QP Code: D141431	**Total Pages:** 2	**Name:**
		Register No.

SECOND SEMESTER (CUFYUGP) DEGREE EXAMINATION, APRIL 2026

APPLIED PHYSICS / PHYSICS

APH2MN102 / PHY2MN102 MODERN PHYSICS AND NUCLEAR PHYSICS

2024 Admission onwards

Maximum Time :2 Hours	**Maximum Marks :70**

Section A

All Questions can be answered. Each Question carries 3 marks (Ceiling : 24 Marks)

1	Describe the photoelectric effect and Einstein's equation for it.
2	Summarize Compton scattering and its significance in quantum mechanics.
3	Explain the concept of wave-particle duality with an example.
4	Examine and write any 2 reasons for the failure of classical Physics.
5	Explain the difference between absorption and emission spectra.
6	Explain the statement "An electron can circle a nucleus only if it's orbit contains an integral number of de Broglie wavelengths".
7	Define nuclear binding energy and explain its importance.
8	Describe the idea of isotopes with two examples.
9	Explain Larmor frequency of protons.
10	Discuss the significance of radioactivity in medical science.

Section B

All Questions can be answered. Each Question carries 6 marks (Ceiling : 36 Marks)

11	Discuss and derive Rayleigh-Jeans formula using Planck's radiation law.
12	Explain the Davisson-Germer experiment and its implications for wave-particle duality.
13	Calculate radius of Gold Nucleus.
14	Prepare the list of spectral lines in Hydrogen spectra.
15	Explain the process of nuclear fission with a suitable diagram.

16	Describe the properties and detection methods of alpha, beta, and gamma rays.
17	Prepare a list of differences between emission line spectra and absorption line spectra.
18	Explain alpha decay using Tunnel theory of alpha decay.
Section C	
Answer any ONE. Each Question carries 10 marks (1x10=10 Marks)	
19	(a) Discuss the Bohr model of the atom and its limitations. (b) Chart the spectral series of Hydrogen atom with the help of an energy level diagram.
20	(a) Describe the properties of nuclei. (b) Find density of Carbon-12 nucleus.