PHYSICS

BOOKS - MODERN PUBLICATION PHYSICS (KANNADA ENGLISH)

UNIT TEST PAPER - NO.8

Exercise

1. A proton and an α particle are accelerated through the same potential difference V. The

ratio of their de Broglie wavelengths is

A. $2:1$

B. $1:2$

C. $8:1$

D. None of these

Answer: D

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2. Ionisation potential for a hydrogen atom is :

A. $13.6eV$

B. $2.4eV$

C. $Zero$

D. Infinity

Answer: A

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3. The mass of electrons , when it is accelerated to kinetic energy of 10000 eV is :

A. $9.28 \times 10^{-31} kg$

B. 8.85×10^{-32} kg

C. 10^{-27} kg

D. 11.7×10^{-32} kg

Answer: A

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4. The energy of a photon (in eV) is related to the wavelength (in $\mathring{A}$) by :

A. $E = \frac{1.24}{\lambda}$

B. $E = \frac{124}{\lambda}$

C. $E = \frac{1.24 \times 10^4}{\lambda}$

D. $E = \frac{124}{\lambda^2}$

Answer: C

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5. Ultraviolet radiation of 6.2 eV falls on an aluminium surface with $W_0 = 4.5eV$. The

kinetic energy in Joules of the fastest electron emitted is approximately :

A. 3×10^{-21}

B. 3×10^{-19}

C. 3×10^{-17}

D. 3×10^{-15}

Answer: B

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6. Light from a hydrogen discharge tube is incident on the cathode of a photocell. The work function of cathode surface is 4.2 eV. In order to reduce the photocurrent to zero, the voltage of the anode relative to the cathode must be made :

A. $-4.2V$

B. $-9.4V$

C. $-17.8V$

D. $+9.4V$

Answer: B

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7. A gas of hydrogen like atoms are in an unknown energy state of principal quantum number n_1 . They can absorb radiations having photons of energy 68 eV. Consequently , the emission spectrum of the gas has only three different lines . All the wavelengths are equal or smaller than that of the absorbed radiation . Assuming Bohr's model to be applicable

answer the following question .

The initial state n_1 of the gas atoms is

A. 2

B. 1

C. 3

D. 4

Answer: A

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8. A gas of hydrogen like atoms are in an unknown energy state of principal quantum number n_1 . They can absorb radiations having photons of energy 68 eV. Consequently , the emission spectrum of the gas has only three different lines . All the wavelengths are equal or smaller than that of the absorbed radiation . Assuming Bohr's model to be applicable answer the following question .

The atomic number of the gas is

A. 2

B. 3

C. 6

D. 5

Answer: C

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9. A gas of hydrogen like atoms are in an unknown energy state of principal quantum number n_1 . They can absorb radiations having photons of energy 68 eV. Consequently , the

emission spectrum of the gas has only three different lines . All the wavelengths are equal or smaller than that of the absorbed radiation . Assuming Bohr's model to be applicable answer the following question .

The minimum wavelength in the obtained spectrum will be nearly.

A. 28Å

B. 280Å

C. 2813Å

D. 5614Å

Answer: A

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10. In Rutherford experiment , the number of the alpha particles scattered through and angle of 60° by a silver foil is 200 per minute. When the silver foil is replaced by a copper foil of the same thickness , the number of α - particles scatted through an angle of 60° per minute is :

A. $200 \times \frac{Z_{Cu}}{Z_{Ag}}$

B. $200 \times \left(\frac{Z_{Cu}}{Z_{Ag}}\right)^3$

C. $200 \times \frac{Z_{Ag}}{Z_{Cu}}$

D. $200 \times \left(\frac{Z_{Ag}}{Z_{Cu}}\right)$

Answer: B

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11. The radius of the smallest electron orbit in the hydrogen like atom is $\frac{0.51 \times 10^{-10}}{4}$ m,

then it is :

A. Hydrogen atom

B. He^{+}

C. Li^{++}

D. Br^{+++}

Answer: D

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12. If the hydrogen atoms are excited to states with principal quantum number n, then the number of possible emission lines is :

A. n

B. $n-1$

C. $\frac{n(n-1)}{2}$

D. $\frac{n(n+1)}{2}$

Answer: C

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13. A hydrogen atom in the ground state absorbs 12.09 eV of energy . The change in the orbital angular momentum of the electron is :

A. $+1.05 \times 10^{-34} Js$

B. $+2.11 \times 10^{-34} Js$

C. $-2.11 \times 10^{-34} Js$

D. $4.22 \times 10^{-34} Js$

Answer: B

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14. A hydrogen-like atom has one electron revolving around a stationary nucleus. The energy required to excite the electron from the second orbit to the third orbit is 47.2 eV. The atomic number of the atom is

A. 2

B. 3

C. 4

D. 5

Answer: D

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15. When the electron jumps from a level $n = 4$ to $n = 1$, momentum of the recoiled hydrogen atom will be

A. Zero

B. 6×10^{27} kg m/s

C. 12.75×10^{-19} kg m/s

D. 13.6×10^{-19} kg m/s

Answer: A

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16. In the case of forward biasing of p - n junction , which one of the following figures correctly depicts the direction of flow of charge carriers ?

A. 

B. 

C. 

D. 

Answer: D

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17. In a common emitter amplifier output resistance is 5000 ohm and input resistance is 2000 ohm. If peak value of signal voltage is 10 mV and $\beta = 50$, then the peak value of output voltage is :

A. $5 \times 10^{-6} V$

B. $2.5 \times 10^{-4} V$

C. 1.25 V

D. 125 V

Answer: C

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18. The current gain of a transistor is 100. If the base current changes by $200\mu A$, what is the change in collected current ?

A. 200 mA

B. 20 mA

C. 2 mA

D. 0.2 mA

Answer: B

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19. radioactive nucleus X undergoes a series of decays corroding to the scheme

$$X \xrightarrow{\alpha} X_1 \xrightarrow{\beta^-} X_2 \xrightarrow{\alpha} X_3 \xrightarrow{\gamma} X_4$$

If the mass number and atomic number of X

are 180 and 72 respectively, the corresponding numbers for X_4 are

A. 17.6 ,69

B. 172,69

C. 176,71

D. 172,71

Answer: B

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20. Statement I : Half life for certain radioactive element is 5 min . Four nuclei of that element are observed at a certain instant of time. After five minutes it can be definitely said that two nuclei will be left undecayed .

Statement II : Half life is defined as time in which population is halfed .

A. Both statement -1 and statement -2 are true and statement -2 is the correct explanation of statement -1.

B. Both statement -1 and statement -2 are true and statement -2 is not the correct explanation of statement -1.

C. Statement -1 is true but statement -2 is false.

D. Statement -1 is false but statement 2 is true.

Answer: D

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21. Statement I : When light of a given intensity falls on a surface is independent of frequency .

Statement II : Momentum of a photon is directly proportional to its frequency and number of photons hitting the surface number of photons hitting the surface per unit time is inversely proportional to frequency.

A. Both statement -1 and statement -2 are true and statement -2 is the correct

explanation of statement -1.

B. Both statement -1 and statement -2 are true and statement -2 is not the correct explanation of statement -1.

C. Statement -1 is true but statement -2 is false.

D. Statement -1 is false but statement 2 is true.

Answer: A

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22. Hydrogen (H), deuterium (D), singly ionized helium $\left(He^{+}\right)$ and doubly ionized lithium $\left(Li^{++}\right)$, all have one electron around the nucleus Consider n = 2 to n = 1 transition . If the wavelength of emitted radiation are $\lambda_1, \lambda_2, \lambda_3, \text{ and } \lambda_4$, respectively, then approximately.

A. $\lambda_1 = \lambda_2 = 4\lambda_3 = 9\lambda_4$

B. $4\lambda_1 = 2\lambda_2 = 2\lambda_3 = \lambda_4$

C. $\lambda_1 = 2\lambda_2 = 2\sqrt{2}\lambda_3 = 3\sqrt{2}\lambda_4$

D. $\lambda_1 = \lambda_2 = 2\lambda_3 = 3\lambda_4$

Answer: A

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23. A nucleus containing Z protons and N neutrons has a mass M . If the mass of a proton is m_p and that of a neutron is m_n , then the mass defect of the nucleus is

A. $M - Zm_p - Nm_n$

B. $Zm_p + Nm_n - M$

C. $\frac{M - Zm_p - Nm_n}{Z + N}$

D. $\frac{Zm_p + Nm_n - M}{Z + N}$

Answer: B

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24. In extrinsic germanium crystal, the holes are provided by :

A. aluminium

B. boron

C. phosphorous

D. antimony

Answer: D

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25. A triode value has mutual conductance of 2×10^{-3} mho . If the grid voltage is changed from -2 V to -4 , the plate current :

A. increases by 0.5 mA

B. decreases by 0.5 mA

C. increases by 4 mA

D. decreases by 4 mA

Answer: D

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