

Biyani Girls College
Model Test Paper-2015-16
Nuclear Physics

Time- 3 Hours

Maximum Marks- 100

Unit-I

1. Explain the Debye model for specific heat of solid. Prove that specific heat of solid at low temperatures is proportional to cube of absolute temperature.
2. Determine the fundamental vector and volume of a primitive cell for simple cubic, body centered cubic and hexagonal close packed structure.

Unit-II

3. Differentiate between diamagnetic paramagnetic and ferromagnetic materials. And also explain by domain theorem.
4. Describe Rutherford's experiment and explain how he estimated charge and nuclear density of nucleus.

Unit-III

5. Define mass defect and binding energy. Draw the graph for variation of binding energy per nucleon with mass number and explain it.
6. What is the meaning of electric quadrupole moment of a nucleus? Derive an expression of it. What conclusions can be drawn from the knowledge of electric quadrupole moment of a nucleus.

Unit-IV

7. What are quarks? Write their properties. Illustrate constitution. And explain scintillation counter.

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Unit-I

1. Define packing fraction. Shown packing fraction for FCC and HCP structures are equal.
2. Write a short note on phonons. How can transfer energy on phonon.

Unit-II

3. If Curie temperature of ferromagnetic material is 727°C , then what will be the order of magnetic of exchange integral? Also calculate internal magnetic field from it
($\mu_{\beta} = 9.3 \times 10^{-34} \text{ O/texta}$)
4. Describe construction and working of cyclo from. Derive an expression for the maximum. Kinetic energy of the particle accelerated by cyclotron. Discuss about limitation of the cyclotron.

Unit-III

5. Describe construction and working of Geiger-Muller counter.
6. Explain Hofstadter electron scattering experiment for the determination of nuclear charge density distribution and radius

Unit-IV

7. What are leptons? What is lepton conservation law? Using above prove that is emission anti-neutrino and β^{+} emission neutrino is emitted.
8. Describe various section of a nuclear reactor with the help of suitable block diagram.

