Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–VII(NEW) • EXAMINATION – WINTER 2016**

**Subject Code:2170808** **Date:23/11/2016**

**Subject Name:Sensor Networks & Instrumentation**

**Time:10.30 AM to 1.00 PM** **Total Marks: 70**

**Instructions:**

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

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|---|---|---|---|
| **Q.1** | **(a)** | What is Sensor? Give classification of Sensors in detail. | **07** |
| | **(b)** | Explain Thermal Sensor (Temperature Sensor) in detail. | **07** |
| **Q.2** | **(a)** | How to select a Sensor? Explain selection of Sensors in detail. | **07** |
| | **(b)** | Explain with neat sketch Capacitive sensors with necessary equations and graphs. | **07** |
| | | **OR** | |
| | **(b)** | Explain with neat sketch $Co_2$ Sensing techniques with necessary equations and graphs. | **07** |
| **Q.3** | **(a)** | Explain Block Diagram and Ideal characteristics of an Op-Amp in detail. | **07** |
| | **(b)** | Explain V-I and I-V Converters using Op-Amp. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is Negative Feedback? Explain and derive equations of gain, input resistance and output resistance for and inverting amplifier with negative feedback. | **07** |
| | **(b)** | Explain Instrumentation Amplifier using Op-Amp in detail. | **07** |
| **Q.4** | **(a)** | Explain first order Low Pass Filter and derive all equations with neat figures. | **07** |
| | **(b)** | Explain second order High Pass Filter and derive all equations with neat figures. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain Second Order Band Pass Filter in detail and derive its equations. | **07** |
| | **(b)** | Explain First Order Band Stop Filter in detail and derive its equations. | **07** |
| **Q.5** | **(a)** | Explain First Order RC filters and derive its equations. | **07** |
| | **(b)** | What is Wireless Sensor Network? Explain its various terms and structure of WSN in detail. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain Applications of Wireless Sensor Network in detail with suitable examples. | **07** |
| | **(b)** | Explain various factors influencing Wireless Sensor Network Design. | **07** |

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