KUVEMPU UNIVERSITY

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TOPICS FOR INTERNAL ASSESSMENT ASSIGNMENTS: 2015-16

Course:M.Sc. PHYSICS (Final Year)

Important Notes: (1) Students are advised to read the separate enclosed instructions before beginning the writing of assignments. (2) Out of 15 *Internal Assignment marks per paper, 5 marks will be awarded for regularity (attendance) to Counseling/ Contact Programme 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. A plane polarized electrodynamics wave travelling in a dielectric medium of refractive index 'n' is reflected at normal incidence from the surface of a conductor. Find the phase change undergone by its electric vector if the refractive index of the conductor is n_2=n(1+iρ) **5 MARKS**

2. The rotational lines of band system of electronic vibration spectra of CN is given by $\bar{V} = (25{,}798 + 3.85\,m + 0.068\,m^2)cm^{-1}$,
   Deduce i) The values of B' andB''
   ii) The position of band head
   iii) Comment on the degradation of the band system **5MARKS**

Paper VI: Nuclear, Cosmic Rays & Particle Physics

1. Discuss energy levels of light nuclei and the hypothesis of charge independence of nuclear forces. **5MARKS**

2. Calculate the energy of neutron produced when a slow negative pion is captured by a proton. Treat the neutron non-relativistically. **5MARKS**

Paper VII: Solid State Physics – I

1. Describe the experimental determination of phonon dispersion relation using a triple axis neutron spectrometer. **4MARKS**
2. Given an account of the various theories of specific heat of solid. Discuss any of them in detail. **4MARKS**
3. Assuming the electrons to be free, calculate the total number of states below $E = 5eV$ in a cubical box of volume of $10^{-5}m^3$. **2MARKS**

Paper VIII: Solid State Physics – II

1. Give physical explanation for the formation of different parts of the hysteresis curve. **5MARKS**
2. Find the magnetic induction in the surface of a spherical superconductor of radius R, which experiences a uniform magnetic field B_o . **5MARKS**

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