



KUVEMPU UNIVERSITY
OFFICE OF THE DIRECTOR
DIRECTORATE OF DISTANCE EDUCATION
Jnana Sahyadri, Shankaraghatta – 577 451, Karnataka



Phone: 08282-256426; Fax: 08282-256370; Website: www.kuvempuuniversitydde.org
E-mails: ssgc@kuvempuuniversity.org; info@kuvempuuniversitydde.org

TOPICS FOR INTERNAL ASSESSMENT ASSIGNMENTS (2010-11)
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. The intensity of Sunlight hitting the earth is about 1300W/m^2 . If sunlight strikes a perfect absorber, what pressure does it exert? How about a perfect reflection. What fraction of atmospheric pressure does the amount to? **04 marks**
2. Show that for a d-s electron configuration the total 3D separation is the same in both L-S and J-J coupling. Show also that d-electron alone gives the same 2D separation. **03 marks**
3. Find the thickness of soap film that gives constructive second order interference of reflected red light ($\lambda = 7000\text{\AA}$). The index of refraction of the film is 1.33. Assume a parallel beam of incident light directed at 30° to the normal. **03 marks**

Paper-VI: NUCLEAR, COSMIC RAYS & PARTICLE PHYSICS

1. Discuss the barrier penetration – decay probabilities for spontaneous emission. **04 marks**
2. Give that the nuclei $^{176}_{71}\text{Lu}$ and $^{233}_{91}\text{Pa}$ have extreme value of electric quadropole movements of +7 and -3b, respectively. Calculate the
a) The ellipticity and
b) The ratio of b/a for the nuclei. Take the mean radius to be given by $R = 1.4A^{1/3}\text{ F}$. **03 marks**
3. Evaluate the maximum energy shift that can be observed for a body whose quadropole moment is Q. **03 marks**

Paper-VII: SOLID STATE PHYSICS – I

1. a) Prove that after reflection oblique lattice gives rays to rectangular lattice. *03 marks*
 b) What is the role of relaxation time in dielectrics? *02 marks*
2. In a energy band of a material of 1cm^3 volume, find the density of states at 2.5 eV above the bottom of the band. Also find the number of energy states that are covered by energy spread equal to thermal energy at 300 K at energy of 2.5 eV above the bottom of the band and in the energy spread between the energies KT and $2KT$ above the bottom of the band. Express the results in units of cm^3 and eV. *05 marks*

Paper-VIII: SOLID STATE PHYSICS - II

1. In an n-type semiconductor $N_d=10^{15}/\text{cc}$, $m_n^* = m$ and the donor level is below the conduction band by 0.05 eV. Find the temperature at which $n = 1/2 N_d$. And explain the concept of the effective mass. *04 marks*
2. Discuss the effects of External magnetic and electric field on the domain? *03 marks*
3. Distinguish between the Hall effect in metals and semiconductor. *03 marks*
