A.D.PATEL INSTITUTE OF TECHNOLOGY
REMEDIAL TEST
PHYSICS

DATE: 21/10/2008 TIME: 8 AM-9 AM

MAXIMUM MARKS: 20

NOTE:
1] Marks to the left indicate the full maximum marks.
2] Assume data wherever necessary and mention your assumptions.
3] Draw relevant diagrams wherever necessary.

Q-1 Answer the following questions: **(08)**

1 What is echo?

2 If the intensity level of sound changes by 10 times its original value, the increase in db is
(a) 1 dB (b) 2 dB
(c) 100 dB (d) 10 dB

3 SONAR is used to detect the position of
(a) Icebergs, submarines in water (b) Mountain
(c) Aeroplane in air (d) None of the above

4 Magnetostriction effect is observed in material like
(a) iron (b) lead (c)quartz (d) NaCl

5 Frequency of ultrasonic wave is
(a) Less than 20 Hz (b) More than 20 KHz
(c) 20 Hz to 20 KHz (d) None of the above

6 Explain the principle of LED.

7 What is photovoltaic effect?

8 Energy band gap for silicon is
(a) 0.7 eV (b) 0.3 eV
(c) 1.5 eV (d) 1.12 eV

Q-2 Answer **any four** of the following questions: **(08)**

1 Give Weber-Fechner law and define reverberation time.

2 Compare energy band diagrams of conductor, semiconductor and insulator.

3 Give applications of ultrasonic in (i) medical (ii) material science.

4 Explain Kundt's tube method for ultrasonic detection.

5 What is Hall effect?

Q-3 Answer **any two** of the following: **(04)**

1 The volume of room is 1200 m^3. The wall area of the room is 250 m^2, the floor area is 150 m^2 and ceiling area is 140 m^2. The average sound absorption coefficient for wall is 0.02, for the ceiling is 0.03 and for the floor is 0.05. Calculate reverberation time.

2 Calculate the thickness of a quartz plate needed to produce ultrasonic waves of frequencies: (i) 2 MHz and (ii) 30 KHz. Young's modulus for quartz $8x10^{10}$ N/m^2 and density of quartz 2650 kg/m^3.

3 A rectangular plane sheet of doped silicon has dimensions of 1 cm along Y direction and 0.5 mm along Z direction. Hall probes are attached on its two surfaces parallel to X-Z plane and a magnetic field of flux density 0.7 weber/m^2 is applied along Z direction. A current of 1 mA is flowing in it in the X direction. Calculate the Hall voltage (V_H) measured by the probes if the hall coefficient of the material is 1.25 x 10^{-3} m^3/c.