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

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**End Semester Examination – Nov/Dec – 2018**

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| **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. | a. | List down any two Digital audio recording/production software. | CO1 | 1 |
| b. | What packages in python are essential for Audio Signal processing? | CO1 | 1 |
| c. | Mention atleast 4 functions that can be performed using Audacity. | CO1 | 2 |
| d. | List down and explain all the possible applications of Audio signal processing in media. | CO1 | 16 |
| (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. | Define: Pink noise. | CO1 | 1 |
| b. | Is it possible to generate square wave by addition of simple sine waves? If yes explain how? | CO2 | 3 |
| c. | Differentiate between .wav and .mp3 format. | CO2 | 2 |
| d. | Discuss in detail the 4 properties of DFT: Linearity, Shift, Symmetry and Convolution. | CO2,  CO3 | 14 |
| (OR) | | | | |
| 4. | a. | Mention any two 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 |
|  |  |  |  |  |
| 5. |  | Draw the block diagram of an STFT system and explain the process in detail. | CO2 | 20 |
| (OR) | | | | |
| 6. |  | State and explain any 5 types of window analysis used in Audio Signal processing. Also mention their pros and cons. | 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. | Explain in detail with suitable diagram the process of peak identification, fundamental frequency detection and error correction. | CO2,  CO3 | 15 |
| (OR) | | | | |
| 8. |  | Define Pitch and Harmonics in an audio signal. Discuss on methodologies to detect the harmonics in an audio signal. Mention the conditions for the peak to be harmonic? | CO2,  CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | With a neat block diagram explain in detail the Stochastic model system. | CO3 | 20 |