

22490

23124

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answer with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following:** **10**
- a) Write percentage composition of natural rubber.
 - b) State any two applications and properties of natural rubber.
 - c) Enlist any two applications of Nitril Rubber.
 - d) Write chemical structure of following rubbers :–
 - i) Neoprene Rubber
 - ii) Silicon Rubber
 - e) State any two properties of butyl rubber.
 - f) Illustrate function of fillers in compounding of rubber.
 - g) Write any four principles changes which are brought by vulcanization.

P.T.O.

- 2. Attempt any FOUR of the following:** **12**
- a) State the advantages of TPE over conventional rubber.
 - b) Explain the roll of accelerator in compounding of rubber also state its two examples.
 - c) Differentiate between sulphur and non-sulphur vulcanization.
 - d) Explain tack test for rubbery material.
 - e) Discuss the need of aging test for rubber sample.
- 3. Attempt any FOUR of the following:** **12**
- a) Explain the stages of raw rubber.
 - b) State the manufacturing properties and applications of EPDM rubber.
 - c) Illustrate the principle and need of mastication in rubber compounding.
 - d) State various vulcanization techniques and explain any one of them.
 - e) Write complete procedure of rebound elasticity for rubber sample.
- 4. Attempt any THREE of the following:** **12**
- a) Explain the properties polyurethane TPE.
 - b) Describe the block copolymerization process for styrene polymer.
 - c) Describe manufacturing recipes for conveyor belt.
 - d) Explain metal oxide vulcanization along with example.
 - e) Explain with neat sketch three roll calendering process for rubber sheet.

- 5. Attempt any THREE of the following:** **12**
- a) State classification of rubber and explain molecular requirement of synthetic rubber.
 - b) Explain the working principle of two roll mill along with the neat sketch.
 - c) Justify the need of autoclave in vulcanization process.
 - d) Describe with neat sketch extrusion of rubber.
 - e) Explain abrasion resistance test for rubber sample.
- 6. Attempt any TWO of the following:** **12**
- a) Identify the material used for tyre application and its proper justification also state four advantages of same material.
 - b) State the need, functions and sequence of addition of following compounding
Additives : Antioxidant, Antiozonant,
Processing aid, Fillers, Peptizers.
 - c) Explain sulphur vulcanization reaction for diene rubber in details.
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