

**K. J. Somaiya Institute of Technology, Sion, Mumbai-22**  
(Autonomous College Affiliated to University of Mumbai)

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|---|--------------------|----------------|
| May-June 2024<br>B. Tech Program Scheme- III<br>Regular Examination: FY Semester: II<br>Course Code: BSC203 and Course Name: Material Chemistry<br>Date of Exam: 17/05/24 | Duration: 02 Hours | Max. Marks: 45 |
|---|--------------------|----------------|

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

|            |   | Max. Marks | CO | BT level |
|------------|---|------------|----|----------|
| <b>Q 1</b> | Solve <b>any five</b> questions out of six.   | <b>15</b>  |    |          |
| i)         | What is Glass Transition Temperature? Explain any two factors that influence glass transition temperature?  |            | 1  | 1        |
| ii)        | 1000 kg of sample of argentiferous lead containing 0.1% silver is melted and then allowed to cool. If eutectic contains 2.6% of silver, what mass of (i) mass of eutectic will be formed and (ii) mass of lead will separate out?   |            | 2  | 3        |
| iii)       | What are the characteristics properties of composite materials?   |            | 1  | 2        |
| iv)        | Explain working principle of NMR spectroscopy   |            | 4  | 2        |
| v)         | Differentiate between Brass and Bronze  |            | 1  | 1        |
| vi)        | What are the applications of powder metallurgy?   |            | 3  | 1        |
| <b>Q.2</b> | Solve <b>any three</b> questions out of four.   | <b>15</b>  |    |          |
| i)         | A polymer has following composition: 100 molecules of molecular weight 2500 units each, 200 molecules are of 3500 units of molecular weight. 350 molecules each of 4000 molecular weights. Calculate the number and weight average of molecular weight and polydispersity index |            | 1  | 3        |

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|            |   |           |   |   |
|------------|---|-----------|---|---|
| ii)        | What is powder metallurgy? How are metal powders prepared by process of atomization?          |           | 3 | 2 |
| iii)       | With the help of suitable diagram explain sandwich panel composites. Where they are used?     |           | 1 | 1 |
| iv)        | With a neat diagram and explain in detail Compression molding of plastics.                    |           | 3 | 3 |
| <b>Q.3</b> | Solve <b>any three</b> questions out of four.   | <b>15</b> |   |   |
| i)         | How are ceramics produced? Explain general methods with examples.                             |           | 1 | 2 |
| ii)        | Draw and explain phase diagram of one component water system.                                 |           | 2 | 3 |
| iii)       | What is a shape memory alloy? What are the advantages and limitations of shape memory alloys? |           | 1 | 2 |
| iv)        | Describe instrumentation of IR spectroscopy with flow chart diagram                           |           | 4 | 2 |

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