

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2023****Subject Code:3142309****Date:19-01-2024****Subject Name: Thermoplastic Materials****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**MARKS**

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|------------|---------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Q.1</b> | <b>(a)</b> Define Thermoplastic Materials. List three commodity and three engineering thermoplastic materials.            | <b>03</b> |
|            | <b>(b)</b> Draw the structures of the following i) PMMA ii) PS iii) PP iv) ABS                                            | <b>04</b> |
|            | <b>(c)</b> Explain the High-Pressure process to manufacture Low Density Polyethylene with a neat sketch.                  | <b>07</b> |
| <b>Q.2</b> | <b>(a)</b> State the properties and applications of PET.                                                                  | <b>03</b> |
|            | <b>(b)</b> Compare the properties of Thermoplastic with Thermoset materials.                                              | <b>04</b> |
|            | <b>(c)</b> Explain the UNIPOL process to manufacture LLDPE.                                                               | <b>07</b> |
|            | <b>OR</b>                                                                                                                 |           |
|            | <b>(c)</b> Draw the structure and discuss about properties of HDPE, LDPE and LLDPE.                                       | <b>07</b> |
| <b>Q.3</b> | <b>(a)</b> Draw the structure and list the properties and applications of Polyacetal.                                     | <b>03</b> |
|            | <b>(b)</b> List the properties and applications of ABS                                                                    | <b>04</b> |
|            | <b>(c)</b> Draw the Isotactic, Syndiotactic and Atactic structures of PP and state the properties and applications of PP. | <b>07</b> |
|            | <b>OR</b>                                                                                                                 |           |
| <b>Q.3</b> | <b>(a)</b> List the properties and applications of Polycarbonate                                                          | <b>03</b> |
|            | <b>(b)</b> State the properties and applications of PVC.                                                                  | <b>04</b> |
|            | <b>(c)</b> Draw the structure and explain the manufacturing process of Nylon 66.                                          | <b>07</b> |
| <b>Q.4</b> | <b>(a)</b> Discuss the preparation of Methyl Methacrylate monomer.                                                        | <b>03</b> |
|            | <b>(b)</b> Draw the structure and list the properties and applications of EVA                                             | <b>04</b> |
|            | <b>(c)</b> Explain the Tower Process to manufacture Polystyrene through Mass polymerization.                              | <b>07</b> |
|            | <b>OR</b>                                                                                                                 |           |
| <b>Q.4</b> | <b>(a)</b> Discuss the preparation of Styrene Monomer.                                                                    | <b>03</b> |
|            | <b>(b)</b> List the properties and applications of NYLON.                                                                 | <b>04</b> |
|            | <b>(c)</b> Explain the manufacturing of PP through the Ziegler type catalyst with a neat flow diagram.                    | <b>07</b> |
| <b>Q.5</b> | <b>(a)</b> Draw the structure and discuss the properties and applications of EVOH.                                        | <b>03</b> |
|            | <b>(b)</b> List the properties and applications of PMMA.                                                                  | <b>04</b> |
|            | <b>(c)</b> Describe with a neat diagram, the manufacturing of HDPE through Ziegler process.                               | <b>07</b> |
|            | <b>OR</b>                                                                                                                 |           |
| <b>Q.5</b> | <b>(a)</b> Explain the bulk polymerization technique to manufacture Acrylic sheets.                                       | <b>03</b> |
|            | <b>(b)</b> Discuss the preparation of Vinyl chloride and Bisphenol- A monomers,                                           | <b>04</b> |
|            | <b>(c)</b> Explain the commercial manufacturing of Polycarbonate through Phosgenation process.                            | <b>07</b> |

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