



Name: Roll No.:

Branch: Signature of Invigilator:

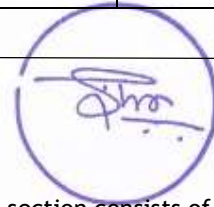
Semester: VIth

Date: 02/05/2022 (MORNING)

Subject with Code: AR302 BUILDING SERVICES - III

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(End SEMESTER EXAMINATION)

CLASS: B. ARCH (open Elective)

SEMESTER: VI th

BRANCH: Architecture

SESSION : SP/2022

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

TIME: 2 HOURS

FULL MARKS: 50

Part A: Choose the most appropriate response for the multiple-choice questions Below.

(30 Marks).

1. The top of the signage at lift landing shall not be above 1.8 m from the floor level.

- a) True b) False.

2. Clear width less than 250 mm shall not be counted for exit width of fire door

- a) True b) False.

3. Which condition does not increase pressure loss in ducts

- a) Large airflow
b) High air velocity
c) Long length of ducts
d) Large diameter ducts

4. Movement from point 4 to 5 is

- a) Sensible Cooling
b) Sensible Heating
c) Latent Cooling
d) Latent heating

5. The science of study of the thermodynamic properties of a mixture of dry air and water vapour in the atmosphere is called

- a) Refrigeration
b) Psychrometry
c) Air conditioning
d) None of the above

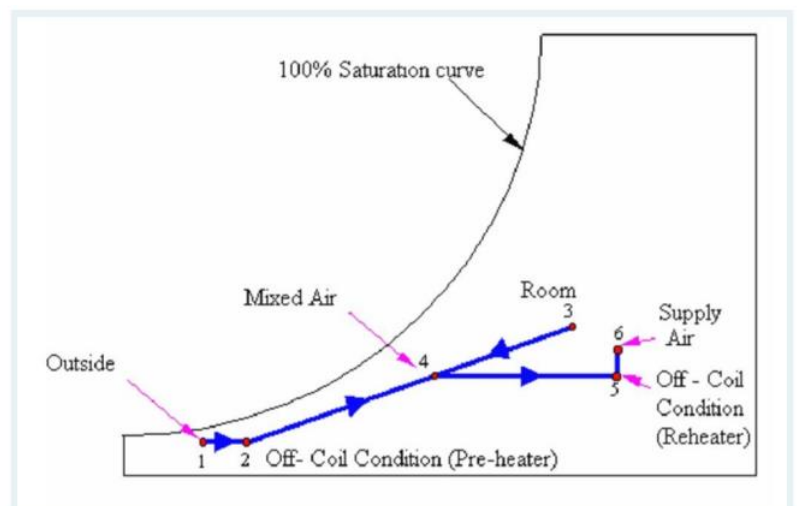


Figure 1 Psychrometric Chart

6. Looking at the Fig 1 Answer: Which of the below point will have highest relative humidity

- a) 3
- b) 4
- c) 5
- d) 6

7. The return air is mixed with fresh air in the feed of the air conditioning process for

- a) Energy efficiency
- b) For reducing load on air conditioner
- c) For getting benefits of the embedded temperature of return air
- d) All the above

8. Looking at the Fig 1 Answer: Which of the below point will have highest enthalpy

- a) 3
- b) 4
- c) 5
- d) 1

9. Looking at the Fig 1 Answer: Which of the below point will have highest value of absolute moisture content

- a) 3
- b) 4
- c) 5
- d) 6

10. Lift landing doors shall be imperforate and shall have a minimum fire resistance rating of

- a) 50 minutes
- b) 30 minutes
- c) 70 minutes
- d) 60 minutes

11. Greater the Bypass factor of coil better will be its air conditioning (1 Point)

- a) True
- b) False

12. Buildings erected in Fire Zone No. 3 shall conform to construction of Type 1 or 2. (1 Point)

- a) True
- b) False

13. For excellent quality of service the time between successive car arrivals at the main terminal floor should be

- a) Less than 25 seconds
- b) More than 25 seconds

- c) Less than 30 seconds
- d) Less than 45 seconds

14. In case of Hot and Dry climate

- 1. Dry bulb temperature is high, but the humidity ratio is low.
- 2. Here the evaporative coolers will be most advantageous.
- 3. Both are true
- 4. None

15. Quantity of Service is measured in terms of the total number of passengers handled during the

- a) peak 5 min period of the day
- b) peak 15 min period of the day
- c) peak 30 min period of the day
- d) None of above

16 Foam or dry chemical powder can be used to control fires under

- a) Class B only
- b) Class C only
- c) Both Class B and Class C
- d) None of above

17 Determination of number of lifts depends on the required

- a) Quantity of service.
- b) Quality of service.
- c) Both quality and quantity of service.
- d) Not dependent on quality and quantity of service.

18 Unless otherwise specified, all exits and exit passageway to exit discharge shall have a clear height of

- a) 3 m
- b) 2.4 m
- c) 2.1 m
- d) 2.7 m

19 For fully sprinkled residential building minimum travel distance to fire exit in type 1 and type 2 construction is

- a) 30 m
- b) 45 m
- c) 22.50 m
- d) 25 m

20 The supply air flow rate for a room having volume of 55 cubic meter needing a ventilation intensity of 8 per hour will be _____ m³/h

- a) 300
- b) 440
- c) 460
- d) None of above

21. Observe the two statement and answer

1.Up peak is a mode designed for situations where the majority of the demand for the elevator(s) is upwards(for example an office building at the start of a workday).

2. Handling Capacity (HC) -The number of passengers that a lift system can theoretically transport during the up-peak traffic condition with car occupancy of 90 percent of the actual capacity expressed as a percent of the total building population.

- a) Both 1 and 2 are correct
- b) Both 1 and 2 are incorrect
- c) 1 is correct and 2 is incorrect
- d) 1 is incorrect and 2 is correct

22. If at point A the air is at temperature of 25 °C, at point B the air is at temperature of 35 °C, at point C the air is at temperature of 15 °C, and at point D the air is at temperature of 5 °C. At which point the air can hold maximum amount of moisture in kg

- a) Point A
- b) Point B
- c) Point C
- d) Option D

23 The door width of lifts for hospitals should be between (1 Point)

- a) 900-1100 mm
- b) less than 900 mm
- c) 1200 mm
- d) 800-900 mm

24 Greater the velocity of air moving through the duct, higher the Bypass factor will be (1 Point)

- a) True
- b) False

25 Which of the following statement is correct?

- a) The constant enthalpy lines are also constant wet bulb temperature lines
- b) The wet bulb and dry bulb temperature are equal at saturation condition
- c) The wet-bulb temperature is a measure of enthalpy of moist air
- d) All of the above

26 Temporary buildings and structures shall be permitted only in (1 Point)

- a) Fire Zones No. 1

- b) Fire Zones No. 2
- c) Fire Zones No. 3
- d) Fire Zones No. 1 and Zones No. 2.

27. Ride quality of the elevator system is affected by

- b) Vibration
- c) Noise
- d) Deceleration
- e) All the above

28. For infectious areas like operation theatre, the adequate air distribution system will be

- a) Natural Ventilation
- b) Displacement Ventilation
- c) Unidirectional Displacement Ventilation
- d) Air mixing

29. If at point A the air is at temperature of 25 °C, at point B the air is at temperature of 35 °C, at point C the air is at temperature of 15 °C, and at point D the air is at temperature of 5 °C. If at all the points same weight of moisture is present, which point will have maximum relative humidity.

- a) Point A
- b) Point B
- c) Point C
- d) Option D

30. The rate at which heat must be removed from a space to maintain air temperature and humidity at the design values is

- a) Space Heat loss
- b) Space Cooling load
- c) Sensible cooling
- d) Latent cooling

Part B: Answer briefly. (20 Marks).

1. Describe concept of Air changes per hour. Compare case of a bakery and church to predict their possible Air change per hour requirements. (2 Marks)
2. How does mechanical ventilation have affected the global environment? (2 Marks)
3. Space heat gain is not equal to cooling load, explain. (2 Marks)
4. If there are 50 persons working in a hall of a workshop having a volume of 500 cubic meters, what will be the ventilation intensity to achieve desirable minimum rate of fresh air flow of 25 cubic meters per person. (2 Marks)
5. Compare modular and compact units of AHU. (3 Marks)
6. Explain process of summer air conditioning with the help of neat sketch. (3 Marks)
7. Fire protection requirements for high rise buildings Evacuation Lifts. (4 Marks)
8. Draw Two, Three, Four car elevator arrangement. (2 Marks)