

Exam Seat No: \_\_\_\_\_

Enrollment No: \_\_\_\_\_

## C.U.SHAH UNIVERSITY

Wadhwan City

Subject Code 4SC02PHC1

Summer Examination-2014

Date: 28/05/2014

Subject Name: Physics-II

Branch/Semester:- B.Sc(Pure Science)/II

Time:02:00 To 5:00

Examination: Regular

### Instructions:-

- (1) Attempt all Questions of both sections in same answer book / Supplementary
- (2) Use of Programmable calculator & any other electronic instrument is prohibited.
- (3) Instructions written on main answer Book are strictly to be obeyed.
- (4) Draw neat diagrams & figures (If necessary) at right places
- (5) Assume suitable & Perfect data if needed

### SECTION-I

- Q-1
- a) Define Doppler's effect in light. (01)
  - b) What is threshold intensity of sound? Give its value with unit. (01)
  - c) Define: Isotopes. (01)
  - d) Define: Isotones. (01)
  - e) Define: Noise. (01)
  - f) Write Bragg's formula for inter-planar crystal spacing 'd' and wavelength ' $\lambda$ ' of X-rays. (01)
  - g) Write formula for the Half Life Time ' $T_{HL}$ ' and Decay Constant ' $\lambda$ ' for a radioactive element. (01)
- Q-2
- a) What are the properties of X-rays? (05)
  - b) Define musical sound. Explain characteristics of musical sound. (05)
  - c) Calculate sound velocity in water if its bulk modulus is  $2.23 \times 10^9$  Pa. (04)

### OR

- Q-2
- a) A certain crystal reflects monochromatic X-rays strongly when the Bragg's 1<sup>st</sup> order glancing angle is 15°. What are the glancing angles for the 2<sup>nd</sup> and 3<sup>rd</sup> order spectra? (05)
  - b) Find out radioactive decay constant ' $\lambda$ ', half life period ' $T_{HL}$ ' and mean life span ' $T_{AVERAGE}$ ' for a radioactive substance if its activity reduces to 1/10<sup>th</sup> of its initial activity in 10 years? (05)
  - c) Differentiate: "Longitudinal Waves" versus "Transverse Waves" (04)

- Q-3
- a) Describe production of X-rays by giving principle construction and working of a Coolidge Tube with neat and clean diagram. (07)
  - b) Describe Laws of radioactivity, in detail. (07)

### OR

- Q-3
- a) Derive Newton's formula for velocity of sound in air and apply Laplace's correction to it. Prove that calculated value of sound velocity in air agrees with its practical value. (07)



- b) Give a comparison of properties of  $\alpha$ ,  $\beta$  and  $\gamma$  radiations.- (07)

### SECTION-II

- Q-4 a) Define: Anisotropy. (01)  
b) Define: Non Bravais lattice. (01)  
c) Draw and define: Unit cell. (01)  
d) For a C.E. connection of an N-P-N transistor, find the value of Current Gain  $\beta$ , if its Current Amplification Factor  $\alpha$  is 0.98 (01)  
e) Define: Ripple Factor -  $\gamma$ . (01)  
f) Draw schematic symbols of LED & Photo Diode. (01)  
g) To which axes is the Miller plane (0 1 0) parallel ? (01)

- Q-5 a) What are Miller Indices? Illustrate the steps to find out Miller indices of a crystal plane with necessary diagram. (05)  
b) Explain in brief: Working of a P-N-P transistor. (05)  
c) Discuss in brief: Full wave Center Tap rectifier. (04)

**OR**

- Q-5 a) Write a short note on Zener Diode. (05)  
b) Explain how multi-colour LEDs works? (05)  
c) Differentiate: "Crystalline Solids" versus "Non-Crystalline Solids". (04)

- Q-6 a) Explain any one Filter Circuit. (05)  
b) Determine the value of Base Current  $I_B$  in Common Base Transistor Configuration if Current Amplification Factor  $\alpha$  is 0.95 and the Emitter Current  $I_E$  is 1 mA. (02)  
c) What is Bravais Lattice? Describe 14 Bravais lattices of 7 crystal systems with lattice parameters and diagrams. (07)

**OR**

- Q-6 a) Give mathematical analysis of a Full Wave Rectifier. (07)  
b) Describe Common Base Transistor configuration with circuit diagram. Explain current gain ratio  $\alpha$ , Collector current  $I_C$  and; I/P & O/P characteristic curves. (07)

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