



DAG-003-0494003

Seat No. _____

B. Sc. / M. Sc. (Applied Physics) (Sem. IV) Examination

April - 2022

Applied Nuclear Physics : Paper - XIV
(New Course)

Faculty Code : 003

Subject Code : 0494003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Instruction : Numbers in the right margin indicate marks.

- 1** Write answers of short questions (Any SEVEN) **14**
(Two marks each)
- (1) Write the advantages of nuclear energy.
 - (2) List various types of particle detectors.
 - (3) Write applications of particle detectors.
 - (4) Explain the principle of operation of the ionization chamber.
 - (5) What are leptons?
 - (6) Explain primary and secondary cosmic rays.
 - (7) What are dark matter and dark energy?
 - (8) Write applications of Mossbauer spectroscopy.
 - (9) Write the difference between active and passive particle detectors.
 - (10) Why Gamma Knife is more advantageous as compared to conventional surgery?
- 2** (A) Answer any TWO of the following questions : **14**
(Five marks each)
- (1) What are strangeness and strange particles?
 - (2) Explain the Linear accelerator.
 - (3) Explain the scintillation counter using a schematic diagram.
- (B) Answer any ONE of the following questions :
(Four marks each)
- (1) Write disadvantages of GM counter.
 - (2) What are the limitations of cyclotron?

- 3 (A) Answer any TWO of the following questions (Five marks each) **14**
- (1) What is Magnetic Resonance Imaging?
 - (2) Explain the principle and construction of a GM counter.
 - (3) What is a cyclotron? Explain its construction & working.
- (B) Answer any ONE of the following questions (Four marks each)
- (1) Write a short note on Quarks.
 - (2) What is the baryon number?
- 4 (A) Answer any TWO of the following questions : **14**
(Five marks each)
- (1) Explain the working of the synchrotron using a necessary schematic diagram.
 - (2) What is a Van-Allan belt? Discuss the outer and inner belts.
 - (3) Write a detailed note on Magnetic Resonance Imaging
- (B) Answer any ONE of the following questions :
- (1) Explain Van de Graff Generator.
 - (2) Write a note on Mossbauer spectroscopy.
- 5 (A) Answer any TWO of the following questions : **14**
(Five marks each)
- (1) Explain the big bang theory in detail using a timeline diagram.
 - (2) What are matter and antimatter? Which was the first antimatter?
 - (3) Explain the gamma knife with the necessary figure.
- (B) Answer any ONE of the following questions :
- (1) Explain positron emission tomography with necessary figures.
 - (2) Tabulate the standard model of the particles.
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