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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **16EE3001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CONTROL AND DRIVES FOR SOLAR TRACKING 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 Process Characteristics and brief about few properties of processes that are important for selecting the control. | CO1 | 15 |
| b. | The temperature of a process control has a range of 300K to 440K and a setpoint of 384K. Find the percent of span error when the temperature is 379K. | CO2 | 5 |
| (OR) | | | | |
| 2. | a. | List the different categories of composite control modes. Derive the closed-loop transfer function of a PID controller for a second order system. | CO1 | 14 |
| b. | Consider a proportional mode level-control system as shown in Fig.1. Valve A is linear, with a flow scale factor of 10m3/h percent controller output. The controller output is nominally 50% with a constant of Kp= 10% per %. A load changes occurs when flow through valve B changes from 500 m3/h to 600 m3/h. Calculate the new controller output and offset error.    Fig.1 | CO2 | 6 |
| 3. | a. | Discuss on various controller modes that show discontinuous changes in controller output as controlled variable error occurs. | CO1 | 14 |
|  | b. | Illustrate the effect of Tilt angle on Solar PV output. | CO2 | 6 |
| (OR) | | | | |
| 4. | a. | Derive the transfer function for Composite controller modes. Explain each with proper block diagrams. | CO2 | 15 |
|  | b. | Discuss the various methods for improving time response. | CO2 | 5 |
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| 5. | a. | With neat block diagram, explain solar energy conversion systems. | CO3 | 15 |
|  | b. | Mention the necessity required for proper tracking of the sun. | CO3 | 5 |
| (OR) | | | | |
| 6. | a. | With neat diagram, explain a model of electromechanical system with solar photo voltaic cell and DC motor. | CO3 | 15 |
|  | b. | Discuss the various factors affecting energy conversion efficiency. | CO1 | 5 |
| 7. |  | Explain the control of solar plants relying on model based predictive control strategy. | CO2 | 20 |
| (OR) | | | | |
| 8. |  | Analyse the types of errors that occur in control system. Examine the convergence and stability. | CO2 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the various blocks in fuzzy-logic controller with proper diagram. | CO3 | 15 |
|  | b. | Write short notes on frequency domain based control of solar plant. | CO3 | 5 |

ALL THE BEST