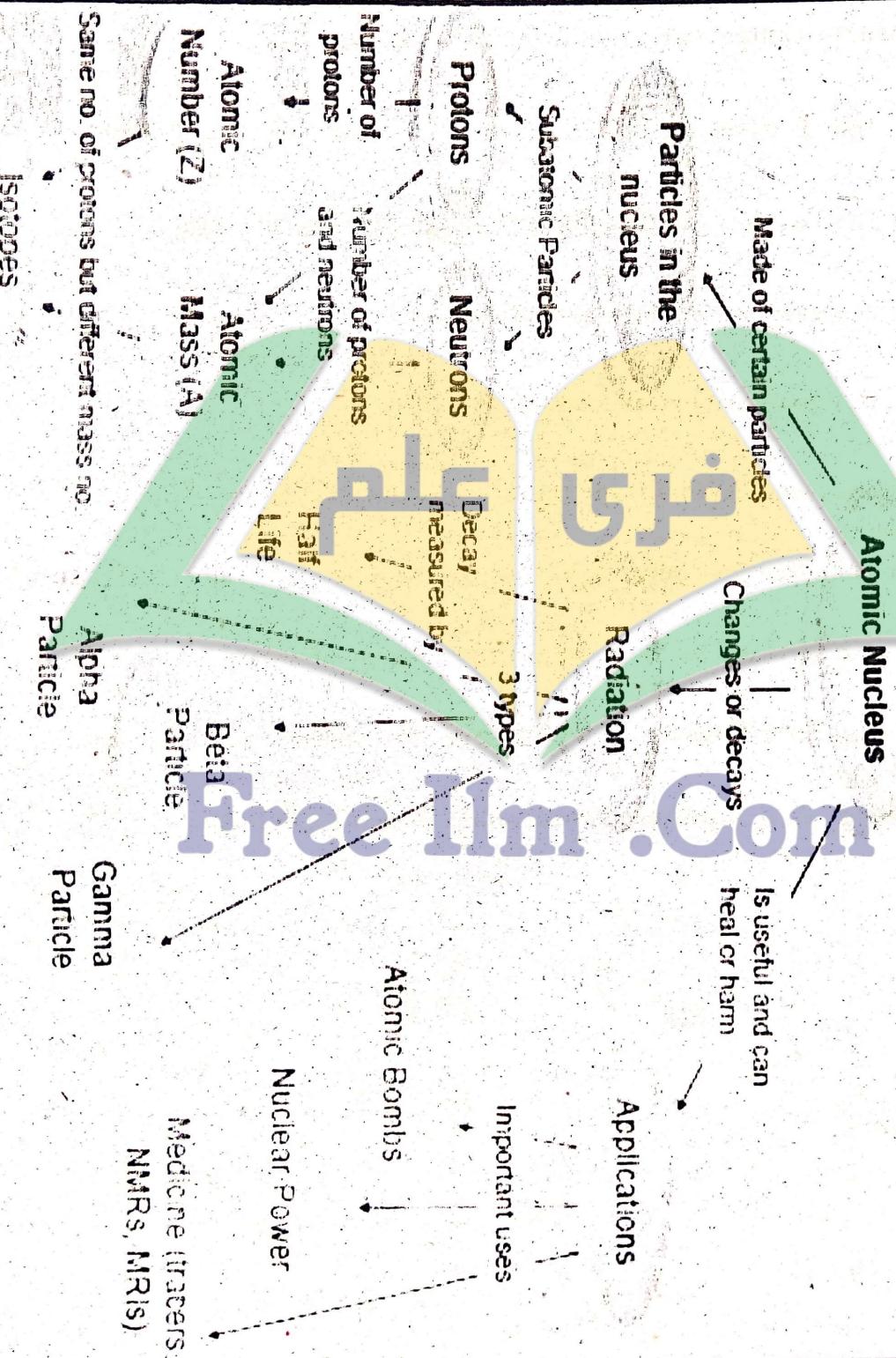


CHAPTER**18****ATOMIC AND NUCLEAR PHYSICS****Nuclear Physics Concept Map**



MULTIPLE CHOICE QUESTIONS

18.1 Atom and Atomic Nucleus
18.2 Natural Radioactivity

- (1) Which statement is correct about isotopes?
 - (a) Atoms of an element have same number of protons.
 - (b) Atoms of an element have different number of neutrons in their nuclei
 - (c) Protium, deuterium and tritium are isotopes of hydrogen
 - (d) All of above
- (2) The mass of the proton and neutron is nearly equal to:
 - (a) 1.67×10^{-27} kg
 - (b) 1.67×10^{-31} kg
 - (c) 1.67×10^{-19} kg
 - (d) 1.67×10^{-21} kg
- (3) A nucleon is ----- times heavier than electron:
 - (a) 1827
 - (b) 1836
 - (c) 1841
 - (d) 1832
- (4) The total number of nucleons in a nucleus is:
 - (a) Atomic number
 - (b) Atomic mass number
 - (c) Isotope number
 - (d) None of these
- (5) The total number of protons in a nucleus or total number of electrons in the orbits is:
 - (a) Atomic number
 - (b) Atomic mass number
 - (c) Isotope number
 - (d) None of these
- (6) The atomic number is represented by:
 - (a) A
 - (b) Z
 - (c) N
 - (d) None of them
- (7) The number of neutrons in a nucleus is represented by:
 - (a) A
 - (b) Z
 - (c) N
 - (d) None of them
- (8) The number of protons and neutrons in a nucleus or atomic mass is represented by:
 - (a) A
 - (b) Z
 - (c) N
 - (d) None of them
- (9) Atoms of the element which have same number of protons but different number of neutrons are:
 - (a) Isotopes
 - (b) Nuclide
 - (c) Both a & b
 - (d) None
- (10) Rutherford discovered that the positive charge in an atom was concentrated in a small region called;
 - (a) atom
 - (b) nucleus
 - (c) molecule
 - (d) shell
- (11) _____ are collectively called nucleons.
 - (a) protons in nucleus
 - (b) electrons in shell
 - (c) protons and neutrons in nucleus
 - (d) neutrons in nucleus
- (12) In which simplest atom, nucleus has only one proton?
 - (a) Helium
 - (b) Carbon
 - (c) Nitrogen
 - (d) Hydrogen
- (13) Generally an atom is represented by the symbol;
 - (a) ${}^A_B X$
 - (b) ${}^A_Z X$
 - (c) ${}^Z_A X$
 - (d) ${}^A_0 X$
- (14) In nuclide ${}^{13}_6 X$ the number of protons are;
 - (a) 3
 - (b) 10
 - (c) 8
 - (d) 6



- (15) Isotopes of an element have the same:
- Chemical properties
 - Atomic number
 - Atomic mass number
 - Colours
- (16) Tritium contains one proton, while protium and deuterium contains;
- two protons
 - three protons
 - one proton
 - no proton
- (17) Who accidentally discovered that uranium salt crystals emit an invisible radiation that can darken a photographic plate;
- Becquerel
 - Marie Curie
 - Pierre
 - Rutherford

18.3 Background Radiations

18.4 Nuclear Transmutations

18.5 Half-life and its Measurement

- (18) Transmutation is
- unstable nuclei changes into stable nuclei
 - spontaneous process
 - Both A and B
 - non spontaneous process
- (19) The Earth and all living things receive radiation from outer space.
- X-rays
 - Cosmic rays
 - Radon gas
 - None of these
- (20) Complete the equation $^{226}_{88}\text{Ra} \rightarrow ^{222}_{86}\text{Rn} + ? + \text{energy}$:
- $^{10}_e^-$
 - $^{14}_{17}\text{N}$
 - $^{12}_{2}\text{He}$
 - $^{18}_{1}\text{Y}$
- (21) $^{14}\text{C} \rightarrow ? + ^{10}\text{e}^- + \text{Energy}$
- $^{10}_e^-$
 - $^{4}_{2}\text{He}$
 - ^{14}e
 - $^{14}_{7}\text{N}$
- (22) $^{60}_{27}\text{Co} \rightarrow ^{60}_{27}\text{CO} + ^0\gamma + \text{Energy}$ this equation shows emission of:
- β -particles
 - α particles
 - gamma particles
 - none of these
- (23) Charge on alpha particles is;
- $2e^-$
 - $3e^-$
 - $4e^-$
 - $5e^-$
- (24) Stream of high energy electrons;
- β -particles
 - α -particles
 - γ -particles
 - Σ -particles
- (25) Gamma rays are also called:
- photons
 - electrons
 - protons
 - positrons
- (26) Which have the greatest power of ionization as compared to others?
- β -particles
 - α -particles
 - γ -particles
 - x-rays
- (27) Penetrating power of γ rays as compared to α rays and β rays is:
- Greater
 - Smaller
 - Equal
 - Anyone can be
- (28) The phenomenon by which radiations split matter into positive and negative ions is called;
- ionization
 - penetration
 - sublimation
 - deflection
- (29) The rate of radioactive decay is proportional to the number of:
- stable nuclei present
 - unstable nuclei present
 - electrons present
 - protons present



- (30) Radium-226 has a half-life of:
 (a) 1820 years (b) 1920 years (c) 1620 years (d) 1600 years

18.6 Radioisotopes and their uses

- (31) Stable nuclei have atomic number between:
 (a) 1 – 82 (b) 2 – 89 (c) 2 – 88 (d) 2 – 85

- (32) Elements are naturally unstable having atomic number greater than;
 (a) 84 (b) 89 (c) 82 (d) 88

- (33) ${}_{2}^{4}\text{He} + {}_{13}^{27}\text{Al} \rightarrow ? + {}_{0}^{1}\text{n}$
 (a) ${}_{11}^{24}\text{Na}$ (b) ${}_{15}^{30}\text{P}$ (c) ${}_{11}^{23}\text{Na}$ (d) ${}_{13}^{24}\text{Na}$

- (34) Which are chemical compounds containing some quantity of radioisotope?
 (a) Radioactive tracer (b) Hard compounds
 (c) High energy compounds (d) Soft compounds

- (35) Which compound readily accumulates in the thyroid gland and can be used for monitoring of thyroid functioning?
 (a) I – 131 (b) I – 130 (c) I – 132 (d) I – 129

- (36) Which compound is used for diagnosis of brain tumor?
 (a) Phosphorus -32 (b) iodine -131 (c) hydrogen-3 (d) neon -152

- (37) Radioactive isotope is used for curing cancerous tumors and cells.
 (a) P -32 (b) I-131 (c) C-14 (d) Co-60

- (38) When a tree dies radioactive isotope present in plant starts decaying?
 (a) C -14 (b) P - 32 (c) I - 131 (d) Co - 60

- (39) The half-life of C-14 is;
 (a) 5720 years (b) 5730 years (c) 5700 years (d) 5202 years

- (40) The stable argon nuclide Ar-40 half-life:
 (a) 2.4×10^8 years (b) 2.9×10^4 years (c) 2.5×10^9 years (d) 2.4×10^{11} years

18.7 Fission Reaction

18.8 Nuclear Fusion

18.9 Hazards of Radiations and Safety Measures

- (41) Mass energy equation and theory of relativity was given by:
 (a) Newton (b) Quantum (c) Einstein (d) Volta

- (42) Nuclear fission was first observed in 1939 by:
 (a) Otto Hahn and Fritz Strassman (b) Otto Hahn and Curie
 (c) Fritz and Curie (d) Otto Hahn and Rutherford

- (43) In each fission reaction energy released;
 (a) 210meV (b) 299mV (c) 200 MeV (d) 255meV

- (44) During fission of 1kg of Uranium -235 energy released is;
 (a) $67 \times 10^{10}\text{J}$ (b) $65 \times 10^8\text{J}$ (c) $60 \times 10^8\text{J}$ (d) $66 \times 10^9\text{J}$



- (45) Half-life of plutonium ($^{236}_{96}Pu$) is 2.85 years and $^{242}_{94}Pu$ is;
 (a) 3.79×10^5 years (b) 7.1×10^8 years (c) 2.85 years (d) 7.1×10^{10} years
- (46) Half-life of $^{60}_{27}Co$ is
 (a) 20 years (b) 40 years (c) 50 years (d) 30 years
- (47) When two light nuclei combine to form a heavier nucleus, this process is called;
 (a) nuclear fission (b) nuclear fusion (c) bombardment (d) disintegration
- (48) The temperature of the centre of sun is;
 (a) 20 million kelvin (b) 2 million kelvin (c) 24 million kelvin (d) 29 million kelvin
- (49) Hazards of radiation for humans are;
 (a) Leukemia (b) Sterility (c) Blindness (d) all given
- (50) In order to find the intensity of radiations, which device (s) is/are used:
 (a) Film badge (b) Dosimeter (c) Radiometer (d) Both a & b

ANSWER KEY

Q.	Ans								
1	d	11	c	21	d	31	a	41	c
2	a	12	d	22	c	32	c	42	a
3	b	13	b	23	a	33	b	43	c
4	b	14	d	24	a	34	a	44	a
5	a	15	b	25	a	35	a	45	a
6	b	16	c	26	b	36	a	46	d
7	c	17	a	27	a	37	d	47	b
8	a	18	c	28	a	38	a	48	a
9	a	19	b	29	b	39	b	49	d
10	b	20	c	30	c	40	a	50	c

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