

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII • EXAMINATION – SUMMER 2015

Subject code: 182604

Date: 11/05/2015

Subject Name: Automation and Control In Rubber Industries

Time: 10.30am-01.00pm

Total Marks: 70

Instructions:

1. Attempt all questions. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

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|-----------|-----|---|----|
| Q.1 | (a) | Describe the static characteristics of an instrument. | 06 |
| Q.1 | (b) | Answer the following | |
| | i | Explain elements of instruments with suitable example. | 05 |
| | ii | Which characteristic information would be indicated by instrumentation diagram? | 03 |
| Q.2 | (a) | Which methods are available to design the rubber processing trials? Explain any one in detail. | 07 |
| Q.2 | (b) | Answer the following | |
| | i | Write a short note on specifications of machine settings. | 04 |
| | ii | Mention the circumstances in which off-line inspection is carried out. | 03 |
| OR | | | |
| Q.2 | (b) | Answer the following | |
| | i | Which general considerations are made in process capability studies? | 04 |
| | ii | Write a brief note on sampling inspection. | 03 |
| Q.3 | (a) | Discuss in detail about forced induced variation in calendered gauge. | 07 |
| Q.3 | (b) | Answer the following | |
| | i | Write a short note on thermistors. | 04 |
| | ii | List the examples of elastic pressure transducers. | 03 |
| OR | | | |
| Q.3 | (a) | Discuss in detail about mechanically induced variation in calendered gauge. | 07 |
| Q.3 | (b) | Answer the following | |
| | i | How temperature measurement of rubber compound is carried out by pyrometer? | 04 |
| | ii | Which are the major components of electrical pressure transducer? | 03 |
| Q.4 | (a) | Answer the following | |
| | i | Explain the force measurement by hydraulic force meter. | 04 |
| | ii | Which features are included as a part of injection moulding machine control? | 03 |
| Q.4 | (b) | Discuss the dynamic behavior of first order control system with suitable example and necessary assumptions. | 07 |

OR

- Q.4 (a)** Answer the following
- i** Explain the force measurement by pneumatic force meter. **04**
 - ii** Which methods are available to control the mixing process? **03**
- Q.4 (b)** Explain the step forcing function. Derive the step response equation of first order control system with its typical features. **07**
- Q.5 (a)** Answer the following
- i** Derive the transfer function for Proportional Integral (PI) Controller **03**
 - ii** Explain the servo problem with suitable example. **04**
- Q.5 (b)** Discuss the problems with microcomputers in data acquisition and analysis. **07**
- OR**
- Q.5 (a)** Answer the following
- i** Derive the transfer function for Proportional Derivative (PD) Controller. **03**
 - ii** Explain the regulatory problem with suitable example. **04**
- Q.5 (b)** Give the classification of interfaces used in rubber testing equipment. **07**
Write a short note on turn-key software which is used for data acquisition in rubber factory.
