

(FOR THE CANDIDATES ADMITTED

SUBJECT CODE **22 PPS 412**

DURING THE ACADEMIC YEAR 2023-24 ONLY)

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY – 2024

M.Sc. – PHYSICS

MAXIMUM MARKS: 50

IV SEMESTER

TIME : 3 HOURS

NUCLEAR AND PARTICLE PHYSICS

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. The Non-Central force is also called as -----force.
(a) Symmetric (b) Central (c) Tensor (d) Non-Symmetric
2. Collective Model introduces many new ideas familiar in ----- Physics into Nuclear Physics.
(a) Atomic (b) Molecular (c) Optical (d) Natural
3. When a nucleus emits a-----particle, its charge changes by one unit while its mass practically remains unchanged.
(a) Alpha (b) Gamma (c) Beta (d) Theta
4. -----Projectile particle is not used for the production of Nuclear Fission.
(a) Neutrons (b) Protons (c) Deutrons (d) Positrons
5. Mesons are known as Strongly Interacting-----.
(a) Hadrons (b) Hyperons (c) Bosons (d) Tritons

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.

(K2)

6. What are Winger forces?
7. Why is it called as Unified Model of Nucleus?
8. Give the expression for Internal Conversion Coefficient and explain its terms.
9. Compare Nuclear Fission and Fusion.
10. What is Quark?

(CONTD 2)

SECTION – B**(5 X 3 = 15 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K3)**

11. (a) List any Three Properties of Deutrons.
(OR)
(b) “Inter-Nucleon forces are Spin dependent” - Explain.
12. (a) Give a brief note on Magic Numbers.
(OR)
(b) Predict the Angular Momenta of nuclear ground states by Shell Model.
13. (a) Write a note on Gamow-Teller Selection Rules.
(OR)
(b) Discuss the Long-Range Alpha-Particles with diagrams.
14. (a) Classify Neutrons according to their energies.
(OR)
(b) Explain in detail the Solar Fusion...
15. (a) Give a brief note on Coloured Quarks.
(OR)
(b) With a diagram, explain the General Classification of Elementary Particles.

SECTION – C**(5 X 5 = 25 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K4 (Or) K5)**

16. (a) Discuss the n-p Scattering at Low Energies.
(OR)
(b) Write a note on Nucleon Scattering.
17. (a) Describe the Liquid drop model of the Nucleus.
(OR)
(b) Discuss in detail about the Collective Model of Nucleus.
18. (a) Give a detailed note on Gamow’s Theory of Alpha-Decay.
(OR)
(b) Explain the theory of Angular Correlation Successive Radiation in Gamma-Emission.
19. (a) Obtain Four Factor Formula.
(OR)
(b) Discuss the Construction and working of Controlled Fusion reactors.
20. (a) Describe Strange Particle and Strangeness.
(OR)
(b) Write a detailed note on (i) String Theory and (ii) Higgs Bosons.