**SIDDHARTH  GROUP OF INSTITUTIONS :: PUTTUR**
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**QUESTION BANK (DESCRIPTIVE)**

**Subject with Code : Industrial Instrumentation** (**20EE0235**)

**Course & Branch**: B.Tech - EEE                    **Year & Sem:** III-B.Tech & II-Sem

**Regulation:** R20

## UNIT –I

## CHARACTERISTICS OF SIGNALS AND THEIR REPRESENTATION

| 1 | (a) | Explain the Dynamic characteristics of the measurement system. | [L2][CO1][4M] |
|---|---|---|---|
|   | (b) | Explain the various Static characteristics of the measurement system. | [L2][CO1][8M] |
| 2 |   | Discuss the various errors that exist in the measurement system | [L2][CO1][12M] |
| 3 |   | Explain the various statistical methods to analyze the Random errors | [L2][CO1][12M] |
| 4 | (a) | Discuss various systematic errors that exist in the measurement systems | [L1][CO1][6M] |
|   | (b) | Explain the different test signals used in standard test input signals | [L2][CO2][6M] |
| 5 |   | Define the term Modulation and explain in detail its classification | [L1[CO2]][12M] |
| 6 | (a) | Discuss in detail the various pulse modulation techniques | [L1][CO2][6M] |
|   | (b) | Explain the terms periodic and aperiodic signals | [L2][CO2][6M] |
| 7 | (a) | Draw and explain the block diagram Pulse Code Modulation (PCM) | [L1][CO2][6M] |
|   | (b) | Explain various modulation techniques | [L2][CO2][6M] |
| 8 |   | Define Terms (a) Modulation<br>            (b) Periodic<br>            (c) Aperiodic<br>            (d) Sampled Data<br>            (e) Modulation<br>            (f) Sampling | [L1][CO2][12M] |
| 9 |   | Define the terms (a) Sampling<br>            (b) Quantizing<br>            (c) Encoder<br>            (d) Modulation<br>            (e) Sample and Hold circuit | [L1][CO2][12M] |

| 10 | (a) | Draw and explain Pulse Width Modulation(PWM) | [L1][CO2][6M] |
|----|-----|-----------------------------------------------|----------------|
|    | (b) | Explain the Pulse Code Modulation(PCM) technique | [L2][CO2][6M] |

## UNIT –II

## DATA TRANSMISSION, TELEMETRY AND DAS

| 1 | (a) | Explain the various methods of data transmission | [L2] [CO3] [6M] |
|---|-----|---------------------------------------------------|------------------|
|   | (b) | Draw and explain the block diagram of the general telemetry system | [L1] [CO3] [6M] |
| 2 | (a) | Explain about Frequency Modulation(FM) | [L2] [CO3] [6M] |
|   | (b) | Explain the frequency modulation telemetry system | [L2] [CO3] [6M] |
| 3 |     | Draw and Explain the Modern Digital Data Acquisition System | L2] [CO3] [12M] |
| 4 | (a) | Compare the Frequency Modulation(FM) with Phase Modulation(PM). | [L2] [CO3] [6M] |
|   | (b) | Discuss the various advantages of Pulse Code Modulation(PAM) over Pulse Amplitude Modulation(PAM) | [L1] [CO3] [6M] |
| 5 |     | Explain in detail the various components used in Analog Data Acquisition systems | [L2] [CO3] [12M] |
| 6 | (a) | Describe the various classifications of multiplexer | [L2] [CO3] [6M] |
|   | (b) | Discuss the technique of Time division multiplexer | [L1] [CO3] [6M] |
| 7 |     | Discuss in detail about Pulse Amplitude Modulation(PAM) telemetry | [L1] [CO3] [12M] |
| 8 |     | Draw and Explain the Digital Data Acquisition System block diagram | [L1] [CO3] [12M] |
| 9 |     | Explain the different types of Multiplexing systems | [L2] [CO3] [12M] |
| 10 |    | Explain in detail about the various components used in Analog and digital Data Acquisition systems | [L2] [CO3] [12M] |

## UNIT –III
## SIGNAL ANALYZERS, DIGITAL METERS

| 1 | a | Define the term wave analyzer and mention the various applications of wave analyzer. | [ L1][CO3][6M] |
|---|---|---------------------------------------------------------------------------------------|-----------------|
|   | b | Explain the constructional details of the frequency selective analyzer with a neat diagram | [L2] [CO3][6M] |
| 2 | a | Explain the operational details of Hetrodyne wave analyzer | [L2] [CO3] [6M] |

| | | | |
|---|---|---|---|
| | b | Discuss the constructional details of the basic spectrum analyzer | [L1] [CO3] [6M] |
| **3** | a | Discuss the operational details of the vector impedance meter | [L1] [CO3] [6M] |
| | b | Explain the operational details of peak reading and RMS Voltmeters | [L2] [CO3] [6M] |
| **4** | a | What are the advantages of digital voltmeter? | [L2] [CO4] [6M] |
| | b | Explain about the successive approximation type digital voltmeters | [L2] [CO4] [6M] |
| **5** | | Explain in detail about the various types of digital voltmeters | [L2][CO4][12M] |
| **6** | | With a neat construction diagram, explain the operation of ramp type and integrating type digital voltmeters. | [L2][CO4][12M] |
| **7** | a | With neat construction diagram, explain the operation of digital multimeter | [L3][CO4][6M] |
| | b | Explain the constructional details of digital tachometer | [L2][CO4][6M] |
| **8** | | Discuss the operation of vector impedance meter | [L2][CO3][12M] |
| **9** | a | With a neat construction diagram, explain the operation of digital frequency meter | [L2][CO4][6M] |
| | b | Define the terms (a) Spectral display<br>(b) Total harmonic distortion<br>(c) Q-Factor | [L2][CO4] [6M] |
| **10** | a | Explain with a neat sketch the working details of Ramp type digital voltmeters | [L2][CO4][6M] |
| | b | Explain with a neat sketch the working details of integrating type digital voltmeters | [L2] [CO4] [6M] |

## UNIT –IV

## TRANSDUCER

| | | | |
|---|---|---|---|
| **1** | a | What is a transducer? Explain classification of transducers | [L1] [CO5] [6M] |
| | b | Explain the advantages of electrical transducer | [L2] [CO5] [6M] |
| **2** | a | Describe the principle and operation of resistive transducer | [L2] [CO5] [4M] |
| | b | Explain about inductive transducers. | [L2] [CO5] [4M] |
| | c | Describe the principle and operation of capacitive transducer | [L2] [CO5] [4M] |
| **3** | a | Describe the construction and working of LVDT with a neat schematic | [L2] [CO5] [6M] |
| | b | Explain the principle of operation of strain gauge and gauge factor | [L2] [CO5] [6M] |
| **4** | a | Discuss in detail about Thermistors. | |
| | b | Describe the working principle of thermocouples | [L2] [CO5] [6M] |
| **5** | a | Describe the working principle of piezo electric transducers | [L2][CO5][12M] |
| | b | Discuss in detail about photovoltaic cells | [L2] [CO5] [4M] |

| 6 | a | Discuss in detail about photo conductive cells | [L2] [CO5] [4M] |
|---|---|---|---|
| | b | Discuss in detail about photo diodes. | [L2] [CO5] [4M] |
| **7.** | a | Explain the characteristics of transducers | [L2][CO5][6M] |
| | b | List out various advantages of electrical transducers | [L1][CO5][6M] |
| **8.** | a. | What is piezo-electric effect and explain its theory of operation | [L1][CO5][6M] |
| | b. | List out various factors involved in the selection of transducer | [L1][CO5][6M] |
| **9.** | | Write notes on (i) Photo diode <br> (ii) Photo Conductive cell <br> (iii) Photo voltaic cell | [L2][CO5][12M] |
| **10.** | | Explain the various types of transducers with relevant diagrams | [L2][CO5][12M] |

## UNIT-V
## MEASUREMENT OF NON-ELECTRICAL QUANTITIES

| 1 | a | Explain the operation principle of strain gauge | [L2][CO6][6M] |
|---|---|---|---|
| | b | Explain the working principle of displacement transducer | [L2][CO6][6M] |
| 2 | a | Explain force measurement using load cells | [L2][CO6][6M] |
| | b | Explain the method used for the measurement of velocity | [L2][CO6][6M] |
| 3 | | Discuss various types of angular velocity measurement methods. | [L2][CO6][12M] |
| 4 | | Discuss various types of temperature sensors used in the measurement of temperature | [L2][CO6][12M] |
| 5 | | What are the different types of methods used in the measurement of acceleration explain with relevant diagrams. | [L1][CO6][12M] |
| 6 | a | What is the anemometer? Briefly explain the hot wire anemometer. | [L1][CO6][6M] |
| | b | Explain the operation of the Resistance thermometer | [L2][CO6][6M] |
| **7.** | | Discuss in detail the various methods used in the measurement of liquid level | [L2][CO6][12M] |
| **8.** | a. | Define strain and what are the reasons for experiencing strain | [L1][CO6][4M] |
| | b. | Explain the concept of Gauge sensitivity | [L2][CO6][8M] |
| **9.** | | Write short notes on (i) Potentiometric accelerometer <br> (ii) LVDT accelerometer <br> (iii) piezo electric type accelerometer | [L2][CO6][12M] |
| **10.** | | Explain the principle of operation of torque transducer | [L2][CO6][12M] |