

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)**

**CLASS:** B.Arch  
**BRANCH:** Architecture

**SEMESTER :** Vth  
**SESSION :** MO/2025

**SUBJECT: AR302 BUILDING SERVICES-III (MECH. & FIRE SAFETY)**

**TIME:** 3 Hours

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Discuss the role of the fire rescue deck and the conditions of its location in a skyscraper building of 80 floors.	[5] 4	1,3
Q.1(b)	State the correlation between the fire zone of a city and the construction type.	[5] 4	2,5
Q.2(a)	Differentiate between car dimension, hoist-way dimension, and lift door width by drawing neat Sketches. Draw a section of the lift to identify the pit well and the machine room.	[5] 3	1,2
Q.2(b)	A residential building has 8 apartments, each with an average population of 5 people. If the recommended handling capacity of the lift for the residential building is 15%, then how many lifts with a 4-person capacity should be installed in the building?	[5] 3	3
Q.3(a)	In a bakery, if 20 chefs are working in a kitchen workshop having a volume of 500 cubic meters, what will be the ventilation intensity to achieve the desirable minimum rate of fresh air flow rate of 10 air changes per hour?	[5] 2	6
Q.3(b)	Explain the importance of incorporating the concept of time lag in the cooling load calculation process.	[5] 5	3,5
Q.4(a)	Describe various components of AHU with the help of a neat sketch. Suggest a suitable location for placing the AHU in a large office building.	[5] 1	3,4
Q.4(b)	Discuss the concept of pressure and temperature loss in a ducting system and explain precautions for reducing pressure and temperature loss.	[5] 2	2,3
Q.5(a)	Explain the concept of adiabatic cooling using the Psychrometric table.	[5] 5	1,2
Q.5(b)	Illustrate a water-based centralized HVAC system for a multi-story building with a basement, and locate the chiller plant, pump room, AHU, and cooling tower, along with a suitable supply and return ducting system.	[5] 1	2,6

:::24/11/2025:::M