Roll No										

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
MID TERM EXAMINATION - APR 2023

Semester : Semester II - 2022
Course Code : PHY1001
Course Name : Sem II - PHY1001 - Material Physics
Program : CIV

Date : 13-APR-2023
Time : 2:00PM - 3:30PM
Max Marks : 50
Weightage : 25%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **(5 X 2 = 10M)**

1. What is the use of X-ray diffraction?

(CO1) [Knowledge]

2. What are primitive unit cells and what are non-primitive unit cells?

(CO1) [Knowledge]

3. Explain the terms (i) Basis (ii) Space lattice (iii) Unit cell

(CO1) [Knowledge]

4. What is the formula to calculate the strain?

(CO2) [Knowledge]

5. Write few properties of ceramic materials?

(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **(4 X 5 = 20M)**

6. Deduce packing factors for body-centered cubic (BCC) structure.

(CO1) [Comprehension]

7. Derive the relationship between atomic radius and lattice parameter for SCC and FCC.

(CO1) [Comprehension]

8. A brass wire of length 2 m has one end, fixed to a rigid support, and from the other end, a 4 kg wt is suspended. If the cross-sectional area of the wire is $12.25X10^{-8}m^2$. Find the extension produced in the wire (Young's modulus of wire = $11X10^{10}N/M^2$).

(CO2) [Comprehension]

9. A bar 500 mm long and 22 mm in diameter is elongated by 1.2 mm under the effect of axial pullof 105 KN. Calculate stress, strain and modulus of elasticity(Youngs Modulus).

(CO2) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **(2 X 10 = 20M)**

10. (a) Describe the cubic, tetragonal, and hexagonal crystal systems. (6 Marks)
(b) What are one-dimensional defects. Explain in a few words. (4 Marks)

(CO1) [Application]

11. Chromium has a BCC structure. its atomic radius is 0.1 nm. Calculate the free volume of the unit cell.

(CO1) [Application]