Dual nature of electron

1. De broglie equation describes the relationship of wavelength associated with the motion of an electron and its
(a) Mass (b) Energy
(c) Momentum (d) Charge

2. The wave nature of an electron was first given by
(a) De-Broglie
(b) Heisenberg
(c) Mosley
(d) Sommerfield

3. Among the following for which one mathematical expression $\lambda = \frac{h}{p}$ stands
(a) De Broglie equation
(b) Einstein equation
(c) Uncertainty equation
(d) Bohr equation

4. Which one of the following explains light both as a stream of particles and as wave motion
(a) Diffraction
(b) $\lambda = h/p$
(c) Interference
(d) Photoelectric effect

5. In which one of the following pairs of experimental observations and phenomenon does the experimental observation correctly account for phenomenon
Experimental observation
Phenomenon
(a) X -ray spectra
Charge on the nucleus
(b) α -particle scattering
Quantized electron orbit
(c) Emission spectra
The quantization of energy
(d) The photoelectric effect
The nuclear atom

6. Which of the following expressions gives the de-Broglie relationship
(a) $h = \frac{\lambda}{mv}$ (b) $\lambda = \frac{h}{mv}$
(c) $\lambda = \frac{m}{hv}$ (d) $\lambda = \frac{v}{mh}$

7. de-Broglie equation is
(a) $n\lambda = 2d\ sin\ \theta$ (b) $E = hv$
(c) $E = mc^2$ (d) $\lambda = \frac{h}{mv}$

8. The de-Broglie wavelength of a particle with mass $1gm$ and velocity $100\ m/sec$ is
(a) $6.63 \times 10^{-33}m$
(b) $6.63 \times 10^{-34}m$
(c) $6.63 \times 10^{-35}m$
(d) $6.65 \times 10^{-35}m$

9. Minimum de-Broglie wavelength is associated with
(a) Electron
(b) Proton
(c) CO_2 molecule
(d) SO_2 molecule

10. The de-Broglie wavelength associated with a material particle is
(a) Directly proportional to its energy
(b) Directly proportional to momentum
(c) Inversely proportional to its energy
(d) Inversely proportional to momentum

11. An electron has kinetic energy $2.8 \times 10^{-23} J$. de-Broglie wavelength will be nearly
$(m_e = 9.1 \times 10^{-31} kg)$
(a) $9.28 \times 10^{-4} m$
(b) $9.28 \times 10^{-7} m$
(c) $9.28 \times 10^{-8} m$
(d) $9.28 \times 10^{-10} m$

12. What will be de-Broglie wavelength of an electron moving with a velocity of $1.2 \times 10^5 ms^{-1}$
(a) 6.068×10^{-9}
(b) 3.133×10^{-37}
(c) 6.626×10^{-9}
(d) 6.018×10^{-7}

13. The de-Broglie wavelength associated with a particle of mass $10^{-6} kg$ moving with a velocity of $10 ms^{-1}$, is
(a) $6.63 \times 10^{-22} m$
(b) $6.63 \times 10^{-29} m$
(c) $6.63 \times 10^{-31} m$
(d) $6.63 \times 10^{-34} m$

14. What is the de-Broglie wavelength associated with the hydrogen electron in its third orbit
(a) $9.96 \times 10^{-10} cm$
(b) $9.96 \times 10^{-8} cm$
(c) $9.96 \times 10^{4} cm$
(d) $9.96 \times 10^{8} cm$

15. If the velocity of hydrogen molecule is $5 \times 10^4 cmsec^{-1}$, then its de-Broglie wavelength is
(a) 2 Å (b) 4 Å
(c) 8 Å (d) 100 Å

16. A 200*g* golf ball is moving with a speed of 5 m per hour. The associated wave length is $(h = 6.625 \times 10^{-34} J - sec)$
(a) $10^{-10} m$ (b) $10^{-20} m$
(c) $10^{-30} m$ (d) $10^{-40} m$

17. A cricket ball of $0.5 kg$ is moving with a velocity of $100 m/sec$. The wavelength associated with its motion is
(a) $1/100 cm$ (b) $6.6 \times 10^{-34} m$
(c) $1.32 \times 10^{-35} m$ (d) $6.6 \times 10^{-28} m$

18. Dual nature of particles was proposed by
(a) Heisenberg
(b) Lowry
(c) de-Broglie
(d) Schrodinger

19. Calculate de-Broglie wavelength of an electron travelling at 1% of the speed of light
(a) 2.73×10^{-24}
(b) 2.42×10^{-10}
(c) 242.2×10^{10}
(d) None of these

20. Which is the correct relationship between wavelength and momentum of particles
(a) $\lambda = \frac{h}{P}$ (b) $\pi = \frac{h}{P}$
(c) $P = \frac{h}{\lambda}$ (d) $h = \frac{P}{\lambda}$

21. The de-Broglie equation applies
(a) To electrons only
(b) To neutrons only
(c) To protons only
(d) All the material object in motion