



MBT-003-0494003

Seat No. _____

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

April / May - 2018

**Paper - XIV : Applied Nuclear Physics
(New Course)**

Faculty Code : 003

Subject Code : 0494003

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

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) Numbers in the right margin indicate marks.

- 1 Attempt any **seven** short questions : (Two marks each) **14**
- (1) Draw a schematic diagram of ionization chamber with nomenclature.
 - (2) Explain the principle of operation of ionization chamber.
 - (3) Draw a characteristics curve of ionization chamber and explain its all regions.
 - (4) What is photographic (nuclear) emulsion ?
 - (5) Write charged pair decay.
 - (6) Write a short note on Quarks.
 - (7) Discuss primary cosmic rays
 - (8) Write about the discovery of π - meson and μ - meson.
 - (9) Give the name of two hypothesis for the basis of cosmological principal which is assumed in all cosmological theories.
 - (10) Write a short note on Cerenkov detector.

- 2** (a) Write answers of any **two** : (five marks each) **10**
- (1) Explain semiconductor junction detector, write its advantages and disadvantages.
 - (2) Write a detailed note on Van-de-graph generator.
 - (3) What is a cyclotron? Explain its construction and working.
 - (4) Explain Liner accelerators, and discuss energy of ion.
- (b) Write answers of any **one** : (two marks each) **4**
- (1) What is a cyclotron ? Explain its construction and working.
 - (2) How the limitations of a cyclotron can be overcame ?
- 3** (a) Write answers of any **two** : (five marks each) **10**
- (1) Write a note on field bosons.
 - (2) Explain the standard model.
 - (3) Discuss the conservation laws for elementary particles.
 - (4) Write a detailed note on flavours of elementary particles.
- (b) Write answers of any **one** : (two marks each) **4**
- (1) Write a note on colour of elementary particles.
 - (2) Explain the quark confinement.
- 4** (a) Write answers of any **two** : (five marks each) **10**
- (1) Write a note on Mossbauer spectroscopy.
 - (2) Explain positron emission tomography with necessary figures.
 - (3) Write a detailed note on Magnetic Resonance Imaging.
 - (4) Write down the disadvantages of nuclear energy.
- (b) Write answers of any **one** : (two marks each) **4**
- (1) Explain gamma knife with necessary figure.
 - (2) Write down the advantages of nuclear energy.

- 5 (a) Write answers of any **two** : (five marks each) **10**
- (1) Discuss history of universe according to big bang.
 - (2) What is Van-Allan belt ? Discuss about the outer and inner belt.
 - (3) Discuss the types of basic interaction in particles with their strength and range.
 - (4) Explain extensive air shower of cosmic rays in detail.
- (b) Write answers of any **one** : (two marks each) **4**
- (1) What is dark matter ? Write the equation for critical density ρ_c .
 - (2) Discuss the geomagnetic effect for cosmic rays.
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