**18ME703**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **November, 2022** | **Mechanical Engineering** | | |
| **Seventh Semester** | **Instrumentation and Control Systems** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| *Answer Question No.1 compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer ONE question from each unit.* | | | (4X10=40 Marks) |
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| 1. | a) | | Explain your understanding on calibration of measurement system. | CO1 | L2 |  |
|  | b) | | Distinguish between active and passive transducers. | CO1 | L1 |  |
|  | c) | | Explain sensors in measurement | CO1 | L3 |  |
|  | d) | | Write short notes on thermistors. | CO2 | L4 |  |
|  | e) | | Explain the principle of thermocouple. | CO2 | L1 |  |
|  | f) | | List out different instruments for high pressure measurement. | CO2 | L1 |  |
|  | g) | | Write short notes on cryogenic fuel level indicator | CO3 | L2 |  |
|  | h) | | State advantages and limitations of a rotameter. | CO3 | L3 |  |
|  | i) | | Classify shaft power measurement techniques | CO4 | L1 |  |
|  | j) | | What are the basic elements of a control system | CO4 | L1 |  |
|  | | **Unit -I** | | | | |
| 2. | a) | | List and Define different static characteristics of a measurement system. | CO1 | L2 | 5M |
|  | b) | | Explain with a neat sketch construction and working of a LVDT. | CO1 | L3 | 5M |
|  | | **(OR)** | | | | |
| 3. | a) | | Derive, from first principle, the relationship for gauge factor of a strain gauge. | CO1 | L1 | 5M |
|  | b) | | Define Strain rosette. Classify strain rosette. How it is used for strain measurement. | CO1 | L4 | 5M |
|  | | **Unit -II** | | | | |
| 4. | a) | | Classify temperature measuring instruments and explain working of bi-metallic strip thermometer for the measurement of temperature. | CO2 | L2 | 5M |
|  | b) | | Explain principle and operation of optical pyrometer with neat sketch? | CO2 | L2 | 5M |
|  | | **(OR)** | | | | |
| 5. | a) | | Sketch and explain bellows pressure gauge for the measurement of differential pressure. | CO2 | L1 | 5M |
|  | b) | | Sketch & Explain Mc.Loed gauge for measurement of Vacuum. | CO2 | L3 | 5M |
|  | | **Unit -III** | | | | |
| 6. | a) | | Explain the working principle of Capacitance liquid level sensor. | CO3 | L2 | 7M |
|  | b) | | List out the disadvantages of liquid level measurement by resistive method. | CO3 | L3 | 3M |
|  | | **(OR)** | | | | |
| 7. | a) | | Explain the Construction, working and applications of Magnetic flow meter. | CO3 | L3 | 4M |
|  | b) | | With the help of hot wire bridge circuit explain the working of hot wire anemometer in constant current mode and constant temperature mode. | CO3 | L2 | 6M |
|  | | **Unit -IV** | | | | |
| 8. | a) | | How does a pneumatic load cell work? Explain the principle of measuring force using pneumatic load cell? | CO4 | L4 | 6M |
|  | b) | | Describe the constructional and operation of hydraulic dynamometer with a neat sketch. | CO4 | L1 | 4M |
|  | | **(OR)** | | | | |
| 9. | a) | | Discuss advantages and disadvantages of open loop and closed control systems? | CO4 | L1 | 5M |
|  | b) | | Describe servo mechanism. Draw block diagram of a servo mechanism. | CO4 | L2 | 5M |

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