

T.Y.B.SC. SEM – V (2014 COURSE) : WINTER - 2017

SUBJECT: ELECTIVE-I: (A) PHYSICS: ELEMENTS OF MATERIALS SCIENCE

Day : Friday
Date : 03/11/2017

W-2017-0665

Time: 3.00 P.M. To 5.00 P.M.
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) Describe critical resolved shear stress (CRSS) with the help of diagram.
- b) State and explain mechanical properties of material.
- c) Determine the molecular length of polyethylene linear polymer that consists of row of carbon atoms which form zigzag chain of C-C-C bond angle of 109.5° having degree of polymerization of 1000. Assume length of C-C bond as 1.5\AA

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

- a) State and explain various types of solid solutions.
- b) Explain piezoelectric materials in detail.
- c) What are the influencing factors in polycrystalline materials?

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

- a) Explain the electrical behaviour of ceramic phases.
- b) What is linear polymer? Define degree of Polymerization.
- 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.4 Attempt any **FIVE** of the following: (10)

- a) Explain line defects.
- b) What are thermoplastic and thermosetting polymers?
- c) Explain phase equilibria.
- d) State few applications of smart materials.
- e) Explain AX-type of ceramic crystal structure.
- f) State Gibb's phase rule.
- g) State the rules of solid solution.