



K23U 2840

Reg. No. :

Name :

V Semester B.Sc. Degree (CBCSS – Supplementary)
Examination, November 2023
(2017 and 2018 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. (4×1=4)

1. _____ suggested that atoms are made up of positively charged lumps of matter with electrons embedded in them.
2. The nucleus mass effects the _____ of spectral lines.
3. A system of particle is stable when its total energy is _____
4. Joining two lighter nuclei into a single nucleus is called _____

SECTION – B

Answer **any seven** – Short answer type. **Each** question carries **two** marks. (7×2=14)

5. Define activity.
6. According to Quark Model, what is the charge of a hadron ?
7. What are magic nuclei ?
8. Distinguish between isotopes and isomers.
9. Give the quark model for a proton.
10. What is nuclear density ?

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11. List the members of radioactive series.
12. Give some examples for nuclear hazards.
13. What are mesons ?
14. What is L-S coupling ?

SECTION – C

Answer **any four** – Short Essay/Problem. **Each** question carries **three** marks. (4×3=12)

15. Explain Bohr atom model.
16. Distinguish between symmetric and antisymmetric wave functions.
17. Find the density of $^{12}\text{C}_6$ nucleus.
18. The binding energy of $^{20}\text{Ne}_{10}$ is 160.647 MeV. Find its atomic mass.
19. Find the activity of 1.00 mg of ^{222}Rn whose atomic mass is 222u.
20. An electron collides with a hydrogen atom in its ground state to $n = 3$. How much energy was given to the hydrogen atom during this inelastic collision (KE is not conserved) ?

SECTION – D

Answer **any two** – Long Essay type. **Each** question carries **five** marks. (2×5=10)

21. Explain liquid drop model in detail.
22. Explain Franck-Hertz experiment.
23. Explain the energy production in stars.
24. Explain the four fundamental interactions in nature and also discuss the various types of elementary particles.