S.Y. M.Sc. (Physics) (CBCS Pattern) Fourth Semester CBCS

PSCPHYT15.1 - Core Elective E-2.1 - Material Science-II Paper-15

P. Pages : 2 **GUG/W/18/11415**

Time : Three Hours * 3 5 0 7 * Max. Marks : 80

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1. Either

a) Explain elastic behavior of solid using atomic model and show that it depends on bonding type. **8**

b) Discuss design parameter Hardness, yield strength, ductility and yield toughness. **8**

OR

e) What is corrosion? What is electro-chemical reaction of corrosion? **8**

f) Discuss construction, working and application of GMR material. **8**

2. Either

a) Discuss the concept of equilibrium and non equilibrium processing. How it affect their functionality? **8**

b) What are the physical top down & bottom up method for synthesis of nano-crystalline solid. **8**

OR

e) How the TiO_2 is prepared using gas evaporation technique? **8**

f) How the nanocrystalline solid are obtained using Hydrothermal process? Give example. **8**

3. Either

a) What is meant by sintering? What is its need in material processing? **8**

b) What is quenching? Describe typical technique and state advantages and quenching. **8**

OR

e) How x-ray diffraction data are used to determine particle size of polycrystalline material? **8**

f) What information is contained in peak position, peak intensity & peak shape of XRD pattern. **8**

4. Either

a) How fluorescent analysis use for structural determination? **8**

b) Discuss Warren-Averbach Fourier Method for data fitting. **8**

OR

e) Explain construction & working principle of TEM. **8**

f) What is the working principle of XPS & how it is used for chemical analysis. **8**

5. Comments on the following terms.

a) Frenkel model. **4**

b) Effect of sintering temperature on formation of structure. **4**

c) What is the role of capping agent in nanomaterial stability. **4**

d) Write short note of STEM technique. **4**

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