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2203N273

Candidate's Seat No :_____

M.Sc. Sem.-1 Examination

402

Medical Physics

March 2022

Time : 2-00 Hours] **[Max. Marks : 50**

Instructions: All questions in **Section – I** carry equal marks.
Attempt any **Three** questions in **Section – I.**
Questions in **Section – II** is **COMPULSORY.**

Section – I

Q-I A. Name the types of Exchange forces and discuss in detail. 7

B. Discuss: Effective range theory 7

Q-II A. Name the types of Exchange forces and discuss in detail. 7

B. Discuss: Effective range theory 7

Q-III A. i. What is Segre plot? Draw the Graph of B/A verses A and give explanation of it. 7

ii. By giving name of all terms of binding energy, write down Weizsacher's semi empirical mass formula.

B. Draw the plot of binding energy per nucleon verses mass number and discuss the features drawn from it. 7

Q-IV A. Explain the main assumptions of the shell model of the nucleus. Discuss its achievements, failures and limitations. 7

B. Draw the table for sequence of nuclear spins according to the single particle shell model. 7

Q-V A. Explain PET theory. 7

B. Explain decay of Co-60 and Caesium-137. 7

P. T. O

Q-VI A. Explain transient and secular equilibrium. 7

B. Write short note on radioactive series. 7

Q-VII A. Tree of elementary particles & name of Fundamental Interactions. 7

B. State the CPT theorem and write short note on Quarks. 7

Q-VIII A. Write types of Cosmic rays and Discuss Primary and Secondary cosmic rays. 7

B. Discuss Bhabha-Heitler theory of cascade showers. 7

Section – II

Q-IX MCQs 8

1. Bartlett exchange force arise from:

A. Special exchange B. Special and Spin exchange

C. Charge exchange D. Spin exchange

2. Yukawa meson theory for nuclear force, at vertex point _____.

A. No conservation of momentum B. Conservation of momentum

C. No conservation of energy D. Conservation of energy

3. Which of the following best explain the process of nuclear fission?

A. Liquid drop model B. Fermi gas model

C. Proton-proton cycle D. None of these

4. From the shell model prediction, the ground state spin and parity of $^{27}_{14}Si$ nucleus is

A. $\frac{3^+}{2}$

B. $\frac{3^-}{2}$

C. $\frac{5^+}{2}$

D. $\frac{5^-}{2}$

5. Among following which isotope is used in high dose rate (HDR) brachytherapy.

A. Ir-191

B. Ir-192

C. Ir-193

D. Ir-194

6. What compound is used more frequently in the radioactive tracers?

A. Oxygen

B. Carbon

C. Nitrogen

D. Fluorine

7. Primary cosmic rays have a range of energy is ____

A. 10^6 eV to 10^9 eV

B. 10^9 eV to 10^{15} eV

C. 10^8 eV to 10^{20} eV

D. 10^9 eV to 10^{20} eV

8. How many proton percentage in primary cosmic rays?

A. 92 %

B. 95 %

C. 93 %

D. 5 %

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