

**Q1/ Choose the correct answer justifying your choice:**

1- Quantum mechanics defined as the theoretical tool that is uses to investigate the .....

- a- macroscopic systems    b- large systems    c- microscopic systems    d- classical systems

2- The photoelectrons have a kinetic energy equal to .....

- a-  $E_r - W_o$                       b-  $E_r$                       c-  $W_o$                       d-  $E_r / W_o$

where  $E_r$  is the energy of the incident radiation and  $W_o$  the energy needed to separate electron from the metal called work function.

3- Correspondence Principle which assumed by Bohr, states that the results of quantum physics are consistent with the results of classical physics at the limit where the ..... can be neglected.

- a- light speed                      b- Planck constant                      c- De Broglie wave length  
d- Heisenberg Uncertainty Principle.

4- The number of photons that will make up 6.625 J of energy for a radiation having frequency  $10^{17}$  Hz are:

- a-  $1 \times 10^{-17}$                       b-  $1 \times 10^{-34}$                       c-  $1 \times 10^{34}$                       d-  $1 \times 10^{17}$

5- The De Broglie wave length of a projectile having a mass  $1.0 \times 10^{-3}$  kg and its velocity is  $3 \times 10^7$  m/s.

- a-  $2.21 \times 10^{-29}$  nm                      b-  $2.21 \times 10^{-21}$  m                      c-  $2.21 \times 10^{-44}$  m                      d-  $2.21 \times 10^{-30}$  nm
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Q2/ Show that, Planck radiation law reduced to Wien's radiation law for high frequencies and to Rayleigh – Jeans radiation law for very low frequencies.

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Q3/ Use the uncertainty principle to prove the impossibility of finding electron inside a nucleus.

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Q4/ Use the equation  $\Delta E \cdot \Delta t \geq \hbar$  to obtain the equation  $\Delta x \cdot \Delta p_x \geq \hbar$