17.19 MULTIPLE CHOICE QUESTIONS (SELF PRACTICE):

Q.1. Gallilean transformations are applicable in:
(a) All frames
(b) Frame of Reference
(c) Non-Inertial frame
(d) Inertial frame

Q.2. Minimum energy required for pair production is:
(a) 939 MeV
(b) 942 MeV
(c) 1.02 MeV
(d) 0.511 MeV

Q.3. Black Body radiations are:
(a) Infra red and Visible light rays
(b) All radiations
(c) Visible light and ultra violet rays
(d) Ultraviolet and X-rays

Q.4. Heisenberg's uncertainty principle is:
(a) $\Delta p \Delta x = \dfrac{\hbar}{2\pi}$
(b) $\Delta p \Delta x = h$
(c) $\Delta p \Delta x = \hbar$
(d) None of these

Q.5. Wave nature of light is proved by:
(a) Polarisation
(b) Black body radiation
(c) Compton's effect
(d) Photo electric effect

Q.6. Kinetic energy of Photo electrons could be increased by:
(a) Decreasing the plate potential
(b) by decreasing the of incident light wave length
(c) Increasing the of incident light wave length
(d) Increasing the plate potential

Q.7. Maximum change in wavelength of X-rays Photon could be obtained when X-rays are scattered at:
(a) Right angle
(b) 180°
(c) 45°
(d) 0°

Q.8. Range of wavelength of visible light is:
(a) 700°A – 1000°A
(b) 1nm – 100nm
(c) 0.1nm – 1nm
(d) 4000°A – 7000°A

Q.9. Dual nature of light is proved by:
(a) Davisson and Germer's experiment.
(b) Black body radiation
(c) Compton's effect
(d) Photo electric effect

Q.10. The minimum light frequency required for photo electric effect is called:
(a) Normal frequency
(b) Cut – off frequency
(c) Threshold frequency
(d) Natural frequency

Q.11. λ_{max} is the:
(a) Wave length of maximum energy
(b) Maximum wave length of radiation
(c) Wave length of minimum energy
(d) All of these

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Q.12. The formula for the momentum of photon is:

(a) $\dfrac{\lambda}{h}$ (b) $h\lambda$ (c) $\dfrac{h}{\lambda}$ (d) $\dfrac{hc}{\lambda}$

Q.13. If the frequency of light causing photo electric emission is doubled, the kinetic energy of photo electrons will be:

(a) The same   (b) Zero

(c) Doubled   (d) Halved

Q.14. The reverse process of pair production is known as:

(a) Annihilation of energy

(b) Antipair production

(c) Materialization of matter

(d) Annihilation of particle into its antiparticle

Q.15. Existence of photon was confirmed by:

(a) Compton   (b) De' broglie

(c) Einstein   (d) Max plank

Q.16. Plank's constant is analogus to:

(a) Inertia   (b) Wave nature

(c) Angular momentum   (d) Linear momentum

Q.17. Wein's displacement law is:

(a) $\lambda_{max} T$ = constant   (b) $\dfrac{\lambda_{max}}{T}$ = constant

(c) $\dfrac{\lambda_{min}}{T}$ = constant   (d) $\lambda_{min} T$ = constant

Q.18. Wave nature and Particle nature of Photon is linked by:

(a) Rest mass of Photon   (b) Wavelength of Photon

(c) Light speed   (d) Momentum of Photon

Q.19. In Compton's Scattering Process, wave length of scattered X-rays:

(a) Remains same   (b) Increases

(c) Decreases   (d) None of these

Q.20. Black body radiations are also called:

(a) Temperature radiations   (b) High energy radiations

(c) Communication radiations   (d) Coherrent radiations

Q.21. Special theory of relativity deals with:

(a) Objects moving with accelerated speed.

(b) Objects moving with variable velocity.

(c) Objects moving with constant speed

(d) Both a and b.

Q.22. Inertial frame has:

(a) Constant velocity   (b) Zero velocity

(c) Zero acceleration.   (d) All of these

Q.23. According to the special theory of relativity, the energy of an object depends upon:

(a) Its mass only.   (b) Momentum and position.

(c) Velocity and time.   (d) Mass and velocity

Q.24. Which one of the following is correct for the inertial frame of reference?

(a) It is in uniform velocity.　　(b) It has zero acceleration.

(c) Net force acting on it zero.　　(d) All of these.

Q.25. Non inertial frame is that:

(a) Which has constant velocity.　　(b) Which has zero acceleration.

(c) Which has acceleration.　　(d) None of these.

Q.26. According to the theory of relativity all motions are:

(a) Neither absolute nor relative.

(b) Some time absolute some time relative.

(c) Absolute.

(d) Relative.

Q.27. The wavelength of maximum radiation of a block body is inversely proportional to the absolute temperature is the statement:

(a) Rayleigh – Jean Law　　(b) Planck's Law.

(c) Stefan's Law.　　(d) Wien's Law

Q.28. $E \propto T^4$ is the mathematical statement of:

(a) Rayleigh – Jean Law　　(b) Planck's Law.

(c) Stefan's Law.　　(d) Wien's Law

Q.29. The energy associated with a particular wavelength is inversely proportional to the fourth power of wavelength is the statement:

(a) Rayleigh – Jean Law　　(b) Planck's Law.

(c) Stefan's Law.　　(d) Wien's Law

Q.30. According Planck's theory energy radiate from the black body in the form of :

(a) Photons　　(b) Packets

(c) Quantum　　(d) All of the above.

Q.31. Energy of photon is directly proportional to its:

(a) Temperature　　(b) Frequency

(c) Wave length　　(d) None of the above.

Q.32. Product of frequency and wavelength of photon is:

(a) Energy absorbed by photon.

(b) Absolute temperature.

(c) Energy radiated by photon.

(d) Velocity of light

Q.33. The photon is the particle, which has:

(a) Infinite rest mass.　　(b) Rest mass but no charge.

(c) No rest mass and no charge.　　(d) a and c are correct.

Q.34. Wave theory of light is unable to prove:

(a) Black body radiation.　　(b) Photoelectric effect.

(c) Compton effect.　　(d) All of them.

Q.35. Wave theory of light cannot prove the:

(a) Reflection of light　　(b) Polarisation.

(c) Compton effect　　(d) Interference of light.

Q.36. Minimum energy required by the electron to leave the metal surface is called as _____ of the metal surface:

(a) Threshold frequency.
(b) Cutoff potential.
(c) Work function.
(d) Threshold energy.

Q.37. Photoelectric effect cannot be produced by non metallic surface because:

(a) They have work function of higher value.

(b) They have large number of free electrons.

(c) They have no free electrons.

(d) Both a and c.

Q.38. Above, threshold frequency the K.E. of photoelectron is:

(a) Inversely proportional to the wave length of the incident photon.

(b) Directly proportional to the frequency of emission.

(c) Directly proportional to the frequency of incident photon.

(d) b and c are correct.

Q.39. In Compton effect a high energy photon on striking with a stationary electron looses its energy:

(a) Conditionally.
(b) Partially.
(c) Wholly.
(d) None of these.

Q.40. The frequency of the incident photon after Compton effect will:

(a) Not change.
(b) Increase
(c) Decrease
(d) None of the above.

Q.41. The wave length of the incident photon after the Compton effect will:

(a) Not change.
(b) Increase
(c) Decrease
(d) None of the above.

Q.42. When the frequency of incident radiation is doubled above threshold frequency then the velocity of photoelectron will be:

(a) Remain same.
(b) Doubled.
(c) Halved
(d) Increase

Q.43. X-rays is the reverse process of:

(a) Pair production.
(b) Compton Effect.
(c) Photoelectric effect.
(d) a and b are correct.

Q.44. In pair production we have a pair of:

(a) Position and electron
(b) Protons.
(c) Electrons.
(d) a and b are correct.

Q.45. In annihilation process of matter:

(a) Protons and electrons are converted for energy

(b) Energy is converted into mass.

(c) Mass is converted into energy.
(d) a and b are correct.

Q.46. In pair production _____ are produced:

(a) Positron and electron.
(b) Photons.
(c) Electron and Neutron.
(d) b and c are correct.

Q.47. In annihilation process _____ are produced:

(a) Positrons.

(b) Photons.

(c) Electrons.

(d) b and c are correct.

Q.48. Which physical quantity will change if intensity of light falling on metal's surface is increased:

(a) K.E of photo electrons.

(b) Velocity of photo electrons.

(c) Plate potential.

(d) Current.

Q.49. The fast moving electrons stopped by a heavy metallic target in an evacuated glass tube, give rise to the production of:

(a) X-Rays.

(b) Laser.

(c) β-Particles.

(d) α-Particles

Q.50. As the temperature of a black body is raised, the wave length corresponding to the maximum intensity:

(a) Remains the same.

(b) Shifts towards longer wavelength.

(c) Shifts towards shorter wave length.

(d) None of the above will happen.

Q.51. Number of photo electrons emitted from metal depends upon:

(a) Intensity of incident light.

(b) Energy of incident light.

(c) Wavelength of incident light.

(d) Frequency of incident light.

Q.52. Where the energy lost by fast moving electron goes?

(a) Appears as photon.

(b) Appears as electron-positron pair.

(c) Appears as its K.E.

(d) It vanishes

Q.53. Which of the following is not true for antiparticle of electron:

(a) It follows mass-energy relation.

(b) It possess the same charge as that on electron.

(c) It possess the same momentum as that of electron.

(d) Its charge to mass ratio is the same as that of electron.

Q.54. Which is not the result of special theory of relativity:

(a) Length contraction.

(b) Space-time transformation.

(c) Time dilation.

(d) Mass variation.

Q.55. The black body which is close to perfect black body is:

(a) Translucent glass box

(b) Cavity radiator

(c) Black holes

(d) All of these

KEY

(1) All frames	(2) 1.02 MeV	(3) All radiations
(4) $\Delta p \Delta x = \hbar$	(5) Polarisation	(6) by decreasing the of incident light wave length
(7) Right angle	(8) 4000°A – 7000°A	(9) Davisson and Germer's experiment
(10) Threshold frequency	(11) Wave length of maximum energy	(12) $\dfrac{h}{\lambda}$
(13) Doubled	(14) Annihilation of energy	(15) Compton
(16) Angular momentum	(17) $\lambda_{max} T = $ constant	(18) Momentum of Photon
(19) Increases	(20) High energy radiations	(21) Objects moving with constant speed
(22) All of these	(23) Mass and velocity	(24) All of these
(25) Which has acceleration	(26) Relative	(27) Wien's Law
(28) Stefan's Law	(29) Rayleigh – Jean Law	(30) All of the above
(31) Frequency	(32) Velocity of light	(33) No rest mass and no charge
(34) All of them	(35) Compton effect	(36) Work function
(37) They have work function of higher value	(38) Directly proportional to the frequency of incident photon	(39) Partially
(40) Decrease	(41) Increase	(42) Increase
(43) Photoelectric effect	(44) Position and electron	(45) Mass is converted into energy
(46) Positron and electron	(47) Photons	(48) Current
(49) X-Rays	(50) Shifts towards shorter wave length	(51) Intensity of incident light
(52) Appears as photon	(53) It possess the same charge as that on electron	(54) Space-time transformation
(55) Cavity radiator		