

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 $3 \times 10^{16} \text{ Hz}$. Calculate its wavelength.	04
	(B) An X-ray beam of 0.4 \AA wavelength is incident on a crystal of lattice spacing 2 \AA . Calculate Bragg’s angle for the 1 st order diffraction.	03
	(C) An X-ray beam of energy 0.01 MeV is reflected from a crystal with interplanar spacing 3.14 \AA . Calculate the glancing angle for the 1 st order Bragg’s spectrum. ($h = 6.62 \times 10^{-34} \text{ Js}$ & $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$)	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

