



K22U 1977

Reg. No. :

Name :

**V Semester B.Sc. Degree (CBCSS-Supplementary)
Examination, November 2022
(2016-18 Admissions)
CORE COURSE IN PHYSICS
5B10PHY : Atomic, Nuclear and Particle Physics**

Time : 3 Hours

Max. Marks : 40

Instruction : Write answers in **English** only.

SECTION – A

(Answer **all**. Very short answer type. **Each** question carries **one** mark.)

1. Breaking of a large nucleus into smaller ones is known as _____
2. The charge of a neutrino is _____
3. The missing energy that keeps a nucleus together is known as _____
4. S. I. unit of Radioactivity is _____ .

SECTION – B

(Answer **any seven**. Short answer type. **Each** question carries **two** marks.)

5. What are L-S and J-J coupling ?
6. Define Mass Defect.
7. Define mean life of a radioactive element.
8. Distinguish between spontaneous and stimulated emission process.
9. List out the features of Bohr atom model.
10. Differentiate between isobars and isotopes. Give examples.

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11. State the Correspondence principle.
12. How energy is produced in stars ?
13. Write any four nuclear properties.
14. Mention some hazards of radioactivity.

SECTION – C

(Answer **any four**. Short essay/Problem. **Each** question carries **three** marks.)

15. Give the meson theory of nuclear forces.
16. Discuss the four fundamental forces in nature.
17. The atomic ratio between ^{238}U and ^{234}U in a mineral sample is found to be 1.8×10^4 . The half-life of ^{234}U is 2.5×10^5 years. Find the half-life of ^{238}U .
18. Find the longest wavelength present in Balmer Series of Hydrogen, corresponding to $H\alpha$ line.
19. Explain about radioactive series.
20. Estimate the magnetic energy U_m of an electron in the 2p state of Hydrogen atom using the Bohr model, whose $n=2$ state corresponds to the 2p state.

SECTION – D

(Answer **any two**. Long essay type. **Each** question carries **five** marks.)

21. Explain the theory of alpha decay in detail.
 22. Discuss the various types of elementary particles in detail.
 23. Discuss the shell model of the nucleus and explain how it accounts for magic numbers and magnetic moment of the nucleus.
 24. Discuss the X-ray spectra in detail.
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