**TEACHING SCHEDULE (COURSE: SOLID STATE PHYSICS)**

Class Room: B208 Timings: 11.30am-12.30pm Day:Monday, Tuesday and Wednesday

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| Lecture No | Topic | Content | Reference |
| 1 |  | Introduction to Course, Discussion on CAs and schedule of CAs |  |
| 2 | Bonding in Solids**:** | Introduction, Bonding in Solids, Cohesive energy, | Palanisamy,Ch#1 |
| 3 |  | Ionic bonding, Calculation of Cohesive energy of ionic solids, | Palanisamy,Ch#1 |
| 4 |  | Covalent bonding, Metallic bonding, Hydrogen bonding, Van der Waals (Molecular) bonding. | Palanisamy,Ch#1 |
| 5 |  | Contd |  |
| 6 | Crystal Structure: | Introduction, Space Lattice, Unit cell, Lattice Parameter of unit cell, Bravais lattices, Crystal Symmetry, | Palanisamy,Ch#2 |
| 7 |  | Contd |  |
| 8 | Date: 11/07/2018 CA-I: MCQ-I & Discussion (Syllabus: Bonding in Solids) | | |
| 9 |  | Stacking sequences in metallic crystal structure, SC, BCC, FCC and HCP structures, | Palanisamy,Ch#2 |
| 10 |  | Contd |  |
| 11 |  | Crystal structures- NaCl, diamond, CsCl, ZnS, | Palanisamy,Ch#2 |
| 12 |  | Contd. |  |
| 13 |  | Directions in crystals, Planes in crystals- Miller indices, Distances of Separation between Successive (*hkl*) Planes. | Palanisamy,Ch#3 |
| 14 |  | Contd. |  |
| 15 | Diffraction of X-rays by Crystals: | Introduction, Bragg’s law, Production of X-rays, | Palanisamy,Ch#4 |
| 16 |  | Determination of lattice parameters: Bragg’s X-ray spectrometer method, | Palanisamy,Ch#4 |
| 17 |  | X-ray Diffraction methods: Laue method and Debye Scherrer method, | Palanisamy,Ch#4 |
| 18 |  | Contd. |  |
| 19 | Date: 06/08/2018 CA-I: MCQ-II & Discussion (Syllabus: Crystal Structure) | | |
| 20 | Electron Theory of Metals: | Introduction, The Classical Free Electron Theory, Electrical conductivity(Free Electron Gas Model) | Palanisamy,Ch#6 |
| 21 |  | Contd. |  |
| 22 |  | Relaxation time, collision time and mean free path | Palanisamy,Ch#6 |
| 23 |  | Problem Solving (related to above concepts) |  |
| 24 | Date: 20/08/2018 CA-III: Written Test (Syllabus: Crystal Structure & Diffraction of X-rays by Crystals) | | |
| 25 |  | Quantum theory of free electrons, | Palanisamy,Ch#6 |
| 26 |  | Electrical Conductivity, | Palanisamy,Ch#6 |
| 27 |  | Fermi Distribution Function, | Palanisamy,Ch#6 |
| 28 |  | Problem Solving (related to above concepts) |  |
| 29 |  | Density of Energy States, | Palanisamy,Ch#6 |
| 30 |  | Problem Solving (related to above concepts) |  |
| 31 |  | Sources of electrical resistance, | Palanisamy,Ch#6 |
| 32 | Date: 05/09/2018 CA-I: MCQ-III & Discussion (Syllabus: Diffraction of X-rays by Crystals) | | |
| 33 |  | Electrons in a periodic potentials, | Palanisamy,Ch#6 |
| 34 |  | Contd. |  |
| 35 |  | Brillouin Zones in two dimensions and three dimensions, Fermi Energy, | Palanisamy,Ch#6 |
| 36 |  | Contd. |  |
| 37 |  | Effective mass of Electron and concept of hole, | Palanisamy,Ch#6 |
| 38 |  | Energy Bands in Solids. | Palanisamy,Ch#6 |
| 39 | Magnetic Properties: | Introduction, Classification of magnetic materials, | Palanisamy,Ch#8  (8.1,8.2) |
| 40 |  | The quantum numbers, Origin of magnetic moment, | Palanisamy,Ch#8  (8.3,8.4) |
| 41 |  | Ferromagnetism, Ferromagnetic domains, Hysteresis, Hard and soft materials | Palanisamy,Ch#8  (8.7, 8.7.3, 8.7.5, 8.7.6) |
| 42 |  | Revision |  |
| 43 |  | Revision |  |
| 44 |  | Revision |  |
| 45 |  | General Instruction about SEE |  |

**References:**

1. Palanisamy P. K., 2004, *Solid State Physics,* Scitech Publications (India) Pvt. Ltd.
2. Pillai S. O., 1999*, Solid State Physics,* 3rd Edition, New Age International (P) Ltd,

Publisher.

3. Kittel C., 2004*, Introduction to Solid State Physics*, 8th Edition,John Wiley and Sons.

4. Dekker A. J., 1998, *Solid State Physics*, Macmillan India Ltd. Publisher.