ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

RESOURCES FOR

"HSC-II PHYSICS"

ZUEB EXAMINATIONS 2021

PREFACE:

The ZUEB examination board acknowledges the serious problems encountered by the schools and colleges in smooth execution of the teaching and learning processes due to sudden and prolonged school closures during the covid-19 spread. The board also recognizes the health, psychological and financial issues encountered by students due to the spread of covid-19.

Considering all these problems and issues the ZUEB Board has developed these resources based on the condensed syllabus 2021 to facilitate students in learning the content through quality resource materials.

The schools and students could download these materials from www.zueb.pk to prepare their students for the high quality and standardized ZUEB examinations 2021.

The materials consist of examination syllabus with specific students learning outcomes per topic, Multiple Choice Questions (MCQs) to assess different thinking levels, Constructed Response Questions (CRQs) with possible answers, Extended Response Questions (ERQs) with possible answers and learning materials.

ACADEMIC UNIT ZUEB:

1. **Extended Response Questions (ERQs)**

HOW TO ATTEMPT ERQs:

- Write the answer to each Constructed Response Question/ERQs in the space given below it.
- Use black pen/pencil to write the responses. Do not use glue or pin on the paper.

SECTION C (LONG ANSWER QUESTIONS)

1. **Write notes on transport in a) Hydra b) Planaria and explain the double circuit plan.**

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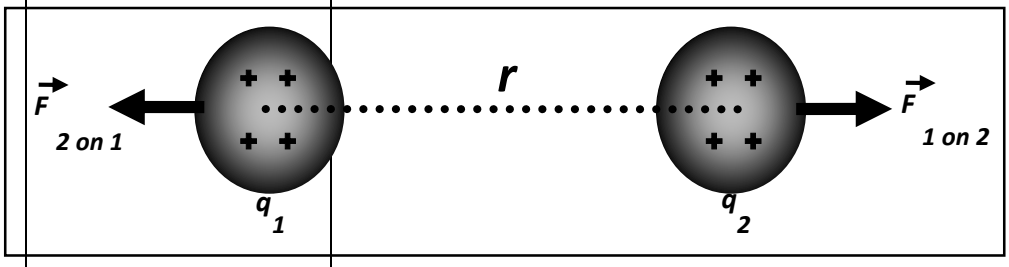
S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 11		
1.	**Define Co-efficient of linear and co-efficient of cubical expansion? [2003 (P.M, P.E), 1997, 95, 89]**	Co-Efficient Of Linear Expansion "Co-efficient of linear expansion is the fractional change in length per degree change of temperature." E x p l a n a t i o n: As we know that change in length 'ΔL' is directly proportional to the initial length of a body 'L_i' and change in temperature 'ΔT' mathematically it can be expressed as: $\Delta L \propto L_i$ $\Delta L \propto \Delta T$ comparing both we get $\Delta L \propto L_i \Delta T$ $\Delta L = \alpha L_i \Delta T$ $\frac{\Delta L}{L_i \Delta T} = \alpha$ $\alpha = \frac{\Delta L}{L_i \Delta T}$ The value of co-efficient of linear expansion doesn't depend upon length, mass, size and temperature it only depend on the nature of a material UNIT: In S.I. system its unit is $(°C)^{-1}$. or K^{-1}. Co-Efficient Of Cubical Expansion [2003(P.E),97,95,89] "Co-efficient of cubical expansion is the fractional change in volume per degree change of temperature." E x p l a n a t i o n: As we know that change in volume 'ΔV' is directly proportional to the initial volume of a body 'V_i' and change in temperature 'ΔT' mathematically it can be express as: $\Delta V \propto V_i$ $\Delta V \propto \Delta T$ Comparing both we get $\Delta V \propto V_i \Delta T$ $\Delta V = \beta V_i \Delta T$ $\frac{\Delta V}{V_i \Delta T} = \beta$ $\beta = \frac{\Delta V}{V_i \Delta T}$ The value of co-efficient of cubical expansion doesn't depend upon length, mass, size and temperature it only depend on the nature of a material.	**K/R/A**	**M**

		UNIT: In S.I. system its unit is $(°C)^{-1}$. or K^{-1}.		

S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 12		
2.	**State Coulomb's law and give the mathematical relation for the force between the charges when placed (i) in free space (ii) in a medium of relative permittivity $\in_r$? [1996 Supp, 03 (PE), 07, 11]**	I n t r o d u c t i o n: In 1785 a French physicist Sir Charles Augustine De Coulomb studies the force between two charges and he stated that: S t a t e m e n t : "Like charges repel and unlike charges attract each other with the same magnitude of force which is directly proportional to the product of their charges and inversely proportional to the square of distance between them." If q_1 and q_2 be the charge of two body. r represent separation between the charges then mathematically coulomb's law can be expressed as:	**K/R**	**E**



$$F \propto \frac{q_1 q_2}{r^2}$$

$$F = K\frac{q_1 q_2}{r^2} \quad \ldots\ldots\ldots eq(i)$$

Where $K = \frac{1}{4\pi\in}$ (Coulomb's constant)

$\in$ = Absolute permittivity = $\in_o \in_r$

$\in_o$ = permittivity of free space = $8.85 \times 10^{-12}\ C^2/N\ m^2$

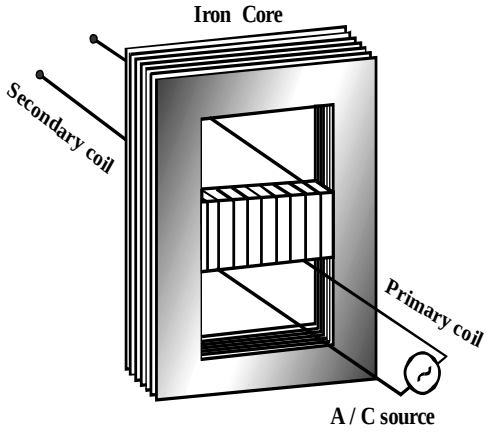
$\in_r$ = Relative permittivity and its value depend upon the nature of the material placed in between charge bodies.

$$\therefore \quad K = \frac{1}{4\pi\in_o\in_r}$$

$$K = \frac{1}{4 \times 3.14 \times 8.85 \times 10^{-12} \times \in_r}$$

$$K = \frac{9 \times 10^9}{\in_r}$$

		We put in eq. (i) $F = \frac{9 \times 10^9}{\in_r} \times \frac{q_1 q_2}{r^2}$ This is the Coulomb force between two charges in any medium. If air in between two charges then we replace $\in$r by 1 in above equation. $F = \frac{9 \times 10^9}{(1)} \times \frac{q_1 q_2}{r^2}$ $F = 9 \times 10^9 \times \frac{q_1 q_2}{r^2}$ This is the Coulomb force between two charges in vacuum or in air.		
3.	**Define Absolute potential.**	Absolute Potential: "Absolute potential or potential at any point P is the amount of work per unit charge in moving a charge from infinity to point P against electrical field" mathematically it can be express as $V_P = \frac{W_{\infty P}}{q}$ ..... eq (i) Since $\frac{W_{AB}}{q} = K Q \left[\frac{1}{r_B} - \frac{1}{r_A} \right]$ $\frac{W_{\infty P}}{q} = K Q \left[\frac{1}{r_P} - \frac{1}{r_\infty} \right]$ $\frac{W_{\infty P}}{q} = K Q \left[\frac{1}{r_P} - \frac{1}{\infty} \right]$ $\frac{W_{\infty P}}{q} = K Q \left[\frac{1}{r_P} - 0 \right]$ $\frac{W_{\infty P}}{q} = \frac{K Q}{r_P}$ We put in Eq (i) $\boxed{V_P = \frac{K Q}{r_P}}$ Generally potential at any point can be expressed as: $\boxed{V = \frac{K Q}{r}}$	**A**	**M**

S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 14		
4.	**Define transformer and derive relation between emf and terms. emf and current**	Transformer is an electrical device which help us to increase or decrease alternating emf". PRINCIPLE: Transformer works on the principle of mutual induction. CONSTRUCTION: Transformer consists of two coil. One is called primary coil and other is called secondary coil, both primary and secondary coil wound on a same iron frame. WORKING: When alternating source connects with a primary coil the due to change of current emf will induce in a primary coil. If N_p is the number of turns in a primary coil then according to Faraday's law, emf induces in a primary coil is given by: $e_p = - N_p \frac{\Delta\phi}{\Delta t}$ Eq (i) Due to mutual induction emf will induce in a secondary coil, if Ns is the number of turns in a secondary coil then emf induce in a secondary coil is given by:  RELATION OF "e" AND "N" Eq (i) ÷ Eq (ii) $\frac{e_p}{e_s} = \frac{- N_p \frac{\Delta\phi}{\Delta t}}{- Ns \frac{\Delta\phi}{\Delta t}}$ $\frac{e_p}{e_s} = \frac{N_p}{Ns}$	**R**	**M**

With the help of above relation we can conclude that:

"emf will increases with increase of number of turns in a secondary coil".

EFFICIENCY Efficiency of a transformer is the ratio of power of secondary to the power primary mathematically if can be expressed as:

$$\eta = \frac{P_S}{P_P}$$

Here $P_S = I_s\ e_s$

and $P_p = I_p\ e_p$ we put in above

$$\eta = \frac{I_S\ e_S}{I_P\ e_P} \quad \ldots\ldots \text{ eq (i)}$$

RELATION OF "e" AND "I" In the case of ideal transformer

$\eta = 100\% = \frac{100}{100} = 1$ we put in above eq (i)

$$1 = \frac{I_S\ e_S}{I_P\ e_P}$$

$$\frac{e_P}{e_S} = \frac{I_S}{I_P}$$

With the help of above relation we can conclude that:
"emf will increases with decrease of induce current".

CLASSIFICATION: Transformer can classify in two ways:

{i} Step-up transformer

(ii) Step-down transformer

STEP-UP TRANSFORMER

In step up transformer:

i. Secondary emf will greater then primary emf.
ii. Turns in secondary coil is greater then turns in primary coil.
iii. Current in secondary coil is less then current in primary coil.

STEP-DOWN TRANSFORMER

In step down transformer:

i- Secondary emf will less then primary emf.

		ii- Turns in secondary coil is less then turns in primary coil. iii- Current in secondary coil is greater then current in primary coil. POWER LOSS IN TRANSFORMER i) EDDY CURRENT Due to change of magnetic flux eddy current induce on the surface of iron core which produce heat and reduces the amount of power transmission to the secondary. It is minimize by using a layer of insolating varnish. ii) HYSTERESIS LOSS Due to change of direction of magnetization of the core power is dissipated within the core called Hysteresis loss. It is minimize by using special alloys for the core material. iii) POWER DISSIPATION Due to the resistance of a coil power is dissipated within the **iii)** coil it is minimize by using suitable thick wire.		

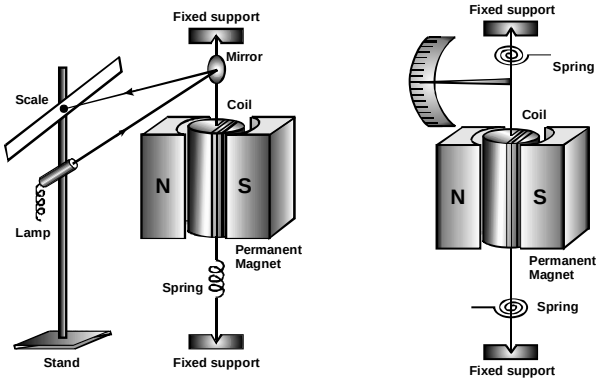
S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 15		
5.	**Describe the construction and working of a moving coil galvanometer?**	INTRODUCTION: In 1882 French Physicist D'Arsonval developed a moving coil galvanometer. This was modified by Dr. Edward Weston in 1888 DEFINITION: "Galvanometer is electromechanical instruments which help us to detect and measure small amount of current". PRINCIPLE: Moving coil galvanometer work on the principle that: "Torque produce in a current carrying coil when it place in a magnetic field". CONSTRUCTION: i) It consists of an insulated copper wire which is wound on the soft iron cylinder known	**K/R**	**E**

as armature and it produce strong magnetic field.

ii) The one end of the wire is connected with the plane minor and other end connected with the spring It is used to store torque produce in a coil.

iii) The permanent U shape magnet is placed near the coil.

iv) The face of a magnet is making concave for producing uniform magnetic field.



WORKING: When current "I" is passed through the coil, the coil is acted upon by a couple, called deflecting couple, which tends to rotate the coil. The deflecting torque is given by:

Defecting torque = B I A N Cos α

Due to the deflecting torque a twist is produced in the suspension wire. An opposing torque is developed called the restoring torque, whose magnitude is proportional to the twist in the suspension mathematically

Restoring torque α θ

Restoring torque = C θ

Here C is the spring constant.

		According to the condition of equilibrium Deflecting torque = Restoring torque B I A N Cos α = C θ $I = \left(\frac{C}{B A N \cos\alpha}\right)\theta$ As the coil placed in a radial magnetic field ∴ α = 0° and Cos α = 1. we put in above $I = \left(\frac{C}{B A N}\right)\theta$ I = constant θ I α θ "So we say that the current passing through a galvanometer is proportional to the deflection of the coil."		

S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 17		
6.	**What are the postulates of the special theory of relativity explain results of Einstein special theory of relativity.**	INTRODUCTION: In 1905 Albert Einstein study the change in length , vccmass, time and energy with respect to relative motion of a body on the basis of two postulate. **(i)** **POSTULATE:** PRINCIPLE OF RELATIVITY: "There is no absolute motion every motion is relative to other motion. Law of physics exactly the same in all inertial frames of reference". (This postulate based on Galilean and Lorenz transformation.) **(ii)** PRINCIPLE OF LIGHT: "Speed of light remains unchanged either source of light move towards or away from the observer." (This postulate based on Michelson and Morley experiment.) RESULT: There are four results or consequences of special theory of relativity. (i) Time Dilation (ii) Relative Mass (iii) Length Contraction	**K/R**	**E**

(vi) Relative Energy

TIME DILATION:

Time of a clock will increases with velocity of a clock, and it become infinity if velocity of a clock is equal to velocity of light. If t_0 represent time when a clock a rest, and t represent time when a clock move with the velocity v, then according to Einstein special theory of relativity.

$$t = \frac{t_0}{\sqrt{1-\left(\frac{v}{c}\right)^2}}$$

RELATIVE MASS:

Mass of a body will increases with velocity of a body and it become infinity if velocity of a body is equal to velocity of light. If m_0 represent mass when a body at rest. m represent mass when a body move with velocity v, then according to Einstein special theory of relativity.

$$m = \frac{m_0}{\sqrt{1-\left(\frac{v}{c}\right)^2}}$$

LENGTH CONTRACTION:

Length of a body will decreases with velocity of a body and it become Zero, if velocity of a body is equal to velocity of light. If L_0 represent length when a body at rest. L represents length when a body moves with velocity v, then according to Einstein special theory of relativity.

$$L = L_0\sqrt{1-\left(\frac{v}{c}\right)^2}$$

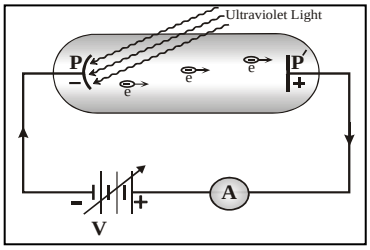
RELATIVE ENERGY

Mass can be converted into energy and energy can be converted into mass. Relation between mass and energy is given by:

$$E = mc^2$$

Where

$c = 3 \times 10^8\ m/s$

7.	**What is photoelectric effect? What remarkable experimental results are obtained? Give Einstein's explanation of the photoelectric effect. Derive equation of photoelectric effect?**	DEFINITIONS: When ultraviolet light incident on a metallic plate then electron can emit from that surface these electrons are called photoelectron and the phenomenon is called photoelectric effect. EXPLANATION: Consider two metallic plates P and P' are enclosed in an evacuated glass tube. When ultraviolet radiations are made to fall on P, Photoelectrons are emitted which are collected by the plate P' connected to the positive terminal of the battery and the Ammeter shows the current. If the light is switched off then there will be no current in the circuit.  CHARACTERISTICS: There are three remarkable experimental results about the photoelectric emission: (i) Electron cannot emit from the surface of metal if frequency of incident photon is less then particular amount of frequency known as threshold frequency. (ii) Intensity of photoelectron will increase by increasing number of photons. (iii) Kinetic energy of photoelectron increases with increase of frequency of photon. FAILURE OF CLASSICAL THEORY: Classical theory can not explain the phenomenon of photoelectric effect due to following reasons **(i)** Photoelectric effect takes place because electrons absorb enough energy from any applied frequency. **(ii)** Kinetic energy of photoelectron should depend upon the amplitude of the wave incident on the metal and therefore upon the intensity rather than the frequency. EXPLANATION OF QUANTUM THEORY: Quantum theory explains the phenomenon of photoelectric effect due to following reasons. (i) An electron either absorbs one whole photon or it absorbs none. So	**K/R**	**E**

		after absorbing a photon. An electron either leaves the surface of the metal or dissipates its energy within the metal in such a short time interval that it has almost no chance to absorb a second photon. (ii) An increase in the intensity of light source simply increases the number of photons and the number of electrons but the energy for electron remain unchanged However, the increase of frequency of the light increase the energy of the photons and hence the energy of electrons too. EQUATION OF PHOTOELECTRIC EFFECT: If υ be the frequency of incident photon. $\phi 0$ is the work function of metal and K.Emax. is the maximum kinetic energy of emitted photoelectron then equation of photoelectric effect can be expressed as: $h\upsilon = \phi 0 + K.E\ max.$ Here $\phi 0 = h\ \upsilon 0$ And $K.Emax = e\ V0$ we put in above equation $h\upsilon = h\ \upsilon 0 + e\ V0$ $h\upsilon - h\upsilon 0 = e\ V0$ $h(\upsilon - \upsilon 0) = e\ V0$ This is the simplest equation of photoelectric effect.		

S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 18		
8.	**State Bohr's postulates? Derive an expression for the radius of the hydrogen atom? Derive an expression for the energy of the hydrogen**	INTRODUCTION: In 1913 Niels Henrik David Bohr assumed hydrogen as a model and explain the main features of atomic model on the basis of three postulates. POSTULATES (i) P R I N C I P L E O F O R B I T Electron revolves around the nucleus in a circular path called orbit. Electron neither absorbs nor release energy when it revolves in a particular orbit. (ii) P R I N C I P L E O F A N G U L A R M O M E N T U M	**K/R**	**E**

atom?

[2017, 2016, 2015, 14, 12, 10, 09, 07, 06, 05, 03, 02 (P.M) ,00,99, 98, 97, 95, 94, 93, 90, 89, 87, 86, 84]

Angular momentum of an electron is equal to the integral multiple of ħ mathematically.

$$L_n = n \hbar$$

Where $n = 1, 2, 3, 4, \ldots\ldots$

And $\hbar = \frac{h}{2\pi} = \frac{6.63 x 10^{-34}}{2 x 3.14} = 1.05 \times 10^{-34}$ J Sec

(iii) PRINCIPLE OF RADIATION

Electron jump from lower energy level to the higher energy level by absorbs photon and jump from higher energy level to lower energy level by release photon

RADIUS OF HYDROGEN ATOM

To derive an expression for the radius of the n^{th} orbit of hydrogen atom consider an electron of mars "m" charge "– e" revolve in a circular path of radius "r_n" then electron must pass centripetal force which is equal to the electrostatic force. Mathematically

$$F_{cp} = F_e$$

$$\frac{m V_n^2}{r_n} = \frac{k(e)(e)}{r_n^2}$$

$$V_n^2 = \frac{k e^2}{m r_n} \quad \ldots\ldots \text{Eq(i)}$$

According to Bohr's atomic theory

$$L_n = n \hbar$$

But $L_n = m v_n r_n$

By comparing both equations, we get

$$m v_n r_n = n \hbar$$

$$v_n = \frac{n \hbar}{m r_n}$$

Squaring both the side

$$v_n^2 = \frac{n^2 \hbar^2}{m^2 r_n^2} \quad \text{.. Eq (ii)}$$

By Comparing Eq. (i) and Eq. (ii), we get.

$$\frac{k\ e^2}{m\ r_n} = \frac{n^2 \hbar^2}{m^2 r_n^2}$$

$$r_n = \frac{n^2 \hbar^2}{k\ e^2 m}$$

$$r_n = \frac{n^2 \hbar^2}{\frac{1}{4\pi \in_0} e^2 m}$$

$$r_n = \frac{4\pi \in_0 n^2 \hbar^2}{e^2 m}$$

$$r_n = n^2 \frac{4x3.14x8.85x10^{-12}(1.05\times10^{-34})^2}{(1.6x10^{-19})^2\ 9.1x10^{-31}}$$

$r_n = n^2 \times 0.53 \times 10^{-10}$

Where n = 1, 2, 3, …….

ENERGY OF HYDROGEN ATOM

To derive an expression for the energy of the n^{th} orbit of hydrogen atom consider an electron of mars "m" charge "– e" revolve in a circular path of radius "r_n" then electron must passes kinetic energy "$K.E_n$" as well as potential energy "$P.E_n$". Therefore total energy "E_n" of n^{th} orbit is given by.

$E_n = K.E_n + P.E_n$ …… Eq (i)

CALCULATION OF $P.E_n$

If "+e" is the charge of nucleus and " – e" is the charge of an electron then potential energy of electron and nucleus is given by.

$$P.E_n = \frac{\mathbf{k\ (+e)\ (-e)}}{\mathbf{r_n}}$$

$P.E_n =$

$$-\frac{\mathbf{k\ e^2}}{\mathbf{r_n}} \quad \text{…… Eq (ii)}$$

CALCULATION OF $K.E_n$

If "V_n" is the velocity of an electron in n^{th} orbit then kinetic energy of an electron is given by

$$K.E_n = \frac{1}{2} m V_n^2$$

Since $F_{cp} = F_e$

$$\frac{m V_n^2}{r_n} = \frac{k e^2}{r_n^2}$$

we put in above.

$$k.E_n = \frac{1}{2} \frac{k e^2}{r_n}$$

…...Eq (iii)

Putting the values of $P.E_n$ and $K.E_n$ in Eq.(i)

$$E_n = \frac{1}{2} \frac{k e^2}{r_n} + \left[- \frac{k e^2}{r_n} \right]$$

$$E_n = \frac{1}{2} \frac{k e^2}{r_n} - \frac{k e^2}{r_n}$$

$$E_n = - \frac{1}{2} \frac{k e^2}{r_n}$$

$$E_n = - \frac{9 \times 10^9 \times (1.6 \times 10^{-19})^2}{2 \times 0.53 \times 10^{-10} \times n^2}$$

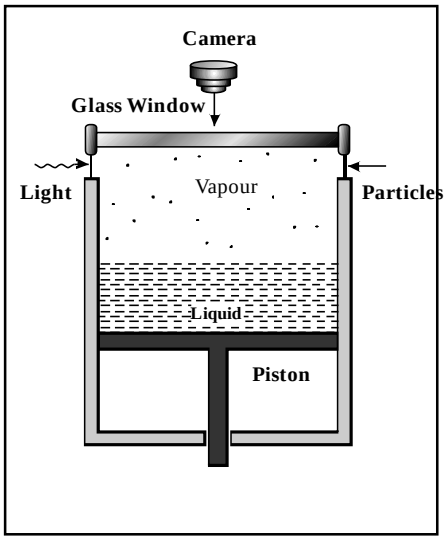
$$E_n = \frac{2.176 \times 10^{-18}}{1.6 \times 10^{-19} \times n^2} \quad eV$$

$$E_n = - \frac{13.6}{n^2} \quad eV$$

$$E_1 = - \frac{13.6}{(1)^2} = -13.6 \quad eV$$

$$E_2 = - \frac{13.6}{(2)^2} = -3.4 \quad eV$$

		$E_3 = -\frac{13.6}{(3)^2} = -1.5$ eV $E_4 = -\frac{13.6}{(4)^2} = -0.85$ eV $E_5 = -\frac{13.6}{(5)^2} = -0.54$ eV . .. $E_\infty = \frac{-13.6}{(\infty)^2} = 0$ So we say that energy will increases with increase of orbit and become zero at infinity		
S.NO	**ERQ**	**ANSWER**	**CL**	**DL**
		CHAPTER 19		
9.	**How half life of the radioactive element can be determined.**	DEFINITION: "Half life or half period of any radioactive element is the duration in which half of parent element is convert into daughter element" EXPLANATION According to the equation of law of radioactive decay $\frac{N}{N_0} = e^{-\lambda t}$ Taking natural log both the side $\ln \frac{N}{N_0} = -\lambda t$ If $t = T_{\frac{1}{2}}$ Then $N = \frac{N_0}{2}$ Or $\frac{N}{N_0} = \frac{1}{2}$ we put in above $\ln \frac{1}{2} = -\lambda T_{\frac{1}{2}}$ $-0.693 = -\lambda T_{\frac{1}{2}}$ $\frac{-0.693}{-\lambda} = T_{\frac{1}{2}}$ $T_{\frac{1}{2}} = \frac{0.693}{\lambda}$ Here λ is the decay constant	**K/R/A**	**M**

S.NO	ERQ	ANSWER	CL	DL
		CHAPTER 20		
10.	**Explain the construction and working of Wilson cloud chamber.**	INTRODUCTION In 1911, C.T.R. Wilson was the first who invents the cloud chamber. Which help to see the track of ionizing particle DEFINITION: "Wilson cloud chamber is a device which help us to observe the path of ionizing particles and α, β & γ rays." PRINCIPLE Wilson cloud chamber work on the principle that, supersaturated condense more readily on ions or dust particles. CONSTRUCTION: It consists of a close chamber with a glass top and a movable piston at its bottom. A liquid such as alcohol with low boiling point is placed in the chamber above the piston. The space above the liquid becomes saturated by the alcohol vapours. The low boiling point liquid is used to obtain super saturation. A strong source of light is used to illuminate the chamber while the photograph is taken.  WORKING	**K/R**	**E**

		The piston is suddenly pulled down so that the vapors in the chamber are cooled adiabatically. The already saturated vapour how becomes supersaturated. The supersaturated vapors condense in form of fog on dust particles and ions as well as on the walls of the container. If the chamber is clean and free of dust particles and the expansion is done at a proper time when the ionizing particle is passing through it, the droplets are formed on the ions only. The ionizing particles leave positive and negative ions all along its track and tiny fog droplet condenses on each ion. The whole track can then be seen and photographed in bright light. T R A C K S O F I O N I Z I N G P A R T I C L E Different ionizing particle produce different type of tracks α - Particles has low penetrating power and high ionization power so the track of α-particles is thick, continuous and straight β - Particles has high penetrating power and low ionization power so the track of β-particles is thin, discontinuous and zigzag γ - Particles has very high penetrating power and very low ionization power so the track of γ -particles is thin, discontinuous and scattered R A D I O A C T I V E I S O T O P E S Most of the isotopes of an atom are unstable and they may emit α , β or γ radiation such an isotopes which emit radiation are called radioactive isotopes		

		Hydrogen isotope $_1H^3$ and Carbon isotope $_6C^{14}$ are the examples of radioactive isotopes. Radioisotope help us to check whether the thickness of a material being produced is constant or not by passing a material between the radioactive source and counter detector Radioisotope help us to detect cracks in welded joints by placing a welded joints between the radioactive source and counter detector The chemical of radioisotope is dissolved in water and the plant irrigated with this water. By using A detector the location of absorbed chemical and water has been absorbed This similar methods have helped to cut down the amounts of water, pesticides, fertilizers and other nutrients to be given to various plants. They are used to increase the resistant power of crops against disease. They are used to improve the quality of crops. They are also used to preserve the food. They are used to eradicate harmful insects. They are used to eradicate plant disease. $_{15}P^{32}$ (Phosphorus – 32) is used to locate precisely the position of tumor in the brain. It also effective for treating leukemia by destroying the excess production of white blood corpuscles with the radiation $_{11}Na^{24}$ (Sodium – 24) has been extremely useful in tracing the blood circulation in the body. $_{53}I^{131}$ (Iodine – 131) are used as tracer to trace out the path of an element in the body it is also used to study of thyroid glands.		

		Radiation in low dosages can also be used for sterilizing bandages, instruments and other surgical accessories $_{27}Co^{60}$ (Cobalt – 60) has been widely used to treat cancerous tumors inside the body.		