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Special Online Speed Test

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ), 2023 අගෝස්තු

General Certificate Of Education (Adv. Level) Examination, August 2023

රසායන විද්‍යාව I Chemistry I	02	S/E	I

Universal gas constant $R = 8.314\ J\ K^{-1}\ mol^{-1}$ Plank's constant $h = 6.626\times10^{-34} J\ s$

Avogadro constant $N_A = 6.022\times10^{23}\ mol^{-1}$ Velocity of light $c = 3\times10^{8} m\ s^{-1}$

Monthly Test 01 -2023 A/L

❖ **Answer all the Questions.**

1. Scientist related with the discovery of protons,

1. Neil Bohr 2. Ernest Rutherford 3. James Chadwick
4. Marsden 5. Becquerel

2. Which one of the following statements is true regarding cathode rays?

1. Cathode rays originate from Anode.
2. They are attracted towards the cathode.
3. Cathode rays more in a curved path in magnetic field.
4. These are a type of electromagnetic radiation.
5. Cathode rays does not show wave and particle nature at the same time.

3. Which of the following is least appropriate regarding the isotopes of an element?

1. They have same number of electrons.
2. Have different number of neutrons.
3. Shows similar chemical properties.
4. Have different number of nucleons.
5. Have same density.

…

4. Energy of a photon having wavelength of 150 nm. (Plants constant $h = 6.62 \times 10^{-34}\ J_s$)

1. $1.1 \times 10^{-18}\ J$ 2. $1.32 \times 10^{-18}\ J$ 3. $1.38 \times 10^{-17}\ J$
4. $1.5 \times 10^{-18}\ J$ 5. $1.35 \times 10^{-18}\ J$

5. The credit of discovering the charge of the electron and discovering neutron respectively goes to scientists,

1. Thomson and Chadwick 2. Rutherford and Chadwick
3. Chadwick and Thomson 4. Robert milikan and Thomson.
5. Robert milikan and chadwick

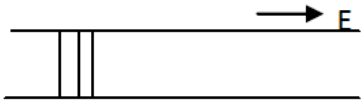
6. What is false regarding cathode rays?
1) Cathode rays creates chemical change.
2) Heat is generated when strike with matter.
3) Green in colour.
4) Deflect in both electric and magnetic fields .
5) Make fluorescence with the collision of certain matter.

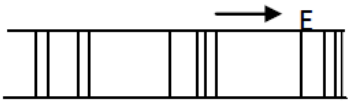
7. Which one of the following scientist is not connected directly to explain the behavior electrons?
1) Neil Bohr 2) Aufbau 3) Pauli
4) Dalton 5) Rutherford

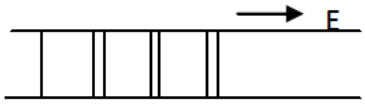
8. First ionization energy of potassium is $418 kJmol^{-1}$. The maximum number of K^+ ions that can be produced by potassium atoms in gaseous state by absorbing 1J of energy is,
1) 1.44×10^{16} *2)* 1.44×10^{17} 3) 1.44×10^{22} 4) 1.44×10^{18} 5) 1.44×10^{20}

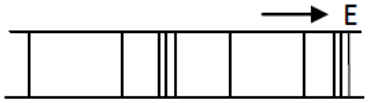
9. In the hydrogen spectrum of hydrogen, The wavelength of green light was found to be 442nm. energy of one mole of photon of green light is
1) 4.5×10^{-19} kJ 2) 4.5×10^{-22} kJ 3) 1.5×10^{-19} kJ
4) 270.8 J 5) 270.8 kJ

10. Which of the following represents the arrangement of the emission lines in the atomic spectrum of hydrogen.

1) 

2) 

3) 

4) 

5) None of above are related to line representation of spectrum .

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Special Online Speed Test

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ). 2023 අගෝස්තු

General Certificate Of Education (Adv. Level) Examination, August 2023

රසායන විද්‍යාව I Chemistry I	02	S/E	I

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(01) (a) (i) How the cathode rays are formed?

(ii) Give 3 properties of cathode rays

(iii) Why positive rays are not called as Anodic rays?

(iv) Why cathode rays are called as fundamental particles?

(v) Explain Rutherford's ∝ scattering experiment

(vi) What are the observation from the above experiment

(vii) What are the conclusions from the above observations?

(b) (i) Give 5 examples for electromagnetic radiations?

(ii) Give uses for each radiation mentioned above?

(iii) Name three series in the hydrogen emission spectrum. And state the reason to which region the above series belongs?

(iv) The wavelength of electromagnetic radiation is $700\ cm$ Calculate the frequency & the energy of photon of this radiation

$$(c = 3 \times 10^{8}\ ms^{-1}, \quad h = 6.63 \times 10^{-34} Js)$$

(v) Calculate the energy carried by 1 mol of photon of this radiation?

(vi) This radiation beiongs to which region of electromagnetic spectrum?

02. a)

i. Explain the Neil bohr's model .

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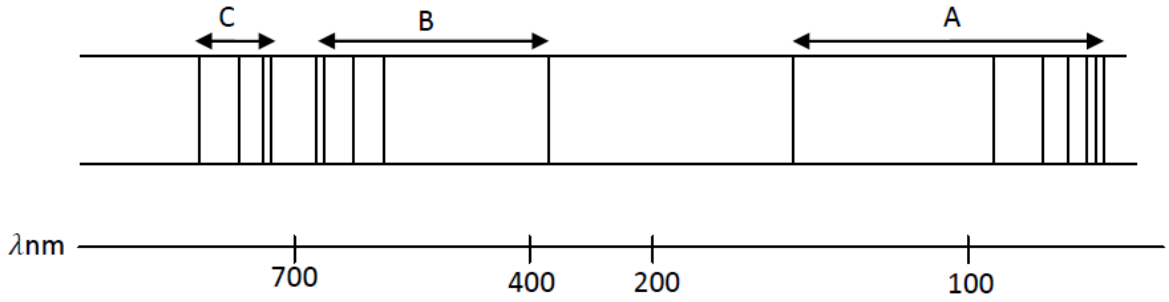
ii. The sketch of emission lines in the atomic spectrum of hydrogen is drawn by a student as follows.



Giving reasons explain whether the above sketch is correct or wrong.

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iii. If the wave length of visible light is $400nm - 700nm$ name, the series of $A, B, and\ C$.

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iv. Students idea was that the data which is essential to calculate the ionization energy of hydrogen can be obtained by the above spectrum.

a) Mention the above data.

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b) If the first ionization energy of hydrogen is $1317kJmol^{-1}$. Calculate the above mentioned data. [$C = 3 \text{ x } 10^{8}ms^{-1}, h = 6.626 \text{ x } 10^{-34}Js\ , L = 6.022 \text{ x } 10^{23}mol^{-1}$].

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b)

i. State two main concepts that you have studied about the existence of sub atomic particles in atom.

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ii. State two assumptions for the currently accepted atomic structure.

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3. **Figure 1** shows the first five electronic energy levels of the H atom (n = 1,2,3,4,5). **Figure 2** shows six lines of the emission electronic spectrum of the H atom.

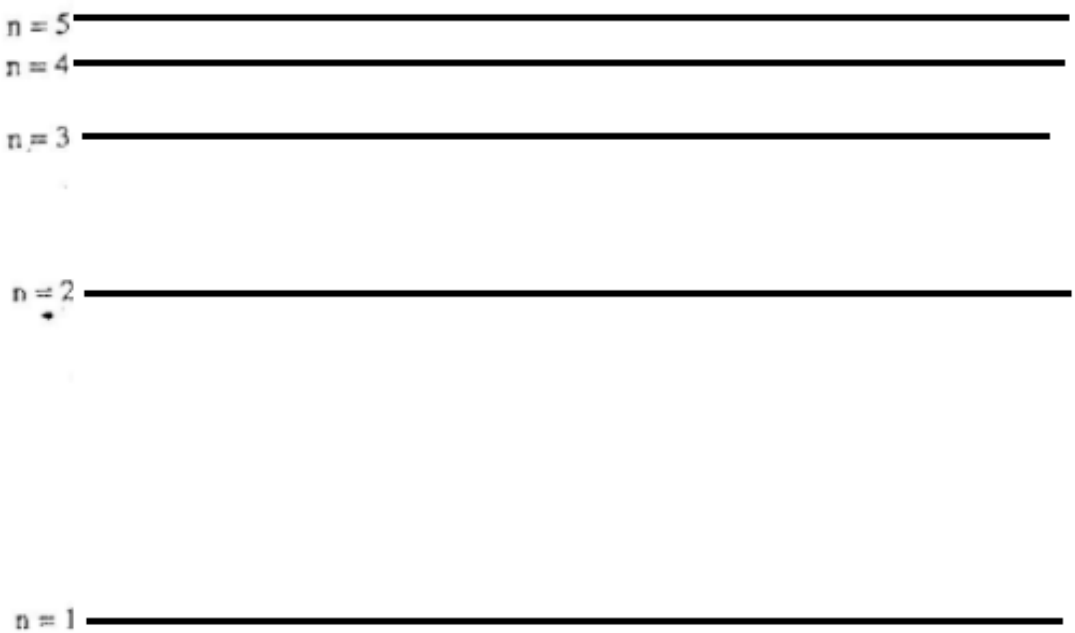

Figure 1

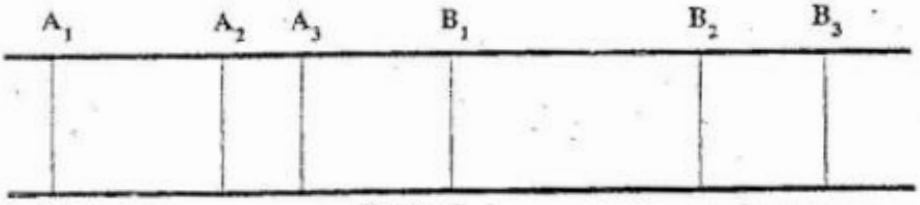

Figure 2

1) Draw six arrows between the energy levels **in Figure 01** to show the electronic transitions corresponding to the six spectral lines in figure 02.

2) **Clearly label in figure 01 these arrows appropriately as A_1,A_2,A_3,B_1.B_2 and B_3.**