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

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

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| **Code :** | **14EI2048** | **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. | Explain the fundamental measurement process and draw the block diagram of generalized measurement system with example. | CO1 | 15 |
| b. | Define error and list out the types of error. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Explain briefly the construction and working of stripchart recorder. | CO1 | 15 |
| b. | How galvanometer can be converted into a voltmeter? | CO1 | 5 |
| 3. | a. | Explain briefly the construction and working of bourdon tubes for measurement of pressure. | CO1 | 15 |
| b. | Explain briefly the integrating instrument with an example. | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | Explain briefly the construction and working of a RTD. | CO1 | 15 |
| b. | Explain how the Wheatstone bridge circuit may be utilized for the measurement of temperature. | CO1 | 5 |
| 5. | a. | With relevant diagrams, explain the different types of strain gauge. | CO1 | 15 |
| b. | What is gauge factor? What is its significance? | CO1 | 5 |
| (OR) | | | | |
| 6. | a. | With neat diagram, explain the construction and working of hot-wire anemometer. | CO1 | 15 |
| b. | Explain the ultrasonic flow meter using the travel time difference method. | CO1 | 5 |
| 7. | a. | Find out the overall transfer function of the system for the signal flow graph shown below. | CO3 | 15 |
| b. | What are the basic properties of signal flow graph? | CO3 | 5 |
| (OR) | | | | |
| 8. | a. | Construct Routh array and determine the stability of the system for the characteristic equation, S5+S4+2S3+2S2+3S+5=0. Comment on the location of the roots of characteristic equation. | CO2 | 15 |
| b. | What are the necessary conditions for stability? Explain the relation between stability and coefficient of characteristic polynomial. | CO2 | 5 |
|  | | **Compulsory:** |  |  |
| 9. | a. | The open loop transfer function of a unity feedback control system is given by. Draw sketches of the polar plot and determine the phase margin and gain margin. | CO2 | 15 |
|  | b. | Find out the type and order of the following system transfer function.  (i)  (ii) | CO2 | 5 |