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 – April/May– 2017**

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| **Code :** | **15EI2006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIO 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. | Compare the features of engineering and physiological control systems with examples. | CO1 | 10 |
| b. | Determine the overall transfer function of the system C(s)/R(s). | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Derive the transfer function for field controlled DC motor. | CO1 | 10 |
| b. | Using Mason’s gain formula, determine the overall gain of the system shown below | CO1 | 10 |
| 3. | a. | What are the time domain specification? Write short notes on them. | CO2 | 10 |
|  | b. | Obtain the response of undamped second order system for unit step input. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | A unity feedback control system has an open loop transfer function G(s)=10/s(s+2). Find the rise time, percentage over shoot, peak time and settling time. | CO2 | 10 |
|  | b. | Obtain the mathematical model of chemical regulation of ventilation. | CO3 | 10 |
| 5. |  | Sketch the root locus of the system whose open loop transfer function is G(s) =  . | CO3 | 20 |
| (OR) | | | | |
| 6. | a. | Using Routh-Hurwitz criterion determine the stability of the system represented by the characteristic equations s5+s4+2s3+2s2+3s+5 = 0. Comment on the location of the roots of the characteristic equation. | CO3 | 15 |
|  | b. | Enumerture the fetaures of frequency response analysis. | CO2 | 5 |
| 7. |  | Sketch the bode plot for the following transfer function.  G(s) = 75(1+0.2s)/s(s2 + 16s +100) | CO2 | 20 |
| (OR) | | | | |
| 8. |  | The open loop transfer function of a system is given by  G(s) =1/s(1+s)(1+2s). Sketch the polar plot and determine gain margin and phase margin. | CO2 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain the concept of stretch reflex with respect to control system concept**.** | CO3 | 10 |
|  | b. | Obtain the mathematical model for the regulation of cardiac output**.** | CO3 | 10 |

ALL THE BEST