15. (a) Explain the altitude effect of cosmic rays.

Or

(b) Distinguish between mesons and baryons.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 600 words.

16. (a) Explain in detail the fine structure of sodium D line.

Or

(b) Explain the theory and experiment for Zeeman effect.

17. (a) Define binding energy. Explain the binding energy curve and its significance.

Or

(b) Explain the Liquid–Drop model of a nucleus.

18. (a) (i) Derive expression for half life period
(ii) Explain Radio carbon dating.

Or

(b) Explain the neutrino theory of β –decay.

19. (a) Explain the construction and working of nuclear reactor.

Or

(b) Explain the construction and working of G.M. Counter.

20. (a) Explain Cosmic ray showers.

Or

(b) Explain the conservation laws and symmetry in elementary particles.

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Reg. No. : .....

Code No. : 41132 E **Sub. Code : JMPH 62**

B.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2019.

Sixth Semester

Physics — Main

ATOMIC AND NUCLEAR PHYSICS

(For those who joined in July 2016 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The permissible values of angular momentum quantum number (l) is ————————

(a) 0 (b) 0 to n + 1

(c) 0 to n – 1 (d) n^2

2. Stark effect is splitting of spectral lines due to

(a) Magnetic field (b) Electric field

(c) Gravitational field (d) none

3. The nucleus of $_1H^2$ is ———— nucleus

(a) even —even (b) odd —odd

(c) odd– even (d) even —odd

4. The nuclear force is ———— and ————

(a) strong, attractive (b) weak, attractive

(c) strong, repulsive (d) none

5. Alpha particle is the nucleus of ————

(a) Hydrogen (b) Helium

(c) Lithium (d) none

6. The expression for half life period of a radioactive nucleus is

(a) $\frac{\lambda}{6.93}$ (b) $\frac{\lambda}{0.693}$

(c) $\frac{0.693}{\lambda}$ (d) None

7. The nuclear fission is due to ———— of ———— nucleus

(a) joining, light (b) splitting, heaw

(c) joining, heavy (d) none

8. The controlled thermo nuclear reaction is achieved in

(a) Cyclotron (b) G.M. Counter

(c) Nuclear Reactor (d) none

9. The idea of elementary particles is proposed by

(a) Dalton (b) J.J. Thomson

(c) Yukawa (d) none

10. Positron is a positive ————

(a) proton (b) neutron

(c) electron (d) none

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) Explain j-j coupling.

Or

(b) State and explain Pauli's exclusion principle.

12. (a) Give the general properties of nucleus.

Or

(b) Explain the proton - neutron hypothesis of nucleus.

13. (a) State arid explain Soddy–Fajan's displacement law with examples.

Or

(b) Give the applications of Mossabauer effect.

14. (a) Calculate the energy released during fission of U^{235}.

Or

(b) Explain the principle and action of atom bomb.