

(FOR THE CANDIDATES ADMITTED  
DURING THE ACADEMIC YEAR 2021 ONLY)

SUBJECT CODE **21UPS614**

REG.NO. :

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

**END-OF-SEMESTER EXAMINATIONS : MAY – 2024**

**B.Sc. – PHYSICS**

**MAXIMUM MARKS: 70**

**SEMESTER: VI**

**TIME : 3 HOURS**

**PART – III**

**ATOMIC AND NUCLEAR PHYSICS**

**SECTION – A (10 X 1 = 10 MARKS)**

**ANSWER THE FOLLOWING QUESTIONS.**

**MULTIPLE CHOICE QUESTIONS.**

**(K1)**

- In photoelectric effect the energy transition is explained using \_\_\_\_\_  
(a) wave theory (b) quantum theory  
(c) Newton's theory (d) Chemical reaction
- The Bragg's law equation is \_\_\_\_\_  
(a)  $\lambda/2 = 2d \sin\theta$  (b)  $N\lambda = 2d \sin\theta$   
(c)  $2N\lambda = d \sin\theta$  (d)  $N\lambda = 2d \sin\theta$
- \_\_\_\_\_ is the time required for a quantity (of substance) to reduce to half of its initial value.  
(a) Life span (b) quantum shift  
(c) Half-life (d) spin time
- Energy released during fission of one nucleus of  $U^{235}$  is about: (Given: energy released per nucleon is 0.8 MeV).....  
(a) 200 MeV (b) 2000 MeV (c) 1 MeV (d) 20 MeV
- \_\_\_\_\_ are intermediate mass particles which are made up of quark-antiquark pair.  
(a) Pions (b) Quarkions (c) Megons (d) Mesons

**ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.**

**(K2)**

- Define the Pauli's exclusion principle.
- List an application of X rays.
- Define nuclear binding energy.
- Write any two uses of GM Counting.
- Define a Quark

**(CONTD .... 2)**

**SECTION – B (5 X 4 = 20 MARKS)****ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING****QUESTIONS.****(K3)**

11. a) Explain the process of Einstein's photoelectric emission and give the equation.

**(OR)**

- b) List the drawbacks of Bohr's atomic model.

12. a) List the applications of Bragg's law.

**(OR)**

- b) Write Moseley's law and its significance:

13. a) Explain liquid drop model of nucleus

**(OR)**

- b) What is known as alpha decay? Explain.

14. a) What are the types of nuclear reactions? Explain.

**(OR)**

- b) Give any two important applications of Geiger-Muller counter.

15. a) What are known as strange particle? Explain.

**(OR)**

- b) Write about annihilation of matter.

**SECTION – C (4 X 10 = 40 MARKS)****ANSWER ANY FOUR OUT OF SIX QUESTIONS.****(16<sup>th</sup> QUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS .****(K4 / K5)**

16. With the necessary diagrams, explain the working of Millikan's oil drop experiment and discuss its results.
17. What is Bragg's law? Obtain Bragg's equation with diagram.
18. Describe the working of nuclear reactor with a neat block diagram
19. i) What is known as nuclear binding energy? (5 marks)  
ii) Give a brief note on 'Mass defects' ? (3 marks)
20. Describe the construction and working of Cyclotron with experimental setup..
21. Give the theory of Quarks and discuss the types . Mention some of its properties.