

SATHYABAMA UNIVERSITY

(Established under section 3 of UGC Act, 1956)

Course & Branch: B.E./ B. Tech – Common to ALL Branches

Title of the paper: Applied Physics

Semester: II

Max. Marks: 80

Sub.Code: 6C0003

Time: 3 Hours

Date: 22-12-2007

Session: FN

PART – A

(10 x 2 = 20)

Answer All the Questions

1. What are the features of heat flow in compound media?
2. Mention the different methods of transmission of heat.
3. State the five monochromatic aberrations of a lens.
4. Why spherical aberration is large in the case of a microscope objective even though its aperture is small?
5. Distinguish between musical sound and noise.
6. Give the units for intensity of sound, intensity level of sound, loudness and loudness level.
7. Define neutral axis and bending moment.
8. In an experiment, the diameter of the rod is 1.26 cm and the distance between the knife edges 70cm. On putting a load of 900g at the mid point, the depression is 0.025cm. Calculate the Young's modulus of the material of the rod.
9. How do the group velocity and wave velocity differ?
10. Mention the properties of de Broglie matter waves.

PART – B

(5 x 12 = 60)

Answer All the Questions

11. (a) Describe the Forbe's method of determination of thermal conductivity of good conductors. (8)
(b) A compound bar of nickel and copper of equal cross section and equal length is so arranged that the free end of copper is in a steam chamber at 100°C and the free end of nickel is in melting ice at 0°C. If there is no heat losses at the sides calculate the temperature of the hot junction.
[Given : $K_{Cu} = 390 \text{ W/m/K}$ and $K_{Ni} = 60 \text{ W/m/K}$] (4)
(or)
12. Explain the following processes
(a) Formation of ice on ponds.

- (b) Thermal conduction in a compound medium when the bodies are arranged in series.
13. (a) What is meant by achromatism? Find the condition for the achromatism of two thin lenses when they are in contact. (8)
 (b) Derive the condition for the achromatism of two thin lenses separated by a distance. (4)
 (or)
14. Discuss with the help of suitable diagrams
 (a) Longitudinal spherical aberration
 (b) Lateral spherical aberration
15. (a) Discuss the principle to be observed in the acoustical design of an auditorium. (8)
 (b) Describe with necessary theory a method of measuring the absorption coefficient of a material. (4)
 (or)
16. What is reverberation time? Derive Sabine's formula for reverberation time.
17. (a) Derive an expression for depression at the free end of a cantilever due to load.
 (Assume the weight of the cantilever is negligible) (8)
 (b) A cantilever of length 50cm fixed at one end is depressed by 20mm at the loaded end. Calculate the depression at a distance of 40cm from the fixed end. (4)
 (or)
18. (a) Derive an expression for depression for a rectangular beam loaded in such a way that the bending is uniform.
 (b) Describe an experimental setup used to find the Young's modulus of a rectangular beam loaded on its either side.
19. (a) Describe and explain Davisson and Germer experiment for the determination of wavelength of electrons. (8)
 (b) Mention the physical significance of wave function. (4)
 (or)
20. (a) Deduce an expression for the energy of an electron in an infinitely deep potential well having one dimension. (8)
 (b) Compute the energy difference between the first and second quantum state for a free electron in a solid of 1m cube. (4)