Maximum Marks: 15

Very Short Questions (1 Mark each)

1. What is the saturation property of nuclear forces?

2. What is the ratio of the radius of $_{28}Ni^{64}$ and $_{49}In^{125}$?.

3. What is isobaric spin?

4. Obtain the ratio of nuclear mass densities of $_{79}Au^{197}$ and $_{47}Ag^{107}$.

5. Define binding energy of a nucleus.

Short Questions (2.5 Marks each)

6. How will you assign parity and spin to the ground state of a nucleus? Discuss.

7. Discuss the similarities between a nucleus and a liquid drop. What are the limitations and achievements of liquid drop?

Long Answer Questions (5 Marks)

8. Explain the salient features of the nuclear force. How are they different from gravitational and electromagnetic forces?

Or

Using the semi empirical mass formula, calculate the binding energy of $_{20}Ca^{40}$. What is the % discrepancy between this value and the actual value?

Maximum Marks: 15

Very Short Questions (1 Mark each)

1. Write down the Maxwell equations in the absence of sources, in an infinite medium.

2. Give any two properties of Plasma.

3. Define Pinch effect.

4. What do you mean by Plasma frequency?

5. Define Debye length.

Short Questions (2.5 Marks each)

6. Prove that electric and magnetic fields of a plane wave are perpendicular to its direction of propagation in a non-conducting medium.

7. Deduce Kramer-Kronig relations.

Long Answer Questions (5 Marks)

8. Obtain the wave equations for E and B in isotropic non-conducting medium.

Or

Prove that the EM wave penetrates the conducting medium to a depth β.

Maximum Marks: 15

Very Short Questions (1 Mark each)

1. How time independent wave function for an electron in a crystal under nearly free electron model is different from that of free electron model?

2. Write down the wave function for a crystal having periodic potential.

3. What is De Hass Van Alfen effect?

4. Define Bloch function.

5. What do you mean by Reduced zone scheme?

Short Questions (2.5 Marks each)

6. Show that the number of orbitals in any energy band is 2N where N is the number of primitive cells in the specimen.

7. Derive wave equation of electron in periodic potential.

Long Answer Questions (5 Marks)

8. State and prove Bloch theorem.

Or

Explain origin and magnitude of energy gap.

J.D.B. Government Girls' College, Kota

M.Sc. SEM-III

Paper-304 (Microwave Electronics-I)

Monthly Test

Maximum Marks: 15

Very Short Questions (1 Mark each)

9. Why TEM wave cannot be propagated through wave guides?

10. Define dominant mode of wave propagation in a wave guide.

11. What is meant by rectangular wave guide?

12. What is Q-factor for a wave guide?

13. What is Faraday's rotation effect?

Short Questions (2.5 Marks each)

14. Derive the field components for TM waves in rectangular wave guide.

15. Explain attenuation constant due to dielectric losses increase or decrease with decrease frequency for TM and TE modes in a wave guide.

Long Answer Questions (5 Marks)

16. Explain causes of attenuation of wave guide.

Or

What are the methods of excitation of wave guide?