

Reg. No.

**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION – NOVEMBER 2019**  
**SUBJECT: ARC 311 - BUILDING SERVICES III**  
**(2014/2010 SCHEME)**

Tuesday, November 26, 2019

Time: 10:00 - 13:00 Hrs.

Max. Marks: 50

- ✗ Answer any FIVE questions.  
✗ Support your answers with neat sketches wherever it is required.

1A. Explain in detail the components in a Compression Refrigeration Cycle and their functions.

1B. What is ventilation? What are the factors affecting ventilation? Explain briefly.

(6+4 = 10 marks)

2A. Explain in detail the classification of typical ductable packaged AC Systems with sketches.

2B. Explain the design considerations for Noise control in HVAC system.

(6+4 = 10 marks)

3A. Differentiate the following phenomena with reference to acoustic performance of buildings:

- i) Echo      ii) Flutter Echo      iii) Creep

3B. Explain how structure borne noise can be controlled through design and planning.

(6+4 = 10 marks)

4A. Differentiate between the acoustical considerations for the design of auditoriums and sound recording studios.

4B. What is sound absorption coefficient of a material? Explain the sound absorbing treatment of walls with the help of sketches.

(6+4 = 10 marks)

5A. Explain how fire safety in a building can be enhanced by building automation systems.

5B. Explain the strategy for energy management in lighting control with reference to intelligent buildings.

(6+4 = 10 marks)

6. Write short notes on any FOUR of the following:

6A. Reticulated Gas System

6B. Wavelength and Frequency of Sound

6C. Sabine's formula

6D. Types of diffusers

6E. Cooling Tower in Air Conditioning systems

(2½ marks × 4 = 10 marks)

