

(6 pages)

Reg. No. :

Code No. : 30564 E Sub. Code : SMPH 63

B.Sc. (CBCS) DEGREE EXAMINATION,
APRIL 2020.

Sixth Semester

Physics – Core

NUCLEAR PHYSICS

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the best answer :

1. If the binding energy is large, the nucleus is
_____.

- | | |
|--------------|--------------|
| (a) stable | (b) unstable |
| (c) moderate | (d) low |

2. In nuclear physics area is measured in —————.
- (a) Meter (b) Barns
(c) Length (d) Kilometer
3. The probability of leaking of alpha particles through the barrier is called —————.
- (a) Peltier Effect (b) Penetration Effect
(c) Tunnel Effect (d) Zeeman effect
4. The phenomenon of nuclear isomerism was discovered by O. Hahn in —————.
- (a) 1923 (b) 1922
(c) 1912 (d) 1921
5. The energy release in fusion is —————.
- (a) 23.84 MeV (b) 25.84 MeV
(c) 24.84 MeV (d) 22.84 MeV
6. The source of stellar energy is —————.
- (a) Fission
(b) Fusion
(c) Fission and Fusion
(d) None

7. Cloud chambers can be used to study the variation of _____.
(a) High ionization
(b) Slow ionization
(c) Specific ionization
(d) Medium Ionization
8. The energy of the particle is converted to light, is the basis of _____.
(a) Bubble Chamber
(b) Wilson Cloud Chambers
(c) G.M. Counter
(d) Scintillation Counter
9. The energy of primary cosmic ray's ranges from _____.
(a) 1 MeV to 10^{14} MeV
(b) 2 MeV to 10^{14} MeV
(c) 1 MeV to 10^{12} MeV
(d) None
10. Cosmic ray consists of high energy _____.
(a) Charge less Particle
(b) Charged Particle
(c) Positive Particle
(d) Negative Particle

PART B — ($5 \times 5 = 25$ marks)

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

Each answer should not exceed 250 words.

11. (a) Describe Proton – Electron hypothesis.

Or

- (b) The general properties of nucleus.

12. (a) To write any five properties of gamma rays.

Or

- (b) Describe the term mean life.

13. (a) To derive the Q value equation for nuclear reaction.

Or

- (b) Briefly explain the term fusion reactors.

14. (a) Explain the action of scintillation counter.

Or

- (b) Describe the term synchrotrons.

15. (a) To write any five difference of primary and secondary cosmic rays.

Or

- (b) Explain the following elementary particle quantum number.
(i) Baryon
(ii) Lepton

PART C — ($5 \times 8 = 40$ marks)

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

Each answer should not exceed 600 words.

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

Or

- (b) Explain the shell model and evidence of magic number.

17. (a) Explain the laws of radioactive disintegration.

Or

- (b) Briefly explain the application of radio isotopes.

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

Or

- (b) Explain the term plasma confinement.

19. (a) Explain the principle, construction and working of G.M. Counter.

Or

- (b) Explain the principle, construction and working of cyclotron.

20. (a) Describe origin of cosmic rays.

Or

- (b) Briefly explain the different types of quark model.
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