NEET : CHAPTER WISE TEST-10

SUBJECT :- PHYSICS **DATE.....**

CLASS :- 12th **NAME.....**

CHAPTER :- MODERN PHYSICS **SECTION.....**

(SECTION-A)

1. The cathode rays have particle nature because of the fact that
(A) They can propagate in vacuum
(B) They are deflected by electric and magnetic fields
(C) They produced fluorescence
(D) They cast shadows

2. When electron beam passes through an electric field, they gain kinetic energy. If the same beam passes through magnetic field, then
(A) Their energy increases
(B) Their momentum increases
(C) Their potential energy increases
(D) Energy and momentum both remains unchanged

3. An electron is accelerated through a potential difference of 1000 *volts*. Its velocity is nearly
(A) $3.8\times10^{7}m/s$ (B) $1.9\times10^{6}m/s$
(C) $1.9\times10^{7}m/s$ (D) $5.7\times10^{7}m/s$

4. The ratio of longest wavelength and the shortest wavelength observed in the five spectral series of emission spectrum of hydrogen is
(A) $\frac{4}{3}$ (B) $\frac{525}{376}$
(C) 25 (D) $\frac{900}{11}$

5. The momentum of a photon is $3.3\times10^{-29}kg-m/sec$. Its frequency will be
(A) $3\times10^{3}Hz$ (B) $6\times10^{3}Hz$
(C) $7.5\times10^{12}Hz$ (D) $1.5\times10^{13}Hz$

6. There are n_1 photons of frequency γ_1 in a beam of light. In an equally energetic beam, there are n_2 photons of frequency γ_2. Then the correct relation is
(A) $\frac{n_1}{n_2}=1$ (B) $\frac{n_1}{n_2}=\frac{\gamma_1}{\gamma_2}$
(C) $\frac{n_1}{n_2}=\frac{\gamma_2}{\gamma_1}$ (D) $\frac{n_1}{n_2}=\frac{\gamma_1^2}{\gamma_2^2}$

7. According to Bohr's theory the moment of momentum of an electron revolving in second orbit of hydrogen atom will be
(A) $2\pi h$ (B) πh
(C) $\frac{h}{\pi}$ (D) $\frac{2h}{\pi}$

8. Einstein's photoelectric equation states that $E_k=h\nu-\phi$. In this equation E_k refers to
(A) Kinetic energy of all the emitted electrons
(B) Mean kinetic energy of the emitted electrons
(C) Maximum kinetic energy of the emitted electrons
(D) Minimum kinetic energy of the emitted electrons

9. A metal surface of work function 1.07 *eV* is irradiated with light of wavelength 332 *nm*. The retarding potential required to stop the escape of photo-electrons is
(A) 4.81 *Ev* (B) 3.74 *eV*
(C) 2.65 *eV* (D) 1.07 *eV*

10. The principle of controlled chain reaction is used in
(A) Atomic energy reactor
(B) Atom bomb
(C) The core of sun
(D) Artificial radioactivity

11. In Bohr model of the hydrogen atom, the lowest orbit corresponds to
(A) Infinite energy
(B) The maximum energy
(C) The minimum energy
(D) Zero energy

12. When light falls on a metal surface, the maximum kinetic energy of the emitted photo-electrons depends upon
(A) The time for which light falls on the metal
(B) Frequency of the incident light
(C) Intensity of the incident light
(D) Velocity of the incident light

13. The retarding potential for having zero photo-electron current
(A) Is proportional to the wavelength of incident light
(B) Increases uniformly with the increase in the wavelength of incident light
(C) Is proportional to the frequency of incident light
(D) Increases uniformly with the increase in the frequency of incident light wave

14. The binding energy of nucleus is a measure of its
(A) Charge (B) Mass
(C) Momentum (D) Stability

15. A chain reaction is continuous due to
(A) Large mass defect
(B) Large energy
(C) Production of more neutrons in fission
(D) None of these

16. As the intensity of incident light increases
(A) Photoelectric current increases
(B) Photoelectric current decreases
(C) Kinetic energy of emitted photoelectrons increases
(D) Kinetic energy of emitted photoelectrons decreases

17. The explosion of the atomic bomb takes place due to
(A) Nuclear fission
(B) Nuclear fusion
(C) Scattering
(D) Thermionic emission

18. When yellow light is incident on a surface, no electrons are emitted while green light can emit. If red light is incident on the surface, then
(A) No electrons are emitted
(B) Photons are emitted
(C) Electrons of higher energy are emitted
(D) Electrons of lower energy are emitted

19. If *m* is mass of electron, *v* its velocity, *r* the radius of stationary circular orbit around a nucleus with charge *Ze*, then from Bohr's first postulate, the kinetic energy $K = \frac{1}{2}mv^2$ of the electron in *C.G.S.* system is equal to
(A) $\frac{1}{2}\frac{Ze^2}{r}$ (B) $\frac{1}{2}\frac{Ze^2}{r^2}$
(C) $\frac{Ze^2}{r}$ (D) $\frac{Ze}{r^2}$

20. Light of frequency $8\times10^{15}\,Hz$ is incident on a substance of photoelectric work function $6.125\,eV$. The maximum kinetic energy of the emitted photoelectrons is
(A) 17 eV (B) 22 eV
(C) 27 eV (D) 37 eV

21 If the energy of a photon corresponding to a wavelength of 6000 $\AA$ is $3.32\times10^{-19}\,J$, the photon energy for a wavelength of 4000 $\AA$ will be
(A) 1.4 *eV* (B) 4.9 *eV*
(C) 3.1 *eV* (D) 1.6 *eV*

22. The force acting between proton and proton inside the nucleus is
(A) Coulombic (B) Nuclear
(C) Both (D) None of these

23. Nuclear forces are
(A) Short ranged attractive and charge independent
(B) Short ranged attractive and charge dependent
(C) Long ranged repulsive and charge independent
(D) Long ranged repulsive and charge dependent

24. The first line in the Lyman series has wavelength λ. The wavelength of the first line in Balmer series is
(A) $\frac{2}{9}\lambda$ (B) $\frac{9}{2}\lambda$
(C) $\frac{5}{27}\lambda$ (D) $\frac{27}{5}\lambda$

25. The electron in a hydrogen atom makes a transition from an excited state to the ground state. Which of the following statements is true
(A) Its kinetic energy increases and its potential and total energies decrease
(B) Its kinetic energy decreases, potential energy increases and its total energy remains the same
(C) Its kinetic and total energies decrease and its potential energy increases
(D) Its kinetic, potential and total energies decreases

26. In photoelectric effect, the K.E. of electrons emitted from the metal surface depends upon

(A) Intensity of light
(B) Frequency of incident light
(C) Velocity of incident light
(D) Both intensity and velocity of light

27. In $_{88}Ra^{226}$ nucleus, there are

(A) 138 protons and 88 neutrons
(B) 138 neutrons and 88 protons
(C) 226 protons and 88 electrons
(D) 226 neutrons and 138 electrons

28. Which one of the series of hydrogen spectrum is in the visible region

(A) Lyman series (B) Balmer series
(C) Paschen series (D) Bracket series

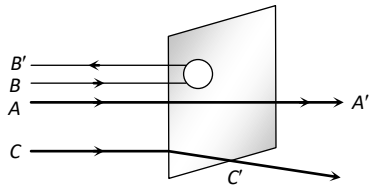
29. The ionization potential for second *He* electron is

(A) 13.6 *eV* (B) 27.2 *eV*
(C) 54.4 *eV* (D) 100 *eV*

30. An electron jumps from the 4th orbit to the 2nd orbit of hydrogen atom. Given the Rydberg's constant $R = 10^5\, cm^{-1}$. The frequency in *Hz* of the emitted radiation will be

(A) $\frac{3}{16}\times 10^5$ (B) $\frac{3}{16}\times 10^{15}$
(C) $\frac{9}{16}\times 10^{15}$ (D) $\frac{3}{4}\times 10^{15}$

31. A beam of fast moving alpha particles were directed towards a thin film of gold. The parts A', B' and C' of the transmitted and reflected beams corresponding to the incident parts *A*, *B* and *C* of the beam, are shown in the adjoining diagram. The number of alpha particles in



(A) B' will be minimum and in C' maximum
(B) A' will be maximum and in B' minimum
(C) A' will be minimum and in B' maximum
(D) C' will be minimum and in B' maximum

32. The radius of hydrogen atom in its ground state is $5.3\times 10^{-11} m$. After collision with an electron it is found to have a radius of $21.2\times 10^{-11} m$. What is the principal quantum number *n* of the final state of the atom

(A) *n* = 4 (B) *n* = 2
(C) *n* = 16 (D) *n* = 3

33. The masses of neutron and proton are 1.0087 *a.m.u.* and 1.0073 *a.m.u.* respectively. If the neutrons and protons combine to form a helium nucleus (alpha particles) of mass 4.0015 *a.m.u.* The binding energy of the helium nucleus will be (1 *a.m.u.*= 931 *MeV*)

(A) 28.4 *MeV* (B) 20.8 *MeV*
(C) 27.3 *MeV* (D) 14.2 *MeV*

34. The binding energy of deuteron $_1^2H$ is 1.112 *MeV* per nucleon and an $\alpha-$particle $_2^4He$ has a binding energy of 7.047 *MeV* per nucleon. Then in the fusion reaction $_1^2H + _1^2H \rightarrow _2^4He + Q$, the energy *Q* released is

(A) 1 *MeV* (B) 11.9 *MeV*
(C) 23.8 *MeV* (D) 931 *MeV*

35. The de-Broglie wavelength of an electron in the first Bohr orbit is

(A) Equal to one fourth the circumference of the first orbit
(B) Equal to half the circumference of the first orbit
(C) Equal to twice the circumference of the first orbit
(D) Equal to the circumference of the first orbit

(SECTION-B)

36. The shortest wavelength in the Lyman series of hydrogen spectrum is 912 *Å* corresponding to a photon energy of 13.6 *eV*. The shortest wavelength in the Balmer series is about

(A) 3648 *Å* (B) 8208 *Å*
(C) 1228 *Å* (D) 6566 *Å*

37. The kinetic energy of electron in the first Bohr orbit of the hydrogen atom is

(A) – 6.5 *eV* (B) – 27.2 *eV*
(C) 13.6 *eV* (D) – 13.6 *eV*

38. An electron changes its position from orbit $n=4$ to the orbit $n=2$ of an atom. The wavelength of the emitted radiation's is (R = Rydberg's constant)

(A) $\frac{16}{R}$ (B) $\frac{16}{3R}$

(C) $\frac{16}{5R}$ (D) $\frac{16}{7R}$

39. Nuclear binding energy is equivalent to

(A) Mass of proton

(B) Mass of neutron

(C) Mass of nucleus

(D) Mass defect of nucleus

40. Radius of first Bohr orbit is r. What is the radius of 2nd Bohr orbit?

(A) $8r$ (B) $2r$

(C) $4r$ (D) $2\sqrt{2r}$

41. The minimum orbital angular momentum of the electron in hydrogen atom is

(A) h (B) h/2

(C) $h/2\pi$ (D) h/π

42. **Match the following :**

Column I	**Column II**
(a) Photoelectric effect	I. Photon
(b) Wave	II. Frequency
(c) X rays	III. K capture
(d) Nucleus	IV. γ rays

(A) a – I, b – II, c – III, d – IV

(B) a – II, b – I, c – IV, d – III

(C) a – II, b – I, c – III, d – IV

(D) None of these

43. If the nucleus $^{27}_{13}Al$ has a nuclear radius of about 3.6 fm, then $^{125}_{52}Te$ would have its radius approximately as :

(A) 6.0 fm (B) 9.6 fm

(C) 12.0 fm (D) 4.8 fm

44. **Assertion :** Neutrons penetrate matter more readily as compared to protons.

Reason : Neutrons are slightly more massive than protons.

(A) If both assertion and reason are true and reason is the correct explanation of assertion.

(B) If both assertion and reason are true but reason is not the correct explanation of assertion.

(C) If Assertion is true but reason is false.

(D) If both assertion and reason are false.

45. Fusion reaction takes place at high temperature because :

(A) nuclei break up at high temperature

(B) atoms get ionised at high temperature

(C) kinetic energy is high enough to overcome the coulomb repulsion between nuclei

(D) molecules break up at high temperature

46. Helium atom emits a photon of wavelength 0.1 A. The recoil energy of the atom due to the emission of photon will be

(A) 2.04 eV (B) 4.91 eV

(C) 1.67 eV (D) 9.10 eV

47. For the case discussed above,the wavelength of light emitted in the visible region by He^+ ions after collisions with H atoms is

(A) 6.5×10^{-7} m (B) 5.6×10^{-7} m

(C) 4.8×10^{-7} m (D) 4.0×10^{-7} m

48. If λ_{Cu} is the wavelength of K_α X-ray line of copper (atomic number 29) and λ_{Mo} is the wavelength of the K_α X-ray line of molybdenum (atomic number 42), then the ratio $\lambda_{Cu}/\lambda_{Mo}$ is close to

(A) 1.99 (B) 2.14

(C) 0.50 (D) 0.48

49. **Assertion :** Photoelectric effect demonstrates the wave nature of light.

Reason : The number of photoelectrons is proportional to the frequency of light.

(A) If both assertion and reason are true and reason is the correct explanation of assertion.

(B) If both assertion and reason are true but reason is not the correct explanation of assertion.

(C) If Assertion is true but reason is false.

(D) If both assertion and reason are false.

50. The work function of a photosensitive material is 4.0 eV. The longest wavelength of light that can cause photon emission from the substance is (approximately)

(A) 3100 nm (B) 966 nm

(C) 31 nm (D) 310 nm