

T.Y.B.SC. SEM – V (2014 COURSE) : SUMMER - 2018
SUBJECT : ELECTIVE-I – ELEMENTS OF MATERIALS SCIENCE

Day : **Monday**
Date : **23/04/2018**

S-2018-0757

Time : **03.00 PM TO 05.00 PM**
Max. Marks : 40.

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 and prove Gibb's phase rule.
- b) State and prove Lever's rule.
- c) Find the critical resolved shear stress for crystal slips on the plane (111) and in the direction (110) with 500 psi stress is applied in the direction (1-11) plane.

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

- a) Describe various types of defects.
- b) Describe critical resolved shear stress (CRSS) with the help of diagram.
- c) What is the elastic strain in a copper rod that is stressed to 60MPa. (Given: Modulus of elasticity of Cu = 10×10^5 MPa).

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

- a) Explain the electrical behaviour of ceramic phases.
- b) Explain (i) Metals and (ii) Semiconductors.
- c) Explain the properties of materials – resistivity and specific heat.

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

- a) Explain hard and soft ferrites.
- b) State rules of solubility.
- c) Define degree of polymerization.
- d) State few applications of smart materials.
- e) State Fick's first law for atomic diffusion.
- f) Explain AX-type of ceramic crystal structure.
- g) Define the term 'Ductility'.

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