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 – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EI3033** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Biomedical sensors and signal conditioning** | **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. | Design a instrumentation amplifiers for blood pressure telemetry. | CO3 | 10 |
| b. | Illustrate with examples, General-purpose non-linear electronic circuits involved in biomedical applications. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | A simple pacemaker is made with two multivibrators connected in series. The first one is an astable multivibrator, the second one is a monstable multivibrator. The output is taken from the monostable multivibrator. Discuss these two types of multivibrator and the rationale of them connected in series. | CO1 | 20 |
| 3. | a. | Design an amplifier circuit for defribillator. | CO3 | 10 |
|  | b. | Describe the functional block diagram of electrocardiograph and list the problems while acquiring ECG signal. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Discuss the frequency domain model for band pass and band stop filter. | CO1 | 10 |
|  | b. | Design an active filter amplifier design for EMG signal. | CO3 | 10 |
| 5. | a. | Discuss amplifier selection for various biomedical sensors. | CO3 | 10 |
|  | b. | Design a Wheatstone bridge amplifier design for ECG signal. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Draw an embedded system design which measure hemoglobin and explain the functionality of each block. | CO2 | 15 |
|  | b. | Give the importance of Transducer bridge Amplifier in biomedical applications. | CO2 | 5 |
| 7. | a. | Design a Low pass filter in frequency domain with cutoff frequency of 1KHz | CO1 | 15 |
|  | b. | List the requirement of bio amplifier. | CO1 | 5 |
| (OR) | | | | |
| 8. | a. | Design a Front-end analogue circuit for EMG signal. | CO2 | 15 |
|  | b. | Justify why oscillator circuits are required for biomedical application. | CO1 | 5 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Design a Front-end analogue circuit design for limb movement sensing. | CO2 | 15 |
|  | b. | Comment on the significance of instrumentation amplifier in biomedical applications. | CO1 | 5 |

ALL THE BEST