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 :** | **15EI2005** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOSIGNAL CONDITIONING CIRCUITS** | **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 an adder circuit using op-amp to get add three input voltages V1, V2 and V3. | CO1 | 10 |
| b. | For the op – amp configuration shown in figure, determine the Rf if the gain required is 61. | CO3 | 4 |
| c. | What are the characteristics of an ideal op amp? | CO1 | 6 |
| (OR) | | | | |
| 2. | a. | An op amp has bias currents IB1 and IB2 as 400nA and 300nA. Calculate the input bias current of the op amp. | CO2 | 4 |
| b. | Explain the types of bio signals mostly used for signal conditioning applications. | CO2 | 3 |
| c. | Mention the characteristics of an ideal Operational Amplifier. | CO1 | 8 |
| d. | Mention the significance of bio electric currents and its measurement. | CO2 | 5 |
| 3. | a. | The use of differential amplifiers is common in bio potential measurements. Why? | CO2 | 8 |
|  | b. | Explain the function of op amp as integrator, draw the waveforms. | CO3 | 12 |
| (OR) | | | | |
| 4. |  | Design and construct a pacemaker circuit that will give pulses on demand. | CO3 | 20 |
| 5. | a. | Describe in detail on analog phase detectors. | CO2 | 6 |
|  | b. | Explain in brief about Phase Locked Loop with relevant schematics. | CO2 | 14 |
| (OR) | | | | |
| 6. | a. | With a neat diagram explain magnetically coupled medical isolation amplifier and its significance. | CO3 | 12 |
|  | b. | Comment on optical mode of isolation in bio measurement. | CO3 | 8 |
| 7. | a. | With a neat diagram, explain the significance of sample and hold circuit in biosignal data aqcuisiton systems. | CO1 | 8 |
|  | b. | Write short notes on different types of DACs. | CO2 | 12 |
| (OR) | | | | |
| 8. | a. | Design a HPF for a cut of frequency of 2 KHz and draw the response. | CO3 | 10 |
|  | b. | Breifly compare various active filters conditioning used in biosignal and their responses. | CO1 | 6 |
|  | c. | Explain the types of Band reject filters. | CO2 | 4 |
|  | | **Compulsory:** |  |  |
| 9. |  | Discuss on various electrical interface problems and safety standards in bio potential measurements. | CO3 | 20 |