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Reg.No :

Name :

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) Regular EXAMINATION October 2025
Third SEMESTER
Value Addition Course (VAC) - MG3DSESDV200 - ACOUSTICS AND
PSYCHOACOUSTICS
(2024 ADMISSION ONWARDS)

Duration: 1 Hour 30 Minutes

Maximum Marks: 70

***Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S), Interest(I)
and Appreciation(Ap)***

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Very short answer questions

Answer any **8** questions

Each question carries **2** marks

- | | |
|---|-------------|
| 1. What is the typical time gap (in ms) between direct sound and early reflections that creates intimacy? | [U] / [CO1] |
| 2. What are room modes? | [U] / [CO2] |
| 3. Why are convex surfaces often preferred in auditorium design? | [U] / [CO3] |
| 4. Why is reverberation control important in auditorium design? | [U] / [CO4] |
| 5. Why is the frequency range of 6–16 kHz critical for vertical (elevation) localization? | [U] / [CO1] |
| 6. What type of surfaces in rooms obey the law of reflection most strongly? | [U] / [CO3] |
| 7. How is pitch different from frequency? | [U] / [CO1] |
| 8. Give one example of a material that is a strong sound absorber. | [U] / [CO3] |
| 9. Which playback device (headphones or loudspeakers) is essential for experiencing true binaural sound? | [U] / [CO1] |
| 10. State the inverse square law in acoustics. | [U] / [CO2] |

[2x8 = 16]

Part B

Short answer questions

Answer any **5** questions

Each question carries **6** marks

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| 11. Analyze why relative distance perception is more accurate than absolute distance perception in listening environments. | [An] / [CO1] |
| 12. Describe the difference between an echo and a flutter echo, giving one example of where each might occur. | [U] / [CO2] |
| 13. Explain how porous absorbers work to reduce sound energy. Why are they most effective at high and mid frequencies? | [U] / [CO3] |
| 14. Explain how reverberation time (RT60) is measured in practice. Why are T20 or T30 values often used instead of directly measuring RT60? | [U] / [CO4] |
| 15. Explain why certain groups, such as trained musicians, may demonstrate stronger cocktail party effect abilities compared to non-musicians. | [An] / [CO1] |
| 16. A lecture hall has a volume of 3000 m ³ and a total absorption of 300 m ² sabins. Calculate the reverberation time using Sabine's formula. (Take c = 343 m/s). | [A] / [CO2] |
| 17. Describe the typical recommended NC levels for (a) classrooms, (b) recording studios, and (c) open-plan offices. | [U] / [CO3] |

[6x5 = 30]

Part C

Essay questions

Answer any **2** questions

Each question carries **12** marks

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|--|--------------|
| 18. Analyze how direct, early reflections, and reverb contribute to a sense of envelopment and spaciousness. | [An] / [CO1] |
| 19. Discuss practical applications of SPL measurement in real-world contexts such as workplace safety, environmental noise monitoring, and audio system calibration. Give examples of how measurements guide decisions. | [A] / [CO2] |
| 20. Evaluate the differences in reverberation time requirements between small spaces (control/monitoring rooms, listening rooms) and large spaces (concert halls, theatres, multipurpose halls). How does RT affect clarity, warmth, and adaptability in these environments? | [E] / [CO4] |

[12x2 = 24]