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

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**End Semester Examination – Nov/Dec – 2018**

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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. | Sketch the fundamental measurement process and explain the generalized measurement system with example. | CO1 | 15 |
| b. | Write the reasons for having instruments calibrated. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Describe the construction and working of XY recorder. | CO1 | 15 |
| b. | Explain how a galvanometer can be converted into an ammeter. | CO1 | 5 |
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| 3. | a. | Explain briefly the construction and working of a thermocouple. | CO1 | 15 |
| b. | Explain how the Wheatstone bridge circuit may be utilized for the measurement of temperature. | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | Use Mason’s gain formula for determining the overall transfer function of the system show in Fig. | CO3 | 15 |
| b. | Define control system. Explain open loop and closed loop control system with example. | CO3 | 5 |
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| 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. | Discuss the constructional features of bourdon-tube pressure gauge. | CO1 | 15 |
| b. | Describe the working principle of energy meter. | CO1 | 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. | CO1 | 15 |
| b. | Describe the necessary condition for stability. Explain the relation between stability and coefficient of characteristic polynomial. | CO1 | 5 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Construct Routh array and determine the stability of the system represented by the characteristic equation, S6+2S5+8S4+12S3+20S2+16S+16=0. Comment on the location of the roots of characteristic equation. | CO2 | 15 |
| b. | Reduce the block diagram shown in the figure and find the transfer function. | CO2 | 5 |