T.Y.B.SC. SEM – V (CBCS - 2016 Course) : WINTER - 2018

SUBJECT - PHYSICS : ELEMENTS OF MATERIALS SCIENCE

Day : Tuesday
Date : 23/10/2018

W-2018-0757

Time : 03.00 P.M. To 06.00 P.M
Max. marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Draw neat diagrams **WHEREVER** necessary.

Q 1. Attempt any **Two** of the following. **(12)**

(a) Explain the mechanical properties like stress and hardness with diagram.
(b) Explain plasticity with diagram.
(c) What is solid solution? Describe the Substitutional solid solutions (ordered & disordered).

Q 2. Attempt any **Two** of the following. **(12)**

(a) Explain thermal properties like (i) Specific heat (ii) Thermal conductivity.
(b) Explain Hook's law. Draw the graph and define elastic limit.
(c) Define critical resolved shear stress (CRSS) and obtain Schmid's law .

Q 3. Attempt any **Two** of the following. **(12)**

(a) Describe the phase diagram for water (H_2O) with diagram.
(b) Explain electrical properties : (i) Electrical conductivity (ii) Dielectric constant.
(c) What is the elastic strain in a copper rod that is stressed to 70 MPa ?
(Take modulus of elasticity of Cu = 1,10,000 MPa).

Q 4. Attempt any **Three** of the following. **(12)**

(a) What is diffusion? Explain Fick's laws of diffusion with diagram.
(b) Explain the structure of NaCl with diagram.
(c) Explain mass average molecular weight (Mm) number average molecular weight (Mn) and polydispersivity index (PDI).
(d) Explain the Line defects such as Edge dislocation.

Q 5. Attempt any **Four** of the following. **(12)**

(a) Why impurities are added in solids? Explain.
(b) Write a short note on pH sensitive smart materials.
(c) Explain the linear polymer with diagram.
(d) Explain the crystal structure of $BaTiO_3$ with diagram.
(e) Write a short note on smart memory alloy (SMA) .
(f) Define (i) Material Science (ii) Alloy.

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