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



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

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| **Code :** | **15EI2017** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MODELLING OF PHYSIOLOGICAL 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. | Evaluate the electrical analogue of the muscle mechanics model shown in Figure | CO2 | 10 |
| b. | Static Analysis is better than dynamic analysis. Justify the statement. | CO2 | 4 |
| c. | Define and develop open loop gain of a control system. | CO1 | 6 |
| (OR) | | | | |
| 2. | a. | Apply the concept of physiological feedback control system in muscle stretch reflex action. | CO1 | 10 |
| b. | List the differences between efferent and afferent nerve fibres. | CO1 | 4 |
| c. | Analyse the necessity of adaptiveness for physiological systems and its significances. | CO3 | 6 |
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| 3. | a. | Compare distributed parameter and lumped parameter models and evaluate its importance in physiological control system. | CO1 | 6 |
|  | b. | Discuss lumped parameter model with an example. | CO2 | 8 |
|  | c. | Differentiate engineering control problem and physiological control problem. | CO1 | 6 |
| (OR) | | | | |
| 4. | a. | Evaluate the presence of pulsative nature of arterial pressure, in pressure profiles of circulatory system. | CO1 | 6 |
|  | b. | Analyse various aspects of modelling of cardiac output curve for the given electrical analogue of cardiac output regulation. | CO2 | 14 |
| 5. | a. | Illustrate the modeling of respiratory controller in chemical regulation of ventillation. | CO1 | 12 |
|  | b. | Evaluate the significance of capillary tube flow rate in dynamic circulation. | CO3 | 8 |
| (OR) | | | | |
| 6. | a. | Type 2 diabetes is referred as non-insulin dependent diabetes. Justify the answer. | CO1 | 5 |
|  | b. | Define metabolic Hyperbola. | CO3 | 5 |
|  | c. | Heat losses due to direct conduction to object are minor. Justify the statement. | CO2 | 5 |
|  | d. | Illustrate the conversion of volumetric flow rates in to partial pressures. | CO1 | 5 |
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| 7. | a. | Briefly describe Counter current model of urine formation in nephron. | CO2 | 10 |
|  | b. | Comment on various transport through cell membrane by diffusion, active and passive transport. | CO2 | 6 |
|  | c. | Write short notes on artificial waste removal. | CO1 | 4 |
| (OR) | | | | |
| 8. | a. | Evaluate the effectiveness of modeling Henle’s loop in waste removal process. | CO2 | 10 |
|  | b. | Illustrate the process of mass balancing by lungs. | CO1 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Illustrate with relevant diagrams the carbon dioxide transport in the blood. | CO3 | 10 |
|  | b. | Explain in brief the process of oxygen and carbon dioxide transfer from tissues. | CO3 | 10 |

ALL THE BEST