



KUVEMPU UNIVERSITY
OFFICE OF THE DIRECTOR
DIRECTORATE OF DISTANCE EDUCATION



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TOPICS FOR INTERNAL ASSESSMENT ASSIGNMENTS (2008-09)
Course: M.Sc. PHYSICS (Final)

Note: Students are advised to read the separate enclosed instructions before beginning the writing of assignments.

Out of 15 Internal Assignment marks per paper, 5 marks will be awarded for regularity (attendance) to Counseling/ Contact Programme/ Practical classes pertaining to the paper. Therefore, the topics given below are only for 10 marks each paper.

Paper-V: ELECTRODYNAMICS, OPTICS AND MOLECULAR SPECTROSCOPY

- 1 Show that the skin depth in a poor conductor is $(2/\sigma)\sqrt{\epsilon/\mu}$ while for good conductor is $\lambda/2\pi$. Find the skin depth for pure water **5 marks**

- 2 a) A particular NMR instrument operates at 30.256MHz; What magnetic fields are required to bring ^1H and ^{13}C nuclei to resonance at this frequency? **3 + 2marks**

b) The gallium arsenide is prepared for laser action but silicon and germanium are not. Explain why?

Paper-VI: NUCLEAR, COSMIC RAYS & PARTICLE PHYSICS

- 1 Pu^{239} emits α -particles of energy 5.4MeV. Calculate the decay probability **5 marks**

- 2 a) Calculate the number of collisions made by fast neutrons is slowing down process in graphite medium till it attains thermal energy. **3 + 2marks**

b) Predict the ground state spin and parity of $^6\text{C}^{13}$ and $^{17}\text{Cl}^{37}$ on the basis of shell model

Paper-VII: SOLID STATE PHYSICS – I

- 1 Two markers are placed in a couple formed of two semi infinite regions of A and B, one at initial held and the other at a short distance away. Show qualitatively how the position of each marker varies with time if $D_A > D_B$. Derive these curves to plot $N(x)$ and $\frac{\partial N}{\partial x}$ verses x and using the equation $U = (D_A \cdot D_B) \frac{\partial N a}{\partial x}$ **5 marks**

- 2 Calculate the induced dipole moment / unit volume (polarization density) of helium gas when it is placed in a field of 6×10^5 v/m. The atomic polarization of helium is 0.18×10^{-40} Fm² and concentration of helium atom is 2.6×10^{25} /m³. Also calculate the separation of positive and negative charge on each atom. **5 marks**

Paper-VIII: SOLID STATE PHYSICS - II

- 1 Distinguish Heisenberg's interaction of the origin from Weiss molecular field. Relate the exchange integral to the Weiss constant and ferromagnetic Curie temperature. **5 marks**

- 2 a) What is London Penetration depth? **5 marks**
b) Calculate the Critical Current which can flow through a long this superconducting wire of Aluminium wire of diameter 10^{-3} m. The critical field for Aluminium is 7.9×10^3 A/m
