

# CBCS SCHEME

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15ARC73

## Seventh Semester B.Arch. Degree Examination, Feb./Mar. 2022 Building Services – IV

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain in detail various factors responsible for good acoustic design for a multipurpose auditorium. With the help of neat sketches and labels. (08 Marks)  
b. Differentiate between sound absorption and sound insulation. (04 Marks)  
c. Discuss the properties of various sound absorbing and insulating materials. (08 Marks)

OR

- 2 a. Define speech intelligibility. (06 Marks)  
b. Illustrate reverberation and reverberation time. Explain Sabine's equation. How does it help in acoustic expert? (09 Marks)  
c. Describe briefly the fundamental attributes of sound. (05 Marks)

### Module-2

- 3 a. Write short notes :  
i) Threshold of audibility and threshold of pain  
ii) Sound absorption co-efficient  
iii) Panel absorbers  
iv) Sound concentration. (12 Marks)  
b. Explain "Sound and Distance", inverse square law with equation and diagram. (08 Marks)

OR

- 4 a. Write short notes on :  
i) Airborne noise  
ii) Structure borne noise  
iii) Pitch  
iv) Cavity resonator. (12 Marks)  
b. Define NRC value and its importance. How does it assist in making the choice of materials? (08 Marks)

### Module-3

- 5 a. Elaborate upon the behavior of sound in an enclosed space with sketches. How shape, size and volume of the room affect acoustical performance. (12 Marks)  
b. Distinguish between historic Greek and roman theaters with the help of sketches. (08 Marks)

OR

- 6 a. Illustrate with sketches :  
i) Space absorbers  
ii) Acoustical shadows  
iii) Transmission loss. (12 Marks)  
b. Draw neat sketches :  
i) Floating Floor  
ii) Machine isolation  
iii) Staggered partition wall construction  
iv) Masking of sound. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Recommend design ideas for equality acoustics for an auditorium having a seating capacity of 200 draw plan, section and 3D views of important areas. Assume suitable useful technical information. (12 Marks)
- b. Explain in the causes of environmental noise in urban areas with examples. Suggest remedial measures to avoid unwanted sound in noisy areas. (08 Marks)

OR

- 8 a. Identify sources of indoor noise suggest measures to control the noise at source level. (10 Marks)
- b. Demonstrate with sketches two measures to be taken to control excessive RT in Lecture Hall. (10 Marks)

Module-5

- 9 a. Solve the following :  
Using Sabine equation :

$$RT_{60} = \frac{0.165V}{S\alpha} = \left( \frac{0.165 \times \text{volume}}{\text{total absorption in hall sabins}} \right)$$

A cinema hall has a volume of  $10,000\text{m}^3$ . It is required to have a reverberation time  $RT_{60}$  of 1.5sec what should be the total absorption in the hall. (14 Marks)

- b. List the various types of urban spaces which could be adopted in town planning to control the urban noise. With the help of neat sketches. (06 Marks)

OR

- 10 a. Elaborate on classification of industrial noise with the help of neat sketches and discuss the various ways to reduce industrial noise. (12 Marks)
- b. A large hall has to be divided into small cabins by erecting sound proof partitions. Suggest minimum three alternate details to construct partitions. (08 Marks)

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