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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14MT2029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STUDIO ACOUSTICS** | **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 seat in a concert hall is 84 ft from the tympani. The tympanist strikes a single note. The sound-pressure level of the direct sound of the note at the seat is measured to be 55 dB. The first reflection from the nearest sidewall arrives at the seat 105 msec after the arrival of the direct sound.   1. How far does the reflection travel to reach the seat? 2. What is the SPL of the reflection at the seat, assuming perfect reflection at the wall? 3. How long will the reflection be delayed after arrival of the direct sound at the seat? | CO3 | 20 |
| (OR) | | | | |
| 2. |  | Discuss upon binaural localization of sound by human ear. Write briefly about the Law of the first wavefront, Cocktail Party effect and the Precedence Effect. | CO1 | 20 |
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| 3. |  | The dimensions of an untreated room are 23.3 × 16 × 10 ft. The room has a concrete floor and the walls and the ceiling are of frame construction with 1/2-in gypsum board (drywall) covering. As a simplification, the door and a window will be neglected as having minor effect. The absorption coefficients for the materials are as follows:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Material** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | | Concrete | 0.01 | 0.01 | 0.015 | 0.02 | 0.02 | 0.02 | | 1/2-in gypsum board | 0.29 | 0.10 | 0.05 | 0.04 | 0.07 | 0.09 |   Calculate the average RT60 of the above given room. | CO2 | 20 |
| (OR) | | | | |
| 4. | a. | Discuss briefly upon the 3 methods of calculation of absorption coefficients for a material. | CO1 | 12 |
| b. | Discuss briefly upon effect of thickness, airspace and density of absorbent materials upon the absorbent coefficient of a material. | CO1 | 8 |
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| 5. |  | Calculate the lowest 10 modes (Axial, Tangential and Oblique) of a room with the below given dimensions. | CO3 | 20 |
| (OR) | | | | |
| 6. |  | List down atleast 5 absorbent materials and discuss their absorption characteristics in detail. | CO1 | 20 |
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| 7. |  | Design a Schroeder’s one dimensional diffusers with prime number 11. Draw the elevation of the prime number quadratic residue based well depths and mention the frequency range that would be diffused by the panel if the dimensions of the depths of 1 unit would 1m. | CO2 | 20 |
| (OR) | | | | |
| 8. | a. | Discuss the steps to be taken to isolate Walls, Ceiling, Floors and Windows of a Recording Studio. | CO3 | 16 |
| b. | Explain: STC and IIC criterion used in Acoustics. | CO1 | 4 |
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|  | | **Compulsory**: |  |  |
| 9. |  | Layout a plan view of a small recording studio with minimum 2 control rooms and 2 studios. Discuss the acoustic treatment that need to be done for the studio complex isolate the studio from any airborne and structureborne noise intrusion. | CO3 | 20 |