

T.Y.B.SC. SEM – V (2014 Course) : SUMMER - 2019
SUBJECT: ELECTIVE-I: (A) PHYSICS: ELEMENTS OF MATERIALS SCIENCE

Day : Saturday
Date : 27/04/2019

Time: 12.00 NOON TO 02.00 PM
Max. Marks: 40.

S-2019-1016

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the **RIGHT** indicate full marks.
 - 3) Draw neat labeled diagrams **WHEREVER** necessary.
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Q.1 Attempt any **TWO** of the following: **(10)**

- a) State different applications of diffusion.
- b) Distinguish between addition and condensation polymerization.
- c) What is a phase diagram? Give two importance's of phase diagram.

Q.2 Attempt any **TWO** of the following: **(10)**

- a) What are smart materials? State few applications of smart materials.
- b) Define deformation. Give comparison between elastic and plastic deformation.
- 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 101.6 cm long and 0.01cm^2 in cross-section?

Q.3 Attempt any **TWO** of the following: **(10)**

- a) Explain the diffusion in crystal.
- b) State and prove Gibb's phase rule.
- c) How many grams of sulphur is needed per 50 g of final rubber product to completely cross-link a polybutadiene $(-\text{C}_4\text{H}_6-)_n$ rubber with sulphur according to the pattern of vulcanization.
(Given: Atomic weight of Sulphur=32, Carbon=12, Hydrogen=1)

Q.4 Attempt any **FIVE** of the following: **(10)**

- a) State characteristics of an alloy.
- b) Discuss magnetic behaviour of ceramics.
- c) How do you determine the molecular weight of polymer?
- d) Explain phase equilibria.
- e) State Fick's first law for atomic diffusion.
- f) Define dielectric strength of a material.
- g) Give thermal properties of materials.

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