

Total number of printed pages-5

43 (6) BUSR-IV

2016

BUILDING SERVICES-IV

Paper : ARC-6.6

(Acoustics)

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Fill in the blanks : **(any ten)** $10 \times 1 = 10$
- (i) Aim of acoustics is achieving a _____ and _____ within a building.
 - (ii) Velocity of sound in brick _____ m/s.
 - (iii) Velocity of sound in steel _____ m/s.
 - (iv) When sound hits a barrier it is _____, _____, _____, _____.

Contd.

- (v) Acoustics can be derived from _____ , _____ , _____ .
- (vi) Issues of acoustics _____ , _____ , _____ .
- (vii) Application of acoustics _____ , _____ .
- (viii) _____ formula of inverse square law.
- (ix) Full form of NRC _____ .
- (x) Full form of APS _____ .
- (xi) Reflected sound is excessively delayed and is loud enough to be obstructed is called _____ .
- (xii) Wallace Sabine designed _____ and was the first one to design architectural acoustics.

2. Write short notes on the following :

(any five)

5×4=20

(i) Masking of Sound

(ii) Reverberation

(iii) Landness

(iv) Inverse square law

(v) Pitch and tone

(vi) Flutter echo

(vii) Sound pressure.

3. Discuss the nature of sound in the following spaces. Support with helpful sketches :

(any two) 5+5=10

(i) Lecture hall

(ii) Auditorium

(iii) Conference hall

(iv) Music hall.

4. Explain the acoustical defects and remedies with needful sketches : **(any one)** 10

(i) Royal Festive Hall, London

(ii) Royal Exchange Theatre, Manchester.

5. A partition wall of surface area 300 *square feet* and thickness 4 *inch* has TL 400dB and 500Hz. Both the source and receiving rooms, each has 300 Sabines absorption at 500Hz. Sound level in source room is 74dB. Find the sound level in receiving room. 10
6. Noise level in receiving room of 15' × 8' × 7' should not exceed 22dB. In this room, α of wall and ceiling is 0.04 and α of carpeted floor is 0.69. A bed in this room has absorption of 15 Sabines. Surface area of partition wall is 90 *square feet* and noise level in the source room is 82dB. Find the transmission loss. 10
7. A hall 50' × 35' × 12' has α of walls 0.035, α of ceiling 0.03, α of floor 0.04. Total absorption due to other items in the hall is 50 sabines. If the ceiling alone is given treatment of a material of $\alpha = 0.6$, how much noise level reduction will take place? 10

8. In a room of $8' \times 8' \times 8'$ the ceiling has spray paint of $\alpha = 0.7$ and α of walls and floor is 0.02 . If the two adjacent walls are covered by panels of $\alpha = 0.85$, find the noise reduction achieved. 10
9. What is acoustics? Why acoustics as a subject is studied in architecture? 5+5=10

OR

Write short notes on : 10
Sound in Flat, Concave and Convex Surfaces with sketches.
