Hall Ticket Number:

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. I Year II-Semester Advanced Supplementary Examinations, June/July-2017

Engineering Physics-II
(Civil, Mech. & E.E.E.)

Time: **3** hours Max. Marks: **50**

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

Part-A (15 Marks)

1. Write the expression of Bragg's law. [1]
2. Define phase space. [1]
3. According to band theory of solids the energy gap between valence band and conduction band in a semiconductor would be [1]
   a) 0 b) ≈ 1 eV c) >3eV d) None
4. Write a brief note on non-destructive testing. [1]
5. Quantum dot is a ---------- dimensional nanomaterial. [1]
6. Find the lowest energy (in electron volts) of an electron confined to move in a one dimensional box of width $1A^0$. [2]
7. Distinguish micro canonical, canonical and grand canonical ensembles. [2]
8. State Hall Effect and give two applications of it. [2]
9. Explain few requirements of a good auditorium. [2]
10. Briefly explain the working of TEM. [2]

Part-B (5 × 7 = 35 Marks)

11. a) What is wave function? What are the necessary conditions of physically acceptable wave function? [3]
    b) Show that the solution of Schrodinger's equation for a particle in an infinite potential well leads to the concept of quantization of energy. [4]

12. a) Distinguish among M-B, B-E and F-D statistics. [3]
    b) Derive the expression for Fermi Dirac statistics. [4]

13. a) Discuss the success and failures of classical free electron theory. [3]
    b) Explain "Kronig-Penny" model of solids and give its salient features. [4]

14. a) What is piezoelectric effect? Explain the production of ultrasonic waves using piezoelectric effect with neat circuit diagram. [4]
    b) Derive Sabine's formula of acoustics. [3]

15. a) Classify nano-materials. Give significance of surface to volume ratio of nano-particles. [3]
    b) Explain the Physical vapour deposition to prepare nanomaterials. [4]

16. a) What are Frenkel defects? Obtain an expression for the equilibrium concentration of Frenkel defects in an ionic crystal. [4]
    b) Elaborate on electron gas. [3]

17. Write short notes on any **two** of the following: [7]
    a) Effective mass b) Magnetostriction Oscillator c) Carbon nanotubes

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