

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2022****Subject Code:3173622****Date:12-01-2023****Subject Name:Sophisticated Testing of Polymers and Rubbers****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> | (a) Explain following terms: breakdown voltage, Refractive Index and HDT  | <b>03</b> |
|            | (b) Write an elaborate note on DSC.   | <b>04</b> |
|            | (c) What is melt flow index and which properties of polymers and rubbers are affected by it explain in details? | <b>07</b> |
| <b>Q.2</b> | (a) Explain Vicat softening temperature.  | <b>03</b> |
|            | (b) Write in details about the importance of testing of polymers and rubber                                     | <b>04</b> |
|            | (c) Write a note on UTM.  | <b>07</b> |
| <b>OR</b>  |   |           |
|            | (c) Write difference between melting temperature & softening temperature?                                       | <b>07</b> |
| <b>Q.3</b> | (a) Define : storage modulus, loss modulus and $\tan\delta$   | <b>03</b> |
|            | (b) What is Flexural Strength, give its experimental detection.   | <b>04</b> |
|            | (c) Discuss XRD in detail.  | <b>07</b> |
| <b>OR</b>  |   |           |
| <b>Q.3</b> | (a) What is impact resistance?  | <b>03</b> |
|            | (b) Explain in brief about Gas chromatography.  | <b>04</b> |
|            | (c) Draw instrumentation diagram of UV spectroscopy, write its principle and applications.                      | <b>07</b> |
| <b>Q.4</b> | (a) Explain rate of heat release.   | <b>03</b> |
|            | (b) Explain Tear Test for polymers.   | <b>04</b> |
|            | (c) What are the major applications of UV, IR, and NMR spectroscopy?  | <b>07</b> |
| <b>OR</b>  |   |           |
| <b>Q.4</b> | (a) Explain in short about fire radiation Staining.   | <b>03</b> |
|            | (b) Write sample preparation of IR, UV and NMR.   | <b>04</b> |
|            | (c) Write short note on Weathering resistance   | <b>07</b> |
| <b>Q.5</b> | (a) Write note on compression testing.  | <b>03</b> |
|            | (b) Write in brief about viscometer.  | <b>04</b> |
|            | (c) List out the various material characterization tests. Explain any one of them.                              | <b>07</b> |

**OR**

- Q.5** (a) What do you mean by limiting oxygen index. **03**
- (b) How to determine vulcanization properties. **04**
- (c) Explain in detail about Thermo Gravimetric Analysis (TGA). **07**

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