newtonian mechanics

(c) Relativistic mechanics **(d)** None of these

2. Mathematical foundations for electromagnetic waves was provided by:

(a) Hertz **(b)** Ampere

(c) Maxwell **(d)** Newton

3. Mathematical formulation for electromagnetic waves is given the name:

(a) Hamiltons equation **(b)** Langrange's equation

(c) Maxwell's equation **(d)** None of these

4. Which one of the following waves require a material medium for their propagation:

(a) X-rays **(b)** Light waves

(c) γ-rays **(d)** Sound waves

5. Which one of the following scientists regarded light as electromagnetic waves:

(a) Maxwell **(b)** de-Broglie

(c) Newton **(d)** Galileo

6. Which one of the following paved the way for modern physics:

(a) Newtonian mechanics **(b)** Theory of relativity

(c) Quantum theory **(d)** All of above

7. Absolute motion cannot be detected:

(a) In different frame of reference **(b)** Its own frame of reference

(c) Both in its frame and different frame **(d)** None of these

8. Point out the formulation that does not depend the choice of reference frames:

(a) Velocity of object **(b)** Newton's law of motion

(c) Quantum theory **(d)** None of above

9. An inertial frame of reference is that:

(a) Which is at rest on earth **(b)** Which moves with uniform velocity

(c) Whose acceleration is zero **(d)** All of above

10. A non-inertial frame of reference is that:

(a) Is always at rest **(b)** Moves with some acceleration

(c) Moves with uniform velocity **(d)** None of these

11. Light was considered as electromagnetic waves by the scientist:

(a) Newton **(b)** Maxwell

(c) Hertz **(d)** Gallilo

12. All motions are:

(a) Uniform **(b)** Relative

(c) Absolute **(d)** Variable

13. Newton's laws of motion are valid:

(a) In non-inertial frame **(b)** In inertial frame

(c) Both (a) and (b) **(d)** None of these

14. The concept of direction is purely:

(a) Relative **(b)** Absolute

(c) Relative to the motion **(d)** None of these

15. Due to relative motion of observer and the frame of reference of events time always:

(a) Dilates itself **(b)** Stretches itself

(c) Both (a) and (b) **(d)** None of these

16. The dilation of time applies to the timing process which are:

(a) Chemical **(b)** Biological

(c) Physical **(d)** All of these

17. Aging process of a human body:

(a) Becomes fast **(b)** Becomes slow

(c) No change **(d)** None of these

18. Mass of an object is:

(a) Constant quantity **(b)** Varying quantity

(c) Depends upon the speed of light **(d)** None of these

19. Earth orbital speed is:

(a) 30 cm/s **(b)** 30 km/s

(c) 30 m/s **(d)** 0.3 m/s

20. When the atomic particles are moving with velocities approaching that of light:

(a) Newton's laws become valid **(b)** Newton's laws become invalid

(c) Relativistic effects become prominent **(d)** None of these

21. From $\Delta m = \frac{\Delta E}{C^2}$ that to get even a small increase in mass of an object, we require:

(a) Very small changes in energy **(b)** Large changes in energy

(c) Small changes in energy **(d)** No change in energy

22. In 1905, the special theory of relativity was proposed by:

(a) Clark Maxwell **(b)** de-Broglie

(c) Bohr **(d)** Einstein

23. Which one of the following physical quantities change with relativistic speed:

(a) Length **(b)** Time

(c) Mass **(d)** All of above

24. If an object moves with speed of light, its mass becomes:

(a) Zero **(b)** Infinity

(c) No change **(d)** None of these

25. The speed of light in free space is:

(a) 3×10^8 m/s **(b)** 3×10^7 m/s

(c) 3×10^9 m/s **(d)** 3×10^6 m/s

26. Due to the relative motion of observer and frame of reference, time:

(a) Contracts **(b)** Dilates

(c) Constant **(d)** Uniform

27. Earth is considered as:

(a) Inertial fame of reference **(b)** Non-inertial frame of reference

(c) Both (a) and (b) **(d)** None of these

28. Any coordinate system relative to which results are taken is known as:

(a) Zero point **(b)** Frame of reference

(c) Infinity point **(d)** None of these

29. The special theory of relativity is based upon:

(a) 3 postulates **(b)** 2 postulates

(c) 4 postulates **(d)** None of these

30. According to special theory of relativity all laws of physics are same in all:

(a) Accelerated frames **(b)** None accelerated frames

(c) Non inertial frames **(d)** None of these

31. The special theory of relativity is applicable to the objects moving with maximum velocity:

(a) Less than speed of light **(b)** Equal to speed of light

(c) More than speed of light **(d)** None of these

32. According to special theory of relativity, an expression for time dilation is given by:

(a) $t = t_o \sqrt{1 - \frac{V^2}{C^2}}$ **(b)** $t = \frac{t_o}{\sqrt{1 - \frac{V^2}{C^2}}}$

(c) $t = \frac{t_o}{1 - \frac{V^2}{C^2}}$ **(d)** $t = t_o \left(1 - \frac{V^2}{C^2}\right)$

33. In special theory, an expression for length contraction is:

(a) $l = l_o \left(1 - \frac{V^2}{C^2}\right)$ **(b)** $l = l_o \sqrt{1 - \frac{V^2}{C^2}}$

(c) $l = l_o \sqrt{1 - \frac{C^2}{V^2}}$ **(d)** None of these

34. In an expression, for time dilation, the factor $\sqrt{1-\frac{V^2}{C^2}}$ is always:

(a) Equal to one **(b)** Equal to zero

(c) Less than one **(d)** More than one

35. In special theory of relativity, an expression for mass variation is:

(a) $m = \frac{m_o}{\sqrt{1-\frac{V^2}{C^2}}}$ **(b)** $m = \frac{m_o}{\sqrt{1-\frac{C^2}{V^2}}}$

(c) $m = m_o\sqrt{1-\frac{V^2}{C^2}}$ **(d)** None of these

36. When an object moves with speed of light, its length:

(a) Remain unchanged **(b)** Increases

(c) Decreases **(d)** None of these

37. If an object moves with speed of light, then its apparent length becomes:

(a) Zero **(b)** Larger

(c) Smaller **(d)** Infinity

38. The mass and energy of an object are related by the expression:

(a) $E = \frac{m}{C^2}$ **(b)** $E = mc^2$

(c) $E = \frac{C^2}{m}$ **(d)** $E = mc$

39. According to special theory of relativity, mass and energy are different quantities and:

(a) Non-inter convertible **(b)** Inter convertible

(c) No change **(d)** None of these

40. The nature of radiation emitted from a hot body depends upon:

(a) Temperature **(b)** Material

(c) Length **(d)** Mass

41. At low temperature, the hot body emits the radiation of:

(a) Shorter wavelength **(b)** High energy

(c) Low energy **(d)** Both (a) and (b)

42. At high temperature, the hot body emits the radiation of:

(a) High energy and shorter wavelength **(b)** Longer wavelength and high energy

(c) Low energy and shorter wavelength **(d)** Shorter wavelength

43. The radiations of longer wavelength:

(a) Have low energy **(b)** Have high energy

(c) At high temperature **(d)** Both (a) and (b)

44. When platinum wire is heated, then it become ———— at temperature 500°C.

(a) White **(b)** Green

(c) Yellow **(d)** Dull red

45. Black colour is:

(a) Good absorber of heat **(b)** Bad absorber of heat

(c) Both (a) and (b) **(d)** None of these

46. For a black body, the product of λ_m and T known as:

(a) Wien's constant **(b)** Planck's constant

(c) Davison constant **(d)** Lumber's constant

47. The value of Wien's constant is measured in:

(a) m.K **(b)** mK^{-1}

(c) $m^{-1}K$ **(d)** $m^{-1}K^{-1}$

48. In SI units, the value of Wien's constant is:

(a) 9.8 mK **(b)** 2.9×10^{-3} mK

(c) 6.63×10^{34} mK **(d)** 3×10^{8} mK

49. The ratio of the energy E to the corresponding frequency f of the radiation emitted or absorbed is known as:

(a) Boltzman constant **(b)** Steffen's constant

(c) Wien's constant **(d)** Planck's constant

50. Max planck awarded the noble prize for his discovery of energy quanta in:

(a) 1918 A.D **(b)** 1920 A.D

(c) 1718 A.D **(d)** 1818 A.D

51. In SI units the value of Stefen's constant is:

(a) $6.63\times10^{-34}\ wm^{-2}k^{-4}$ **(b)** $2.9\times10^{-3}\ wm^{-2}k^{-4}$

(c) $5.67\times10^{-8}\ wm^{-2}k^{-4}$ **(d)** $3\times10^{8}\ wm^{-2}k^{-4}$

52. In SI units the value of Planck constant is:

(a) 6.63×10^{-34} J.S **(b)** 2.9×10^{-3} J.S

(c) 5.67×10^{-8} J.S **(d)** 3×10^{8} J.S

53. The idea of matter waves was given by:

(a) Einstein **(b)** de-Broglie

(c) Planck **(d)** Davison and Germer

54. The de-Broglie wavelength "λ"associated with a particle of mass "m" moving with velocity V is given by:

(a) $\lambda = mvh$ **(b)** $\lambda = \frac{l}{mvh}$

(c) $\lambda = \frac{h}{mv}$ **(d)** $\lambda = \frac{mv}{h}$

55. The de-Broglie wavelength λ of a particle of mass m and momentum P is given by:

(a) $\lambda = \frac{p}{h}$ **(b)** $\lambda = \frac{h}{p}$

(c) $\lambda = ph$ **(d)** None of these

56. The electrons behave as waves because they can be:

(a) Deflected by electric field **(b)** Ionize as gas

(c) Deflected by magnetic field **(d)** Diffracted by crystals

57. A photon of frequency f has an energy:

(a) $E = hf$ **(b)** $E = \frac{h}{f}$

(c) $E = \frac{f}{h}$ **(d)** None of these

58. If the momentum of particle is doubled, than its de-Broglie wavelength:

(a) Doubles **(b)** Halves

(c) Remain unchanged **(d)** None of these

59. In Davison and Germer experiment, nickel crystal acts as a:

(a) Perfect reflector **(b)** Perfect absorber

(c) Two dimensional grating **(d)** Three dimensional grating

60. The Davison and Germer experiment relates to:

(a) Diffusion **(b)** Interference

(c) Polarization **(d)** Electron diffraction

61. In Davison and Germer experiment, the angle between incident beam and diffracted beam is called:

(a) Angle of incidence **(b)** Glancing angle

(c) Angle of diffraction **(d)** Angle

62. In Davison and Germer expert, the angle which the incident beam makes with the normal to the nicked crystal is:

(a) 69° **(b)** 65°

(c) 90° **(d)** 180°

63. The uncertainty principle was given by:

(a) de-Broglie **(b)** Heisenberg

(c) Einstein **(d)** Max Planck

64. The uncertainty principle applicable to:

(a) Small system only **(b)** Large system only

(c) Sub-atomic particles only **(d)** Both sub-atomic and large system

65. The uncertainty principle is applicable only when:

(a) Momentum is measured only

(b) Position is measured only

(c) Both position and momentum are measured

(d) None of these

66. The uncertainty principle is significant for:

(a) Macroscopic bodies **(b)** Microscopic bodies

(c) Both microscopic and microscopic **(d)** None of these

67. The uncertainty principle relates uncertainties in the measurements of energy and:

(a) Velocity **(b)** Time

(c) Momentum **(d)** Mass of the particle

68. The uncertainty in the location of a particle is equal to its de-Broglie wavelength, then uncertainty in its velocity will be equal to:

(a) Four times its velocity **(b)** Twice its velocity

(c) Half of its velocity **(d)** Its velocity

69. Photoelectric effect was discovered by:

(a) Einstein **(b)** G.P Thomson

(c) Hall wades **(d)** Bohr

70. The photoelectric effect predicts that light is made of:

(a) Photons **(b)** Neutrons

(c) Protons **(d)** None of these

71. The phenomenon of photoelectric effect was first explained by:

(a) Einstein **(b)** Bohr

(c) Maxwell **(d)** Planck

72. The way through which electromagnetic radiation or photons interact with matter depends upon their:

(a) Frequency **(b)** Energy

(c) Wave length **(d)** All of the above

73. The process through which photons can interact with matter is:

(a) Photo electric effect **(b)** Compton effect

(c) Pair production **(d)** Any of these

74. The amount of photoelectric current depends upon:

(a) Intensity of light beam **(b)** Energy of incident photons

(c) Stopping potential **(d)** All of the above

75. While demonstrating the photoelectric effect the stopping potential is achieved when:

(a) Anode is made more and more positive **(b)** Battery is switched off

(c) Photo electric current becomes Zero **(d)** None of these

76. If the photoelectric current is goes on decreasing it means that:

(a) Photons are attracted by the anode **(b)** Photoelectrons are attracted by the anode

(c) Photoelectrons are repelled by the anode **(d)** Electrons are repelled by the anode

77. Threshold frequency is the:

(a) Varies from metal to metal

(b) Minimum frequency below which no electron is emitted

(c) Same for all metals

(d) Both (a) and (b)

78. Einstein was received the noble prize in the basis of:

(a) Quantum theory of light **(b)** Theory of relativity

(c) Explanation of photoelectric effect **(d)** Energy band theory

79. The unit of work function is:

(a) Electron volt **(b)** Ampere

(c) Volt cell **(d)** Hz

80. A photocell can be used to operate:

(a) Counting system **(b)** Security system

(c) Automatic door system **(d)** All of above

81. A photon is a:

(a) Positively charged particle **(b)** Quantum of radiation

(c) Unit of Energy **(d)** Unit of wavelength

82. When the stopping potential is applied to the anode of photocell, no current is absorbed. This mean:

(a) The emission of photoelectrons stops

(b) The photoelectrons are emitted but are reabsorbed by the photo cathode itself

(c) Both (a) and (b)

(d) None of these

83. The best metal to be used for photoemission is:

(a) Cesium **(b)** Lithium

(c) Potassium **(d)** Sodium

84. Photoelectric effect was discovered by:

(a) Lenard **(b)** Einstein

(c) Hertz **(d)** Neutron

85. Which conservation law is obeyed in Einstein photoelectric equation:

(a) Momentum **(b)** Charge

(c) Mass **(d)** Energy

86. If the energy of photon is 10 eV and work function is 5 eV, then the a value of stopping potential will be:

(a) 50 V **(b)** 2 V

(c) 5 V **(d)** 15 V

87. When a photon of energy 7 eV is made incident on a metal then emitted electron is stopped by a stopping potential –5.5 V. The work function of the metal will be:

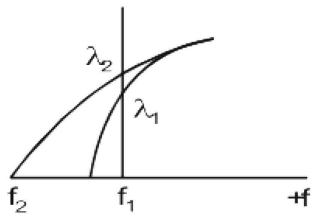
(a) 12.5 eV **(b)** –1.5 eV

(c) 37.5 eV **(d)** 1.5 eV

88. In the equation if $f_2 > f_1$ then:

(a) $\lambda_1 > \lambda_2$ **(b)** $\lambda_1 = \sqrt{\lambda_2}$

(c) $\lambda_1 = \lambda_2$ **(d)** $\lambda_1 < \lambda_2$



89. Which of the following makes use of photoelectric effect:

(a) Television camera **(b)** Television receiver

(c) Radar **(d)** CRO

90. The work function for photoelectric effect:

(a) Same for all metals **(b)** Depends on the frequency

(c) different for different metals **(d)** None of these

91. In photoelectric emission, the energy of emitted electron is:

(a) Larger than that of photon **(b)** Less than that of photon

(c) Same as that of photon **(d)** None of these

92. Einstein photoelectric equation is:

(a) $hf = \phi + \frac{1}{2} mV^2_{max}$ **(b)** $\phi = hf + \frac{1}{2} V^2_{max}$

(c) $hf + \phi = \frac{1}{2} m V^2_{max}$ **(d)** None of these

93. A photon of frequency f is incident on a metal surface whose threshold frequency is f_o then work function of metal will be:

(a) $h(f + f_o)$ **(b)** hf_o

(c) hf **(d)** Zero

94. The photoelectric current depends upon:

(a) Intensity of the incident radiation

(b) Frequency of incident photon only

(c) Intensity and frequency of incident radiation

(d) None of these

95. The velocity of the photoelectron depends upon:

(a) Intensity of incident photon

(b) Frequency of incident photon

(c) Intensity as well as frequency of incident photon

(d) None of these

96. The study of photoelectric effect is useful for understanding:

(a) The quantum nature of matter **(b)** The wave nature of matter

(c) Bohr's atomic model **(d)** Structure of the nucleus

97. The stopping voltage in photoelectric effect depends upon:

(a) Nature of the metal surface **(b)** Intensity of incident light

(c) Frequency of incident light **(d)** Frequency as well as metal surface

98. The cut off voltage is independent of intensity of incident light if:

(a) Material of electrode is fixed

(b) Frequency of incident light

(c) Frequency and material of electrode are fixed

(d) None of these

99. The photoelectric threshold frequency depends upon.

(a) Frequency **(b)** Nature of material

(c) Intensity of light **(d)** None of them

100. The maximum number of the photoelectrons released in photocell is independent of:

(a) Frequency of incident light **(b)** Nature of the cathode surface

(c) Intensity of the radiations **(d)** None of these

101. A milliammeter in the circuit of a photo cell measures:

(a) Energy of photon **(b)** Velocity of photoelectrons

(c) Number of electrons released per second **(d)** None of these

102. The photoelectric effect is based upon the conservation of:

(a) Angular momentum **(b)** Energy

(c) Momentum **(d)** Mass

103. Which statement about a photon is invalid:

(a) Its momentum is $\frac{hf}{c}$ **(b)** Its total energy is hf

(c) It has zero rest mass **(d)** Its mass is $\lambda^2 f^2$

104. The Compton effect is associated with:

(a) X-rays **(b)** γ-rays

(c) Positive rays **(d)** β-rays

105. The Compton effect in x-rays proves that:

(a) X-rays have wave characteristics **(b)** X-rays have particle characteristic

(c) Electron have wave characteristics **(d)** None of these

106. An ideal black body is:

(a) A perfect absorber of radiation **(b)** The most efficient radiation

(c) A body when hot emits radiation **(d)** All of the above

107. The wavelength corresponding to maximum intensity of radiation shifts steadily towards shorter wavelength:

(a) The temperature decreases **(b)** The temperature increases

(c) The temperature is constant **(d)** The temperature is zero

108. Radiations are always emitter or absorbed in the form of packet of energy. This is a statement of:

(a) Stefan's law **(b)** Planck's quantum law

(c) Einstein law **(d)** None of these

109. A good absorber of heat radiation would be:

(a) A black body **(b)** A polished plate

(c) A white plate **(d)** None of the above

110. Black bodies are formed of:

(a) Reflecting solid objects **(b)** Metals

(c) No-reflecting objects **(d)** Non-metals

111. A black body becomes white at temperature:

(a) 1300°C **(b)** 900°C

(c) 1500°C **(d)** 1600°C

112. A body emits radiation which is of long or wavelength in visible infrared region at:

(a) Low temperature **(b)** High temperature

(c) At constant temperature **(d)** None of these

113. The nature of radiation emitted by a body depends upon:

(a) Mass **(b)** Temperature

(c) Volume **(d)** Pressure

114. At high temperature, a body emits radiations of:

(a) Long wavelength **(b)** Small wavelength

(c) Intermediate wavelength **(d)** None of these

115. At low temperature, a body generally emit radiations of:

(a) Long wavelength **(b)** Small wavelength

(c) Intermediate wavelength **(d)** None of these

116. The relation between work function and maximum energy of photoelectrons was discovered by:

(a) Stefan **(b)** Marely

(c) Planck **(d)** Einstein

117. The Compton effect was presented in:

(a) 1933 **(b)** 1924

(c) 1920 **(d)** 1923

118. Compton effect was presented by:

(a) Einstein **(b)** Ampere

(c) Auther holly Compton **(d)** None of these

119. In Compton effect, the wavelength of scattered photons as compared to the wavelength of incident x-rays is:

(a) Larger **(b)** Smaller

(c) Constant **(d)** None of these

120. Compton considered that x-rays consist of:

(a) Neutrons **(b)** Protons

(c) Electrons **(d)** Photons

121. The expression derived by Compton for Compton shift scattering an angle θ is given as:

(a) $\Delta\lambda = \frac{h}{m_o c}(1 - \cos\theta)$ **(b)** $\Delta\lambda = h(1 - \cos\theta)$

(c) $\Delta\lambda = m_o c(1 - \cos\theta)$ **(d)** $\Delta\lambda = \frac{m_o c}{n}(1 - \cos\theta)$

122. The numerical value of Compton wavelength is equal to:

(a) 3.43×10^{-12} m **(b)** 1.43×10^{-12} m

(c) 2.43×10^{-12} m **(d)** 0.43×10^{-12} m

123. In Compton effect the change in wavelength of a scattered photon is called:

(a) Compton shift **(b)** Einstein equation

(c) Angle of refractions **(d)** None of these

124. Author Holly Compton was awarded Nobel Prize in:

(a) 1927 **(b)** 1928

(c) 1923 **(d)** 1931

125. A.H Compton studies the scattering of x-rays by:

(a) Tightly bounded positrons **(b)** Loosely bounded electrons

(c) Tightly bounded electrons **(d)** Loosely bounded photons

126. A.H Compton studies the scattering of x-rays by loosely bounded electrons from:

(a) Copper crystal **(b)** NaCl crystal

(c) Graphite target **(d)** None of these

127. Compton shift is actually the change in:

(a) Mass of incident photon **(b)** Wavelength of incident photon

(c) Charge on photon **(d)** All of the above

128. When X-rays are scattered by loosely bounded electrons from graphite target, which is known as:

(a) Photoelectric effect **(b)** Compton effect

(c) Thomson effect **(d)** None of these

129. Compton shift refers to:

(a) Proton **(b)** Meson

(c) Positron **(d)** Photon

130. The process of conversion of a photons into an electron and a positron is known as:

(a) Compton effect **(b)** Photoelectric effect

(c) Pair production **(d)** None of these

131. The process of pair production is also known as:

(a) Compton effect **(b)** Photoelectric effect

(c) Materialization of energy **(d)** None of these

132. The minimum energy required for the pair production is:

(a) 0.21 MeV **(b)** 0.12 MeV

(c) 1.02 MeV **(d)** None of these

133. The process of pair production takes place if the energy of photon is:

(a) Greater than $2m_oc^2$ **(b)** Less than $2m_oC^2$

(c) Equal to $2m_oC^2$ **(d)** None of these

134. The reverse process of pair production is called:

(a) Materialization of energy **(b)** Compton effect

(c) Annihilation of matter **(d)** None of these

135. Positron was discovered by:

(a) Dirac **(b)** Anderson

(c) Wilson **(d)** None of these

136. The condition $hf > 2m_oc^2$ refers to the process of:

(a) Compton effect **(b)** Pair production

(c) Photoelectric effect **(d)** Annihilation of matter

137. The equation $e^- + e^+ \rightarrow \gamma + \gamma$ refers to:

(a) Compton effect **(b)** Pair production

(c) Annihilation of matter **(d)** Fusion process

138. In annihilation of matter, the two photons are produced traveling:

(a) In opposite direction **(b)** In same direction

(c) At on angle of 180° **(d)** Both (a) and (c)

139. The positron was discovered in:

(a) 1928 **(b)** 1828

(c) 1918 **(d)** 1923

140. Every particle with corresponding anti-particle with:

(a) The same mass **(b)** Opposite charge

(c) Different mass **(d)** Both (a) and (b)

141. Tick the correct equation in case of Davison and Germer experiment:

(a) $\frac{1}{2}\ mv^2 = ve$ **(b)** $mv = \sqrt{2mve}$

(c) $\lambda = \frac{h}{\sqrt{2mve}}$ **(d)** None of these

142. Uncertainty principle states that:

(a) $\Delta x \,.\, \Delta E \approx h$ **(b)** $\Delta x \,.\, \Delta P \approx h$

(c) $\Delta E \,.\, \Delta P \approx h$ **(d)** None of these

143. Heisenberg uncertainty principle is used in:

(a) Wave mechanics **(b)** Classical mechanics

(c) Both (a) and (b) **(d)** Quantum mechanics

144. Strictly speaking, the Earth is:

(a) Inertial frame of reference **(b)** Non-inertial frame of reference

(c) Both (a), (b) **(d)** None

145. Time dilation applies to the timing process:

(a) Chemical **(b)** Physical

(c) Biological **(d)** All

146. The length contraction happens:

(a) Along the direction of motion **(b)** Perpendicular to direction of motion

(c) Both (a), (b) **(d)** None

147. Earth's orbital speed is:

(a) 30 km/s **(b)** 30 m/s

(c) 30 km/h **(d)** None

148. Mass of an object moving with 0.8 C is:

(a) Zero **(b)** Infinite

(c) $\frac{m_o}{\sqrt{0.36}}$ **(d)** $\sqrt{0.36}\, m_o$

149. For a black body, the product of λ_{max} and T is equal to:

(a) Wien's constant **(b)** Planck's constant

(c) Davison constant **(d)** Dirac constant

150. Unit of Stephen's constant is:

(a) $W\, m\, K^{-2}$ **(b)** $W\, m^{-2}\, K^{-4}$

(c) $W\, m\, K^{-4}$ **(d)** None

151. Stopping potential of photoelectrons:

(a) Increase with increase in intensity **(b)** Decrease with increase in intensity

(c) Independent of intensity **(d)** None

152. The energy of photon of radio waves is about:

(a) 10^{-4} eV **(b)** 10^{-6} J

(c) 10^{-8} eV **(d)** 10^{-10} eV

153. A photocell is used in:

(a) Security systems **(b)** Counting systems

(c) Automatic door systems **(d)** All

154. The inverse of photoelectric effect is:

(a) Emission of γ-rays **(b)** X-rays

(c) Thermionic emission **(d)** None

155. Pair production occurs only when energy of photon is at least equal to:

(a) 1.02 eV **(b)** 1.02 MeV

(c) 1.2 MeV **(d)** All

156. Interplanar distance (spacing) for nickel crystal:

(a) 0.91×10^{10} m **(b)** 0.91×10^{-10} m

(c) 0.91×10^{-6} m **(d)** None

157. A three dimensional image of remarkable quality can be achieved by:

(a) Electron microscope **(b)** Scanning electron microscope

(c) Optical microscope **(d)** All

158. Value of $\hbar$ =

(a) 1.05×10^{34} J **(b)** 1.05×10^{-34} Js

(c) 1.05×10^{-34} Ns **(d)** All

159. Which one of the following radiations has the strongest photon?

(a) Microwaves **(b)** X-rays

(c) γ-rays **(d)** None

160. Rest mass of photon is:

(a) Zero **(b)** Infinite

(c) 9.11×10^{-31} kg **(d)** None

161. Energy for 1 kg of mass is:

(a) 1×10^{6} eV **(b)** 5.6×10^{35} eV

(c) 9×10^{16} eV **(d)** None

162. Compton shift is maximum for scattering angle of photon:

(a) 0° **(b)** 90°

(c) 180° **(d)** 45°

163. Complete the electromagnetic spectrum microwaves, ————, visible, ultraviolet.

(a) Infrared **(b)** X-rays

(c) γ-rays **(d)** Short radio waves

ANSWERS

1.	(b)	**2.**	(c)	**3.**	(c)	**4.**	(d)	**5.**	(a)
6.	(b)	**7.**	(b)	**8.**	(b)	**9.**	(d)	**10.**	(b)
11.	(b)	**12.**	(b)	**13.**	(b)	**14.**	(a)	**15.**	(c)
16.	(d)	**17.**	(b)	**18.**	(c)	**19.**	(b)	**20.**	(c)
21.	(a)	**22.**	(d)	**23.**	(d)	**24.**	(b)	**25.**	(a)
26.	(b)	**27.**	(b)	**28.**	(b)	**29.**	(b)	**30.**	(b)
31.	(b)	**32.**	(b)	**33.**	(b)	**34.**	(c)	**35.**	(a)
36.	(c)	**37.**	(a)	**38.**	(b)	**39.**	(b)	**40.**	(a)
41.	(d)	**42.**	(a)	**43.**	(a)	**44.**	(d)	**45.**	(a)
46.	(a)	**47.**	(a)	**48.**	(b)	**49.**	(d)	**50.**	(a)
51.	(c)	**52.**	(a)	**53.**	(b)	**54.**	(c)	**55.**	(b)
56.	(d)	**57.**	(a)	**58.**	(b)	**59.**	(d)	**60.**	(d)
61.	(b)	**62.**	(b)	**63.**	(b)	**64.**	(d)	**65.**	(c)
66.	(b)	**67.**	(b)	**68.**	(d)	**69.**	(c)	**70.**	(a)
71.	(a)	**72.**	(d)	**73.**	(d)	**74.**	(a)	**75.**	(c)
76.	(c)	**77.**	(d)	**78.**	(c)	**79.**	(a)	**80.**	(d)
81.	(b)	**82.**	(b)	**83.**	(a)	**84.**	(b)	**85.**	(d)
86.	(c)	**87.**	(d)	**88.**	(a)	**89.**	(a)	**90.**	(c)
91.	(b)	**92.**	(a)	**93.**	(b)	**94.**	(c)	**95.**	(b)
96.	(a)	**97.**	(d)	**98.**	(c)	**99.**	(b)	**100.**	(c)
101.	(c)	**102.**	(b)	**103.**	(d)	**104.**	(a)	**105.**	(b)
106.	(d)	**107.**	(b)	**108.**	(b)	**109.**	(a)	**110.**	(a)
111.	(d)	**112.**	(a)	**113.**	(b)	**114.**	(b)	**115.**	(a)
116.	(d)	**117.**	(d)	**118.**	(c)	**119.**	(a)	**120.**	(d)
121.	(a)	**122.**	(c)	**123.**	(a)	**124.**	(a)	**125.**	(b)
126.	(c)	**127.**	(b)	**128.**	(b)	**129.**	(d)	**130.**	(c)
131.	(c)	**132.**	(c)	**133.**	(a)	**134.**	(c)	**135.**	(a)
136.	(b)	**137.**	(c)	**138.**	(d)	**139.**	(a)	**140.**	(d)
141.	(c)	**142.**	(b)	**143.**	(d)	**144.**	(b)	**145.**	(d)
146.	(a)	**147.**	(a)	**148.**	(c)	**149.**	(a)	**150.**	(b)
151.	(c)	**152.**	(d)	**153.**	(d)	**154.**	(b)	**155.**	(b)
156.	(b)	**157.**	(b)	**158.**	(b)	**159.**	(c)	**160.**	(a)
161.	(b)	**162.**	(b)	**163.**	(a)				