AAFAQ ACADEMY – KASUR

Paper: Physics **Chapter (21)** **Class: F.Sc. Part – II**

NUCLEAR PHYSICS

Name: _____ Roll No: (in words) _____

EVENING GROUP

OBJECTIVE TYPE

Total Marks: 20 **Paper Code: _____** **Total Time: 15 Minutes**

NOTE: Write your **Roll No.** in space provided. Using lead pencil will result in loss of marks.

Q.No.1: You have four choices for each objective type question as A,B,C and D. The choice which you think is correct; fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Sr. No.	QUESTION	A	B	C	D
1.	A baryon consists of	Two quarks	Three quarks	Two quarks, one anti quark	None of these
2.	After $\gamma-$emission from $^{235}_{92}U$, the residual nuclei will be	$^{226}_{88}Ra$	$^{239}_{94}Pu$	$^{235}_{91}Pa$	None of these
3.	Radioactive substances can be stored by using	Lead	Iron	Copper	Steel
4.	Which nucleus is the most stable nucleus?	$^{31}_{15}P$	$^{56}_{26}Fe$	$^{141}_{56}Ba$	$^{226}_{88}Ra$
5.	For electronic quenching in Geiger – Mueller counter	–ve voltage is applied at anode	+ve voltage is applied at cathode	A gas is used	Zero voltage is applied at anode
6.	Rutherford discovered proton by the bombardment of $\alpha-$particle on	Nitrogen	Oxygen	Beryllium	Carbon
7.	Which radioactive element present in air?	Uranium	Krypton	Radium	Radon
8.	The range of weak nuclear force is	$10^{-12}\,m$	$10^{-15}\,m$	$10^{-17}\,m$	None of these
9.	The dead time for Geiger – Mueller counter is about	$10^{-6}\,s$	$10^{-8}\,s$	$10^{-4}\,s$	$10^{-3}\,s$
10.	Which one is used for the treatment of liver cancer?	$Na-24$	$I-131$	$Sr-90$	$Co-60$
11.	Which one of the following is most energetic reaction?	Nuclear fission	Nuclear fusion	Chemical reaction	Electrochemical reaction
12.	In the living things, the ratio $^{14}_{6}C$ to $^{12}_{6}C$	Decrease with time	Increase with time	First decrease then increase	Remains constant
13.	The energy required to produce an electron – hole pair in solid state detector is	$3eV-4eV$	$3keV-4keV$	$3MeV-4MeV$	All of these
14.	Wilson cloud chamber is based on the principle that the supersaturated vapors condense more readily on	Ions and dust particles	Dust particles	Ions	None of these
15.	Specially designed solid state detector can be used to detect	$\alpha-$particles	$\beta-$particles	$\gamma-rays$	Both (A) and (B)
16.	The SI – units of radiation dose are	$rntgen$	$gray$	$becquerel$	$curie$
17.	After $2hours$, $\left(\frac{1}{16}\right)th$ of the initial amount of certain radioactive element remains un – decayed. The half life of the radioactive element is	$15\,\text{min}$	$30\,\text{min}$	$45\,\text{min}$	$60\,\text{min}$
18.	The capture of neutron by a nucleus results in the formation of	Helium	Deuteron	Proton	Radio isotope
19.	Which of the following radiation are suitable for treatment of skin?	$\alpha-$particles	$\beta-$particles	$\gamma-rays$	All of these
20.	The strong nuclear force act on the	$\pi-meson$ only	$meson$ only	$leptons$ only	$hadrons$ only

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EVENING GROUP

SUBJECTIVE TYPE

Total Marks: 24 **Time Allowed: 0 Hours 60 Minutes**

SECTION – I (SHORT QUESTIONS)

2. Attempt any EIGHT questions. (8×2=16)Marks

i. Why are heavy nuclei un-stable?
ii. Explain how α- and β-particles may ionize an atom without directly hitting the electrons? What is the difference in the action of the two particles for producing ionization?
iii. Discuss the advantages and disadvantages of nuclear power compared to the use of fossil fuel generated power.
iv. What factors make a fusion reaction difficult to achieve?
v. What do you understand by "background radiation"? State two sources of this radiation.
vi. If you swallowed a β-source, which would be the more dangerous to you? Explain why?
vii. What is a radioactive tracer? Describe one application each in medicine, agriculture and industry.
viii. Explain the term "mass defect" and binding energy" with the help of examples.
ix. How γ-rays emission resembles with emission of photon of light?
x. Give brief account of interaction of neutrons with matter.

SECTION – II (ESSAY TYPE) Attempt given question

3. Do as directed...

i. What is nuclear fusion? Describe it in detail. Also discuss nuclear fusion in the sun. (5)

ii. Sheet of lead $5 \bullet 0mm$ thick reducing the intensity of beam of $\gamma -$rays by a factor $0 \bullet 4$. Find half value thickness of lead sheet which will reduce the intensity to half of is initial value. (3)

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SECTION – III (Practical)

4. (a) Write answer of TWO questions. (2×2=4)

i. a
ii. c
iii. v
iv. b

4. (b) Write procedure to determine the resistance of voltmeter by graph method. (3)

(OR)

Write procedure to find the unknown high resistance by using neon flash lamp. (3)

4. (c) Answer the following questions on the basis of graph drawn between potential difference (V) and charge (Q). (4)

i. What you conclude from the graph?
ii. Find the capacitance of capacitor from the graph.

Good Luck
Ch. Khalid Mahmood Ashraf