

A.D. PATEL INSTITUTE OF TECHNOLOGY
FIRST INTERNAL TEST
PHYSICS

DATE: 25 /03/2009

TIME:8.00 to 9.00 AM

NOTE:

- 1) Marks to the left indicates full maximum marks.
- 2) Assume data whenever necessary and mention your assumption.
- 3) Draw relevant diagrams whenever necessary.

Q-1 Answer any SIX the following short questions (06)

1. What is Weber -Fechner law?
2. Magnetostriction effect is observed in material like
(a) Iron (b) Lead (c) Quartz (d) Nacl
3. If the intensity level of sound changes by 10 times its original value, the increase in dB is
(a) 1 dB (b) 20 dB (c) 100 dB (d) 10 dB
4. Frequency of ultrasonic wave is
(a) Less than 20 Hz (b) more than 20 KHz (c) 20 Hz to 20 KHz (d) none of them
5. Define primitive cell.
6. What is the unit of Thermal conductivity?
(a) $\Omega \cdot m$ (b) $\Omega^{-1} \cdot m^{-1}$ (c) (Joule/second)/m. K (d) WmK^{-1}
7. How many Bravais lattice are associated with Orthorhombic crystal system?
(a) 1 (b) 2 (c) 3 (d) 4
8. Kundt's tube is a device for _____ ultrasonics waves.
(a) Generating (b) Filtering (c) Measuring velocity (b) None of them

Q-2 Calculate any TWO of the following (06)

1. What is the resultant sound level when a 70 dB sound is added to 80 dB sound?
2. Calculate the frequency to which piezoelectric oscillator circuit should be tuned so that a piezoelectric crystal of thickness 0.1 cm vibrates in its fundamental mode to generate ultrasonic waves. (Young's modulus and density of crystal are 80 Gpa and 2654 kg/m^3).
3. The reverberation time is found to be 1.5 sec for an empty hall and it is found to be 1 sec when a curtain cloth of 20 m^2 area suspended at the center of the hall. If the dimensions of the hall are $10 \times 8 \times 6 \text{ m}^3$ calculate the co-efficient of absorption of curtain cloth.

Q-3 Answer any TWO of the following. (08)

1. Derive the expression for electrical conductivity.
2. Draw the following planes in a cubic unit cell
($10\bar{1}$), (002), ($10\bar{2}$), (111).
3. What are the applications of ultrasonic waves in science and technology and in medical field?