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

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

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| **Code :** | **15EI2006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOCONTROL 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. | Determine the transfer function of the given mechanical system. | CO1 | 15 |
| b. | Explain the concept of Control Systems. Distinguish between open loop and closed loop control systems with an example. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Illustrate the rules to be followed in block diagram reduction technique. | CO1 | 5 |
| b. | Determine the overall transfer function of the given Signal Flow Graph. | CO1 | 15 |
| 3. | a. | Describe the concept of muscle stretch reflex with suitable diagrams. | CO1 | 6 |
| b. | Obtain the mathematical model of the circulatory system. | CO1 | 14 |
| (OR) | | | | |
| 4. | a. | Demonstrate the features of physiological control systems. | CO1 | 4 |
| b. | Derive the mathematical model of Lung Mechanics. | CO1 | 16 |
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| 5. |  | Determine the response of the second order overdamped system when unit step is given as input. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | For a unity feedback control system the open loop transfer function,  . Obtain the position, velocity and acceleration error constants. | CO2 | 10 |
| b. | Elaborate the various time domain specifications with the response graph. | CO2 | 10 |
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| 7. |  | Determine the location of roots on s-plane and hence comment on the stability of a control system whose characteristic equation is given by, | CO3 | 20 |
| (OR) | | | | |
| 8. |  | The unity feedback control system has an open loop transfer function . Sketch the Root Locus for the given system. | CO3 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Write short notes on frequency response plots. | CO3 | 4 |
| b. | Sketch the Bode plot for the following transfer function and evaluate the gain and phase cross-over frequency. | CO3 | 16 |