Enrollment No: _____   Exam Seat No: _____

C.U.SHAH UNIVERSITY
Summer Examination-2019

Subject Name : Physics−II

Subject Code : 4SC02PHY1   **Branch: B.Sc. (All)**

Semester : 2   **Date: 30/04/2019**   **Time: 02:30 To 05:30**   **Marks : 70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**
  a) Give the difference between longitudinal and transverse waves.
  b) What are Bravais and non-Bravais lattices?
  c) Differentiate between crystalline and amorphous materials.
  d) How does an intrinsic semiconductor differ from extrinsic semiconductors?
  e) What is a full wave rectifier?
  f) Define forward biasing condition of PN junction diode.
  g) Draw only the I$\rightarrow$ V characteristic curve of PN junction diode.
  h) Drawing the symbol for a PNP transistor, identify its parts.
  i) Name the three configurations of a transistor.
  j) Which kind of diodes is used in the 7- segment displays?
  k) Complete the statement: Lattice + _____ = Crystal Structure.
  l) Name the different specific semiconducting materials with impurities used in the LEDs for emission of Red/Green and Yellow/ Red light beams?
  m) What is the main difference between a photodiode and a LED?
  n) Define surface tension.

Attempt any four (4) Questions from Question No.-2 to Question No.-8

Q-2   **Attempt all questions**   **(14)**
  (A) Derive an expression for the velocity of transverse waves in a stretched string. Write the laws of vibrating string.   **07**
  (B) What is Bragg's law? Derive its formula.   **07**

Q-3   **Attempt all questions**   **(14)**
  (A) Describe the 14 Bravais lattices with the 7 crystal systems.   **07**
  (B) Describe the step-by-step procedure to obtain Miller indices with an example. Draw the miller planes for: (1 0 0), (1 0 1), (0 0 1), (0 1 0)   **07**

Q-4   **Attempt all questions**   **(14)**
  (A) Write a short note on the different applications of X-rays in various fields.   **06**

(B)	Enumerate the properties of X-rays	**05**
(C)	Name the temperature scales with their interchange transformation formulae.	**03**

Q-5 **Attempt all questions** **(14)**

(A) Discuss Thermoelectric Thermometer giving its principle, construction, figure, working, merits and demerits. **06**

(B) Briefly explain Specific heat and Specific heat capacity. **05**

(C) A liquid is cooled from 55°C to 50°C in 5 minutes; and from 50°C to 46.5°C in the next 5 minutes. Determine the surrounding temperature. **03**

Q-6 **Attempt all questions** **(14)**

(A) Write a short note on "LED protecting circuit against reverse bias". **04**

(B) Discuss multi-coloured LEDs. **03**

(C) Explain the principle, construction, working, advantages, disadvantages and applications of a Solar Cell. **07**

Q-7 **Attempt all questions** **(14)**

(A) Draw a Common Emitter (CE) transistor configuration circuit using PNP and NPN transistors. Derive its input-output characteristics along with the graphs. **07**

(B) Discuss in detail Photo Diodes, mentioning its principle, construction, working and characteristic graphs. **07**

Q-8 **Attempt all questions** **(14)**

(A) Calculate the minimum potential required to produce X-rays of frequency $3 \times 10^{16} Hz$. Calculate its wavelength. **04**

(B) An X-ray beam of 0.4Å wavelength is incident on a crystal of lattice spacing 2Å. Calculate Bragg's angle for the 1st order diffraction. **03**

(C) An X-ray beam of energy 0.01 MeV is reflected from a crystal with inter planar spacing 3.14Å. Calculate the glancing angle for the 1st order Bragg's spectrum. ($h = 6.62 \times 10^{-34} Js$ & 1 eV= $1.6 \times 10^{-19} J$) **03**

(D) A flexible thread of length 90 cm and mass 1 gm is stretched by 3 kg mass tied at one end, vibrates in 3 segments. Calculate the transverse frequency. **04**