

**END OF SEMESTER EXAMINATIONS, NOVEMBER – 2017**

## SOLID STATE PHYSICS

**SUBJECT CODE: 12UAPH10**

MAJOR: B.Sc., (Physics) / *Physics CCA*  
TIME : 3 HOURS

**SEMESTER : VI**  
**MAX.MARKS: 75**

**SECTION-A (10 x 1 = 10)**

**Answer ALL questions:**

1. The type of bond that diamond has is \_\_\_\_  
a) Covalent  
b) ionic  
c) Metallic  
d) Vanderwall's
2. Ionic bonds exist only in \_\_\_\_ form.  
a) Gas  
b) Liquid  
c) Solid  
d) Plasma
3. The packing fraction of a BCC structure is \_\_\_\_  
a) 0.52  
b) 0.58  
c) 0.68  
d) 0.78
4. An example for orthorhombic structure is \_\_\_\_  
a) Quartz  
b) Calcite  
c)  $CuSO_4$   
d)  $PbCO_3$
5. A line imperfection is called as \_\_\_\_  
a) Stacking fault  
b) Grain boundary  
c) Dislocation  
d) Interstitial defect
6. Coherence means \_\_\_\_  
a) Mono chromaticity  
b) Directionality  
c) Ordering of light field  
d) High intensity
7. Anodization is associated with \_\_\_\_  
a) Chemical method  
b) Physical method  
c) Sputtering  
d) None of these
8. Sublimation is a process in which \_\_\_\_ is connected to \_\_\_\_  
a) Gas to liquid  
b) Liquid to solid  
c) Solid to liquid  
d) Solid to gas
9. Sol-Gel technique is used in the preparation of \_\_\_\_  
a) Nano oxides  
b) Metal oxides  
c) Reduction solids  
d) All the above
10. An example for smart material is \_\_\_\_  
a) CNT  
b) Quartz  
c) Diamond  
d) Felspar

**SECTION-B (5 x 4 = 20)**

**Answer ALL questions:**

11. a) Give a brief note on classification of solids.  
(OR)  
b) Discuss the potential energy diagram of ionic molecules.
12. a) Write a short note on (i) Unit cell (ii) Primitive cell.  
(OR)  
b) Explain the formation of BCC structure with diagram.
13. a) Describe the Nucleation method of crystal growth.  
(OR)  
b) Write a note on (i) Vacancies (ii) interstitial atom.
14. a) Describe the preparation of thin film by the process of electroplating.  
(OR)  
b) Brief the study of thin-film Vacuum coating technique.
15. a) Discuss the properties of Nano wires.  
(OR)  
b) Write a short note on Plastic solar cells.

**SECTION-C (5 x 9 = 45)**

**Answer ALL questions:**

16. a) Explain the primary and secondary bonds and their characteristics.  
(OR)  
b) With suitable diagrams explain the different types of covalent bonds.
17. a) Discuss the seven basic crystal system with necessary diagrams.  
(OR)  
b) Explain the crystal structure of diamond and NaCl.
18. a) Describe the Czochralski's crystal pulling technique with a neat diagram.  
(OR)  
b) Explain the principle, construction and working of a He – Ne Laser.
19. a) Enumerate the various sputtering techniques in the preparation of thin films.  
(OR)  
b) Explain the principle and working of Vacuum evaporation technique with a neat diagram.
20. a) Give a detailed account on Carbon Nano Tubes.  
(OR)  
b) Outline the Health and Environmental impact of Nano Materials.

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