

2072
M. Tech. (Material Science and Technology)
Second Semester
MT-205: Ceramics and Biomaterials

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1) Attempt the following:-

(10x1)

- a. What are composite materials? Give two examples.
- b. Mention any two applications of PLZT sensors.
- c. How are carbides classified based on chemical bonds?
- d. Mention the composition of optical glasses.
- e. Name to biopolymers and their applications.
- f. How are proteins classified based on their structure?
- g. What are electrical insulators and how are they made?
- h. Mention any two applications of biomaterials in medicine.
- i. How are mechanical properties important for biomaterials?
- j. Name different types of ceramics.

Section A

- 2)a. What are ferrites and how are they classified? Discuss the differences between Spinel and Hexagonal Ferrites. (5)
- b. Describe the composition and properties of photosensitive glasses. Mention any three applications. (5)
- 3)a. How are ceramics important in electronics? Discuss this by focusing on piezo-electrical and superconducting ceramics. (5)
- b. Discuss the steps involved in the synthesis of high purity silica glass by focussing on any one method of synthesis. (5)
- 4)a. Differentiate between nitrides and silicides by focusing on their structure, bonding and applications. (5)
- b. Using a flow chart, mention the stepwise procedure involved in garnet processing. (5)

P.T.O.

(2)

Section B

- 5) Classify biomaterials based on their origin, composition, properties and arrangement of functional groups. (10)
- 6)a. What are hydrogels and how can their mechanical properties be improved? Mention their four applications. (5)
- b. Enlist different methods to test the biocompatibility and toxicity of biomaterials and discuss any two methods in detail. (5)
- 7)a. Elaborate the reasons that why is it important to modify the surface of biomaterials. (5)
- b. Write a descriptive note on the interaction of blood with biomaterials. (5)

x-x-x