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Code No.: 1203S

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. I Year II-Semester (Supplementary) Examinations, Dec./Jan.: 2015-16

Engineering Physics – II
(For Civil, Mechanical and EEE Branches)

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 X 2=20 Marks)

1. If the intercepts made by the plane on three crystallographic axes are 2, 3 and 1 units respectively find Miller indices of a plane.
2. Write Schrodinger's wave equation and explain terms involved in it.
3. Define position space and momentum space in statistical mechanics.
4. Explain photon gas.
5. What are the failures of free electron theory of metals?
6. What is a Cooper pair? and explain.
7. Discuss any two methods of detecting ultrasonic waves.
8. What is an absorption coefficient in sound?
9. Distinguish between bulk, thin film and nanoparticle.
10. Mention four applications of nano materials.

Part – B (Marks: 5 X 10 = 50 Marks)

11. a) Describe powder diffraction method to study the structure of crystalline solids. [7]
b) Calculate the minimum amount of energy that an electron can possess in an infinitely deep potential well of 4 nm width. [3]
12. a) Derive Bose-Einstein Statistics. [6]
b) What are the various types of ensembles in statistical mechanics? [4]
13. a) What is Hall effect? Derive an expression for Hall coefficient. [7]
b) Superconducting tin has a critical temperature of 3.7 K and a critical field of 0.0306 Tesla at 0 K. Find the critical field at 2 K. [3]
14. a) Discuss how ultrasonic waves are produced using piezoelectric method with neat sketch. [5]
b) Derive Sabine's formula for reverberation time. [5]
15. a) Describe any one method for preparation of carbon nanotubes. [4]
b) Explain the principle of transmission electron microscopy (TEM) with a neat diagram. [6]
16. a) State and explain Bragg's law of diffraction. Write the difference between crystal gratings and plane transmission grating. [5]
b) Apply the Fermi-Dirac statistics to electron gas and obtain the expressions for Fermi Energy. [5]
17. Answer any two of the following:
 - (a) Explain Type-I and Type-II superconductors with suitable examples. [5]
 - (b) Discuss the desirable acoustic properties of a good auditorium. [5]
 - (c) Write briefly optical properties of nanomaterials. [5]