

T.Y.B.SC. SEM – V (CBCS - 2016 Course) : SUMMER - 2019
SUBJECT - PHYSICS : ELEMENTS OF MATERIALS SCIENCE

Day : Wednesday
Date : 24/04/2019

Time 11.00 A.M. To 02.00 P.M.
Max. marks : 60

S-2019-0880

N.B.

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the **RIGHT** indicate **FULL** marks.
 - 3) Draw neat diagrams **WHEREVER** necessary.
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- Q 1.** Attempt any **Two** of the following. **(12)**
- (a) Explain elasticity with diagram.
 - (b) What are solid solutions? Describe the Interstitial solid solutions with diagram.
 - (c) Explain the mechanical properties like strain and brittleness with diagram.
- Q 2.** Attempt any **Two** of the following. **(12)**
- (a) Explain Hook's law. Draw the graph and define elastic limit.
 - (b) Explain thermal properties : (i) Thermal conductivity (ii) Thermal expansion.
 - (c) The resistivity of an aluminium alloy is $2.8 \times 10^{-6} \Omega\text{-cm}$. What would be the resistance of an aluminium wire of length 101.6 cm and 0.01 cm^2 in cross-section?
- Q 3.** Attempt any **Two** of the following. **(12)**
- (a) Describe the phase diagram for CO_2 with diagram.
 - (b) Explain electrical properties (i) Specific resistance (ii) Dielectric strength.
 - (c) What is diffusion? Explain Fick's laws of diffusion with diagram.
- Q 4.** Attempt any **Three** of the following. **(12)**
- (a) Explain the ethylene polymerization with diagram.
 - (b) Explain the zinc blend or zinc sulphide (ZnS) structure with diagram.
 - (c) Define critical resolved shear stress (CRSS) and obtain Schmid's law.
 - (d) An alloy of copper and tin contains 85 w/o copper and 15 w/o tin. Calculate a/o of each element. Assume total mass 10000 amu.
- Q 5.** Attempt any **Four** of the following. **(12)**
- (a) Write a short note on Electrochromic smart materials.
 - (b) Explain the Frenkel defect with diagram.
 - (c) Define (i) Metals (ii) Polymers.
 - (d) Explain Monodisperse and Polydisperse polymers.
 - (e) State the rules of substitutional solid solution.
 - (f) Why impurities are added in solids? Explain.

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