Enrollment No: _____ Exam Seat No:_____

C. U. SHAH UNIVERSITY

Winter Examination-2021

Subject Name : Nuclear Physics and Electromagnetism

Subject Code : 4SC05NPE1 **Branch: B.Sc. (Physics)**

Semester: 5 **Date: 13/12/2021** **Time: 11:00 To 02:00** **Marks: 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a)	Give definition of oscillating dipole.	**01**
b)	Define polarization.	**01**
c)	What is hysteresis?	**01**
d)	Define Poynting vector. Give its unit.	**01**
e)	Give statement of pointing theorem.	**01**
f)	Define Gauge transformation.	**01**
g)	Define displacement current density.	**01**
h)	Define Isotopes. Give any one example	**01**
i)	What is Isobars?	**01**
j)	What do you mean by mirror nuclei.	**01**
k)	If protons and neutrons both are even then they are _____	**01**
l)	Stable nucleus are (a) Radioactive or (b) non-radioactive choose any one.	**01**
m)	1 amu = _____MeV	**01**
n)	Name the constituents of nucleus.	**01**

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

a)	Explain radiation due to oscillating dipole and calculate vector and scalar potential from it.	**07**
b)	Explain electromagnetic field energy and momentum	**07**

Q-3 **Attempt all questions** **(14)**

a)	Explain in detail plane electromagnetic wave propagation in Non-conducting medium.	**07**
b)	Explain in details Retarded potentials.	**07**

Q-4		**Attempt all questions**	**(14)**
	a)	Write Maxwell's equations in differential form and discuss Maxwell's modification in Ampere's law.	**07**
	b)	Explain in details electromagnetic potentials of electromagnetic field.	**07**
Q-5		**Attempt all questions**	**(14)**
	a)	Explain in details Lienard-Wiechert potentials.	**07**
	b)	Describe Rutherford's α-scattering experiment with necessary diagram.	**07**
Q-6		**Attempt all questions**	**(14)**
	a)	Write a note on intrinsic properties of nucleus.	**06**
	b)	Find the nuclear radius of ^{56}Fe, ^{7}Li, ^{16}O, ^{40}Ca, ^{13}C, ^{13}N, ^{45}Ti, ^{64}Cu.	**08**
Q-7		**Attempt all questions**	**(14)**
	a)	Write a note on nuclear stability.	**04**
	b)	Derive Semi-empirical mass formula and explain each term.	**10**
Q-8		**Attempt all questions**	**(14)**
	a)	Give the evidences of shell model.	**07**
	b)	Write a note on liquid drop model.	**07**