KUVEMPU UNIVERSITY

OFFICE OF THE DIRECTOR

DIRECTORATE OF DISTANCE EDUCATION

JnanaSahyadri, 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:2016-17

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. Obtain the multipole expansion of electromagnetic potential due to an arbitrary charge distribution. Explain the meaning of each term in the expansion. **5MARKS**

2. Consider a monochromatic beam of light incident upon a single slit. Let the wavelength of the light be λ and the slit width be w=5 λ **5MARKS**

   (a). sketch the intensity pattern as function of angle in the region from the slit.

   (b). calculate the position of the first maximum and first minimum.

Paper VI: Nuclear, Cosmic Rays & Particle Physics

1. Mention the assumptions of the shell model and discuss the experimental evidences for magic number. Calculate the ground state spin and parity of ${}^{17}_{8}O$ and ${}^{12}_{6}C$ **5MARKS**

2. What are strange particles? Why do we call them so? Write down the Gell-Mann and Nishijima Scheme and explain the various terms in it. **5MARKS**

Paper VII: Solid State Physics – I

1. Obtain an expression for activation energy for the formation of defects in ionic crystal. **5MARKS**

2. Calculate the orientational polarizability of water molecules at room temperature. Given the dipole moment of a water molecule is $1.9\text{x}10^{+29}$ C.m. **5MARKS**

Paper VIII: Solid State Physics – II

1. Draw temperature dependence of susceptibility of all types of magnetic materials. Explain the Heisenberg's exchange interaction in ferromagnetism.. **5MARKS**

2. A specimen of germanium is doped with 0.1 atomic percent of arsenic. Assuming that, at room temperature, all the arsenic atoms are ionized, find the electron and hole densities in germanium. The arsenic carrier density at room temperature in germanium is $2.37\text{x}10^{19}/\text{m}^3$. The density of germanium atom is $4.41\text{x}10^{28}/\text{m}^3$. **5MARKS**

*****