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 :** | **15EI2017** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MODELING 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. | Develop the mechanical equivalent of the electrical analogy of respiratory mechanics shown in Figure. | CO1 | 10 |
| b. | Comprehend on the distributed model of a nerve fibre with relevant equations. | CO2 | 6 |
| c. | Suggests a thermoregulatory example that relates to open loop control system. | CO3 | 4 |
| (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 |
| 3. | a. | Compare distributed parameter with lumped parameter models and evaluate its importance in physiological control system. | CO1 | 6 |
|  | b. | Apply the concept of physiological feedback control system in muscle stretch reflex action. | 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. | Develop the electrical model of neural control mechanism. | CO2 | 10 |
|  | b. | Comment on various physical, chemical, rheological properties of blood. | CO3 | 10 |
| (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 |
| 7. | a. | Comment on the role of blood circulation in internal heat transfer. | CO2 | 5 |
|  | b. | Describe in detail heat transfer within the body. | CO2 | 10 |
|  | c. | Differentiate free and forced convection. | CO1 | 5 |
| (OR) | | | | |
| 8. | a. | Evaluate the effectiveness of modeling Henle’s loop in waste removal process. | CO2 | 10 |
|  | b. | Illutrate the sprocess of mass balancing by lungs. | CO1 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Brielfy explain the gas transport mechanism in lungs. | CO3 | 10 |
|  | b. | Analyse various stages of oxygen transport in blood. | CO1 | 10 |

ALL THE BEST