AAFAQ ACADEMY KASUR

Physics Book II **Chapter (21) NEW** **Objective + Subjective**

NUCLEAR PHYSICS

Test Session 2014 – Name : _____ Roll No: (in words) _____
Group: _____ **Dated: March 10,2014**

OBJECTIVE

Time: 10 Minutes **Marks: 10**

Note: Write your roll No. in space provided. Over-writing, cutting, erasing, using of lead pencils will result into loss of marks.

Q.1: Encircle the correct answers.

i. 1 amu is equal to:
a) $1.0606\times10^{77}\,\text{kg}$
b) $1.66\times10^{-31}\,\text{kg}$
c) $1.66\times10^{-27}\,\text{kg}$
d) $1.66\times10^{-19}\,\text{kg}$

ii. Radioactivity happen due to the disintegration of:
a) Nucleus
b) Mass
c) Electrons
d) Protons

iii. The radioactive decay obeys the law:
a) $N = N_0 e^{\lambda t}$
b) $N = N_0 e^{-\lambda t}$
c) $N_0 = N e^{-\lambda t}$
d) $N_0 = N(1+e^{-\lambda t})$

iv. The SI unit of decay constant is:
a) m
b) m^{-1}
c) S^{-1}
d) Nm^{-1}

v. The first atomic reactor was introduced by:
a) Currie
b) Enrico Fermi
c) Newton
d) Bohr

vi. In Wilson cloud chamber, β-particles leave:
a) Thin and continuous tracks
b) Thick and continuous tracks
c) No tracks
d) Thin and discontinuous tracks

vii. The potential difference between the top and bottom of a cloud chamber is of the order of:
a) 290 v
b) 400 v
c) 1 kv
d) None of above

viii. The mass spectrum of naturally occurring neon, showing:
a) 1 isotope
b) 2 isotope
c) 3 isotope
d) 4 isotope

ix. The energy of photon for photoelectric effect is less than:
a) 1 Me V
b) 2 Me V
c) 5 Me V
d) 8 Me V

x. In Wilson cloud chamber, if tracks are thick, straight and continuous, then particle is:
a) $\alpha-$particles
b) $\beta-$particles
c) $\gamma-$rays
d) All

SUBJECTIVE

Time: 30 min. **Marks: 20**

Q.2: Write the short answers. **(2×6)**

i. What are isotopes? What do they have in common and what are their differences?
ii. Why are heavy nuclei unstable?
iii. What fraction of a radioactive sample decays after two half-lives have elapsed?
iv. Describe a brief account of interaction of various types of radiations with matter.
v. A particle which produces more ionization is less penetrating. Why?
vi. What information is revealed by the length and shape of the tracks of an incident particle in Wilson cloud chamber?
vii. What do we mean by the term critical mass?
viii. Discuss the advantages and disadvantages of nuclear power compared to the use of fossil fuel generated power.

Note: Long questions:

Q.3 **(a)** What is G.M. counter? Give its construction. How is it used to count the nuclear radiation? (5)

(b) The half-life of $^{91}_{38}\text{Sr}$ is 9.70 hours. Find its decay constant. (3)