Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17EI2034** | **Duration :** | **3hrs** |
| **Sub. Name :** | **INSTRUMENTATION AND CONTROL SYSTEMS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Describe the fundamental measurement process and draw the block diagram of generalized measurement system with example. | CO1 | 15 |
| b. | Explain how a galvanometer can be converted into an ammeter. | CO2 | 5 |
| **(OR)** | | | | |  | (OR) |
| 2. | a. | Describe the construction and working of X-Y recorder. | CO1 | 15 |
| b. | Mention the reasons for having instruments calibrated. | CO1 | 5 |
|  |  |  |  |  |
| 3. | a. | Discuss the constructional features of bourdon-tube pressure gauge. | CO1 | 15 |
| b. | Explain how the Wheatstone bridge circuit may be utilized for the measurement of temperature. | CO1 | 5 |
| **(OR)** | | | | |
| 4. | a. | Explain briefly the construction and working of a thermocouple. | CO1 | 15 |
| b. | Describe the working principle of energy meter. | CO6 | 5 |
|  |  |  |  |  |
| 5. | a. | Describe the working principle of strain gauge with neat sketch and explain the different types of strain gauge. | CO1 | 15 |
| b. | Define gauge factor and mention its significance. | CO1 | 5 |
| **(OR)** | | | | |
| 6. | a. | With neat diagram explain the construction and working of hot-wire anemometer. | CO2 | 15 |
| b. | Explain the ultrasonic flow meter using the travel time difference method. | CO2 | 5 |
|  |  |  |  |  |
| 7. | a. | Using block diagram reduction technique find the closed loop transfer function. | CO3 | 15 |
| b. | Explain open loop and closed loop control system with an example. | CO3 | 5 |
| **(OR)** | | | | |
| 8. | a. | The open loop transfer function of a unity feedback control system is given by. Sketch the polar plot and determine the phase margin and gain margin. | CO4 | 15 |
| b. | Find the type and order of the following system transfer function  (i)  (ii) | CO4 | 5 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Construct Routh array and determine the stability of the system represented by the characteristic equation. Comment on the location of the roots of characteristic equation. | CO5 | 15 |
| b. | Explain the necessary condition for stability and relation between stability and coefficient of characteristic Polynomial. | CO5 | 5 |