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 :** | **14MT2034** | **Duration :** | **3hrs** |
| **Sub. Name :** | **AUDIO SIGNAL PROCESSING** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | What is Audio Signal Processing? Mention and explain atleat 5 applications of the field of Audio Signal Processing. | CO2,  CO3 | 20 |
| (OR) | | | | |
| 2. |  | If the total number of samples (N) is given to be 4, find the DFT of the complex exponentials and the scalar product if x(n) = [1,-1,1,-1]. | CO2 | 20 |
| 3. | a. | Mention any 2 Application software for recording audio and playback. Discuss all their unique features in detail. | CO3 | 10 |
|  | b. | What are the various libraries used in Python for Audio Signal processing? Explain each one of them in detail. | CO3 | 10 |
| (OR) | | | | |
| 4. |  | Discuss in detail the 4 properties of DFT: Linearity, Shift, Symmetry and Convolution. | CO2 | 20 |
| 5. |  | State and explain any 5 types of window analysis used in Audio Signal processing. Also mention their pros and cons. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Draw the block diagram of an STFT system and explain the process in detail. | CO1, CO2 | 20 |
| 7. | a. | How do you recognize the pitch and the harmonics by looking at the magnitude spectrum of a sound mentioned below: | CO2, CO3 | 5 |
|  | b. | Discuss on how to detect the peak using sinusoidal model and track the time varying sinewave in Spectogram. | CO3 | 15 |
| (OR) | | | | |
| 8. |  | What is Pitch and Harmonics in an audio signal? Discuss on methodologies to detect the harmonics in an audio signal. What are the conditions for the peak to be harmonic? | CO2, CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | What is stochastic signals? How can it be described? What is the main analysis issue in stochastic model? Discuss any two approximation techniques used in stochastic model. | CO2, CO3 | 20 |