Reg. No.: ....

Name: ....

V Semester B.Sc. Degree (CCSS – Supplementary) Examination, November 2018
(2011 & Earlier Admissions)
Core Course in PHYSICS
5B10 PHY : Atomic, Nuclear & Particle Physics

Time : 3 Hours

Total Weightage : 30

SECTION – A

(Choose the correct answer. **Each** bunch carries a weightage of **1**)

1. i) Balmer series contains wavelength in _____ region.

   a) visible   b) infrared   c) magnetic   d) microwave

   ii) When there are more atoms in the excited state than the ground state it is called

   a) Laser   b) Optical pumping

   c) Population inversion   d) Metastable state

   iii) Group 7 elements in periodic table are

   a) inert gases   b) metals   c) halogens   d) non-metals

   iv) In positive beta decay, _____ is emitted.

   a) positron   b) electron   c) pions   d) neutrons

2. i) When two nucleus join together to form a single nucleus, it emits energy. Such process is called

   a) weak interaction   b) nuclear fission

   c) nuclear fusion   d) binding energy

   ii) Hadrons consisting of three quarks are called

   a) leptons   b) tau neutrino   c) baryons   d) mesons

   iii) The coulomb energy of a nucleus is given by

   a) $-aA^{2/3}$ b) $-aA$ c) $-aA^{-1/3}$ d) $-A$

   iv) Orbital angular momentum can acquire values

   a) $\hbar$ b) $l\,\hbar$ c) $m\,\hbar$ d) $\sum L_i$

P.T.O.

K18U 1749

SECTION – B

(Answer **any six** questions. **Each** carries a weightage 1)

3. What is the radius of the orbital according to Bohr model ?

4. What is metastable state in lasers ?

5. What is an Pauli's exclusion principle ?

6. Which element has a K_α X-ray line whose wavelength is 0.180nm ?

7. Which element is the most stable and why ?

8. What is the spin angular momentum of a proton ?

9. The helium isotope ^6_2He is unstable. What kind of decay would it undergo ?

10. Draw the diagram of common type of nuclear power plant ?

SECTION – C

(Answer **any nine** questions. **Each** carries a weightage of **two**)

11. Explain why the planetary model of the atom failed.

12. What is the shortest wavelength present in the Brackett series of spectral lines ?

13. What is symmetric and antisymmetric wavefunction ?

14. What is spin-orbit coupling ?

15. Explain semi-empirical mass formula.

16. Brief account of radioactivity.

17. Obtain a relation between the incident particles falling on a slab and its thickness.

18. Distinguish between the four fundamental interactions.

19. What are antimatters and give few examples ?

20. Explain about ITER.

21. Explain radioactive series.

22. Explain meson theory of nuclear forces.

SECTION – D

(Answer **any one** question. **Each** carries a weightage of **4**)

23. Obtain a relation for binding energy per nucleon through liquid drop model.

24. Explain nuclear fission and fusion.

—————————