SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act,1 956)

Course & Branch: B. E/B. Tech - Common to ALL Branches
Title of the paper: Applied Physics - I
Semester: I Max. Marks: 80
Sub.Code: ET103/ 6C0003 (2002/2003/2004/2005/2006) Time: 3 Hours
Date: 09-12-2006 Session: FN

PART – A (10 x 2 = 20)

Answer ALL the Questions

1. Distinguish between conduction and convection of heat.
2. Give a brief account on formation of ice on ponds.
3. What is power of a lens? Give its unit.
4. It is desired to make a achromatic lens of mean focal length 30cm by using two lenses of materials A and B. If the dispersive power of A and B are in the ratio 1:2, find the focal length of each lense.
5. State Weber-Fechner law.
6. Define intensity of sound. Convert the intensity 10^{-4} W/m^2 into intensity level.
7. What is neutral surface?
8. White a short note on bending moment of a beam.
9. What are matter waves? Calculate the wave length associated with an electron accelerated by a potential of 150V.
10. Give the physical significance of wave function.

PART – B (5 x 12 = 60)

Answer ALL the Questions

11. Describe with necessary theory the Forbe's method of determining the thermal conductivity of a good conductor.

(or)

12. Describe with necessary theory the Lee's disc method of determining the thermal conductivity of a bad conductor.

13. i) What is achromatism of lens? Obtain the condition for achromatism when two lenses are in contact. (7)

ii) What is chromatic abberration? Discuss the longitudinal chromatic abberration. (5)

(or)

14. i) Explain spherical abberration with the help of suitable figures and also explain any two methods of minimizing it.
    ii) Explain the defect astigmatism in optics. How can you remove it?

15. Define reverberation time. Derive the Sabine's formula for standard reverberation time by stating the assumptions and limitations.

(or)

16. i) Explain the characteristics of musical sound. (4)
    ii) Explain the factors which affect the acoustics of a building. Give their remedies. (8)

17. i) Show that the depression produced in a cantilever loaded at the free end is proportional to cube of the length of cantilever. (9)
    ii) A cylindrical bar of radius 5 mm and length 1.5m is fixed at one end and a load of 2 Kg is applied at the free end. Calculate the depression if the Young's modulus is $8x10^{10}$ N/m^2. (3)

(or)

18. i) Describe the statical method of determining the Young's modulus of the given cantilever when load is applied uniformly throughout the beam. (8)
    ii) A cylindrical brass bar 1 cm square in cross section is supported on two knife edges 1m apart. A load of 750gm at the centre of the bar depresses that point by 2mm. What is the Young's modulus of the bar? (4)

19. Describe Davisson and Germer experiment for the study of electron diffraction. Explain briefly the results obtained.

(or)

20. i) Derive Schrodinger's time independent wave equation in three dimension. (7)
    ii) Obtain an expression for the allowed energy levels of a free particle confined to a potential well of side L. (5)