Competitive Exams: Physics MCQs (Practice_Test 9 of 35)

1. An electron having kinetic energy T is moving in a circular orbit of radius R perpendicular to a uniform Magnetic induction B. If kinetic energy is doubled and magnetic induction is tripled, The radius will become
   a. R ′ $\frac{9}{4}$
   b. R ′ $\frac{3}{2}$
   c. R ′ $\frac{2}{9}$
   d. R ′ $\frac{4}{3}$
2. If in the first Bohr orbit of a hydrogen atom the total energy of the electron is-21.76 × 10 − 19 J, then its potential energy will be
   a. -43.52 × 10 − 19 J
   b. -21.76 × 10 − 19 J
   c. -10.88 × 10 − 19 J
   d. -13.60 × 10 − 19 J
3. Consider the following substances, which are frequently used as a source of electrons:
   a. Magnesium
   b. Calcium
   c. Tungsten
   d. Platinum

The correct sequence of the above substances in increasing order of their work functions is

a. 1,2, 3,4

b. 2,1, 3,4

c. 2,1, 4,3

d. 1,2, 4,3

4. The de-Broglie wavelength of material particles which are in thermal equilibrium at temperature T is

a. h/sqrt 2mkT

b. h/sqrt 2 mkT

c. h-mkT

d. h/sqrt2 kT

5. The phase velocity (Vp) and the group velocity (Vg) of a de-Broglie wave, in free space (speed of light is c) are related as

a. Vp/Vg = sqrt2

b. Vp. Vg = C2

c. Vp/Vg = 0.5

d. Vp Vg = 2C2

6. In Compton scattering, the incident photon will lose maximum energy if it is scattered at an angle of:

a. 0

b. 60

c. 90

d. 180

7. In one of the radioactive decay chains we come across the element 22688 Ra. The final product of the chain is 20682 Pb. The number of a and b-is emitted

a. 3 a and 6b-

b. 4 a and 5b-

c. 5 a and 4b-

d. 6 a and 6b-

8. At time t. = 0, N1 nuclei of decay constant l1 and N2 nuclei of decay constant l2 are mixed. The decay rate of the mixture is
   a. N1 N2 e- (l1 + l2) t
   b. (N1/N2) e- (l1 – l2) t
   c. (N1 N2 e-l1t + N2 l2 e-l 2t)
   d. N1/N2 e- (l1 + l2) t
9. The nuclear reaction is an example of
   a. nuclear chain reaction
   b. successive disintegration
   c. pair production
   d. artificial radioactivity
10. Which one of the following particles is a lepton?
    a. Neutron
    b. Proton
    c. Electron
    d. Lambda
11. Match List I with List II and select the correct answer:

List-I (Process)	List-II (Approximate Energy released in mV)
A. Fission of one uranium nucleus B. Formation of one helium nucleus by Fission C. Formation of a compound nucleus D. Formation of a deuteron by the	1. Energy 2 2. Energy 8 3. Energy 200 by the capture of a neutron 4. Energy 28 captures of a neutron by a proton

A B C D

a. 3 4 2 1

b. 2 4 1 3

c. 4 2 3 1

d. 3 1 2 4

12. Under space charge condition with the plate voltage Eb = 100 V and the permanence K = 104 (In S. I unit) , the plate current in a diode will be

a. 10 – 6 mA

b. 10 mA

c. 102 mA

d. 106 mA