

AAH501 -BUILDING SERVICES II

PART A

UNIT 1

Multiple Choice Questions

1. lift is primarily used for:
A) Horizontal transportation
B) Vertical transportation
C) Water supply
D) Ventilation
2. The enclosed vertical space in which a lift moves is called the:
A) Lift pit
B) Lift well (shaft)
C) Machine room
D) Guide rail
3. Which component balances the weight of the lift car?
A) Governor
B) Counterweight
C) Buffer
D) Pulley
4. Which lift is specially designed for carrying patients on stretchers?
A) Goods lift
B) Service lift
C) Hospital lift
D) Fire lift
5. Which type of lift is commonly used in low-rise buildings?
A) Hydraulic lift
B) Traction lift
C) Pneumatic lift
D) Service lift
6. Guide rails are used to:
A) Increase lift speed
B) Guide the lift car safely
C) Reduce electricity consumption
D) Decorate the lift shaft
7. Which of the following is a safety device in a lift?
A) Buffer
B) Handrail
C) Comb plate
D) Balustrade
8. Escalators are mainly used for:
A) Transporting goods
B) Continuous movement of people
C) Water transport
D) Air circulation

9.The standard inclination of an escalator is approximately:

- A) 15°
- B) 30°
- C) 45°
- D) 60°

10.Which component of an escalator moves with the passengers?

- A) Handrail
- B) Steps
- C) Truss
- D) Motor

11.The structural frame supporting an escalator is called:

- A) Truss
- B) Guide rail
- C) Shaft
- D) Counterweight

12.Which building commonly requires several escalators?

- A) Small residence
- B) Shopping mall
- C) Farmhouse
- D) Warehouse

13.A conveyor is mainly used for:

- A) Passenger transport
- B) Material handling
- C) Water supply
- D) Fire protection

14.Which conveyor is widely used in airports for baggage handling?

- A) Screw conveyor
- B) Belt conveyor
- C) Bucket conveyor
- D) Chain conveyor

15.Which conveyor is suitable for powdered materials?

- A) Roller conveyor
- B) Screw conveyor
- C) Chain conveyor
- D) Overhead conveyor

16.Which lift is intended for transporting heavy materials?

- A) Passenger lift
- B) Goods lift
- C) Hospital lift
- D) Fire lift

17.Which of the following is NOT a component of a lift?

- A) Counterweight
- B) Guide rail
- C) Balustrade
- D) Lift car

18. Escalators are preferred because they:

- A) Require passengers to wait
- B) Move continuously
- C) Operate only during emergencies
- D) Need manual operation

19. The electric motor in a lift is used to:

- A) Open doors
- B) Drive the lift
- C) Increase ventilation
- D) Provide lighting

20. Which conveyor is best suited for moving boxes in warehouses?

- A) Roller conveyor
- B) Bucket conveyor
- C) Pneumatic conveyor
- D) Screw conveyor

21. Fire-resistant construction is essential for:

- A) Lift well
- B) Conveyor belt
- C) Escalator steps
- D) Handrail

Analytical MCQs

1. A hospital is planning a new building where patients on stretchers must be transported comfortably. Which lift should be installed?

- A) Passenger lift
- B) Service lift
- C) Hospital lift
- D) Dumbwaiter

2. A shopping mall expects thousands of visitors every day between floors. Which system provides the most efficient continuous movement?

- A) Goods lift
- B) Escalator
- C) Bucket conveyor
- D) Dumbwaiter

3. An industrial plant needs to move cement powder continuously. Which conveyor is the most suitable?

- A) Roller conveyor
- B) Screw conveyor
- C) Chain conveyor
- D) Overhead conveyor

4. A six-storey office building requires an energy-efficient passenger transportation system for frequent use. Which lift type is generally preferred?

- A) Hydraulic lift
- B) Traction lift
- C) Dumbwaiter
- D) Goods lift

5. During lift maintenance, engineers inspect the guide rails carefully because they:

- A) Support building walls
- B) Ensure smooth and safe movement of the lift car
- C) Reduce electricity bills
- D) Operate landing doors

6. A warehouse transports cartons from one packing section to another on a flat moving surface.

Which equipment is most appropriate?

- A) Belt conveyor
- B) Hospital lift
- C) Passenger lift
- D) Escalator

7. A fire-resistant enclosed shaft is required mainly to:

- A) Improve decoration
- B) Protect lift users and equipment during fire
- C) Increase lift speed
- D) Reduce maintenance

8. An airport wants to transport passengers smoothly between arrival and departure levels without waiting. Which system is most suitable?

- A) Goods lift
- B) Escalator
- C) Screw conveyor
- D) Bucket conveyor

9. A factory must transport heavy machine parts along a production line. Which conveyor is generally the best choice?

- A) Belt conveyor
- B) Chain conveyor
- C) Pneumatic conveyor
- D) Vibrating conveyor

UNIT II

Multiple Choice Questions

1. Ventilation is the process of:

- A) Increasing humidity only
- B) Supplying fresh air and removing stale air
- C) Heating a building
- D) Reducing room size

2. Which type of ventilation uses wind and temperature differences?

- A) Mechanical ventilation
- B) Natural ventilation
- C) Exhaust ventilation
- D) Balanced ventilation

3. Which of the following is NOT a method of natural ventilation?

- A) Windows
- B) Roof ventilators
- C) Exhaust fan
- D) Louvers

4. Mechanical ventilation mainly uses:

- A) Sunlight
- B) Fans and blowers
- C) Trees
- D) Roof openings

5. Which factor is most important for thermal comfort?

- A) Wall colour
- B) Temperature
- C) Ceiling height
- D) Floor finish

6. The recommended indoor relative humidity for comfort is:

- A) 10–20%
- B) 20–30%
- C) 40–60%
- D) 80–100%

7. Refrigeration is the process of:

- A) Producing electricity
- B) Removing heat from a low-temperature space
- C) Increasing humidity
- D) Compressing air only

8. Which component compresses the refrigerant?

- A) Evaporator
- B) Condenser
- C) Compressor
- D) Expansion valve

9. The condenser in a refrigeration system:

- A) Absorbs heat from the room
- B) Rejects heat to the surroundings
- C) Produces cooling directly
- D) Stores refrigerant

10. Which device controls room temperature automatically?

- A) Humidifier
- B) Thermostat
- C) Air filter
- D) Blower

11. Which equipment increases moisture in indoor air?

- A) Dehumidifier
- B) Humidifier
- C) Compressor
- D) Condenser

12. The primary function of an air filter is to:

- A) Increase room temperature
- B) Remove dust and contaminants
- C) Reduce humidity only
- D) Produce fresh air

13. Which air filter provides very high filtration efficiency?

- A) Mesh filter
- B) HEPA filter
- C) Carbon brush
- D) Nylon screen

14. A fan generally delivers:

- A) High-pressure air
- B) Low-pressure, high-volume air
- C) Steam
- D) Refrigerant

15. A blower delivers:

- A) Air at higher pressure than a fan
- B) Refrigerant gas
- C) Water under pressure
- D) Hot oil

16. Local heating is suitable for:

- A) Heating an entire city
- B) Heating one room or a small area
- C) Cooling buildings
- D) Industrial refrigeration

17. Which system distributes heat from one central location?

- A) Local heating
- B) Central heating
- C) Window ventilation
- D) Natural cooling

18. Which equipment is commonly used in central heating systems?

- A) Boiler
- B) Ceiling fan
- C) Window AC
- D) Water cooler

19. Which of the following is an advantage of mechanical ventilation?

- A) Depends entirely on wind
- B) Controlled airflow
- C) No electricity required
- D) No maintenance required

20. During winter, indoor heating often reduces:

- A) Humidity
- B) Air pressure
- C) Oxygen concentration
- D) Carbon dioxide concentration

21. Air filtration in HVAC systems mainly improves:

- A) Building height
- B) Indoor air quality
- C) Lift speed
- D) Lighting intensity

Analytical MCQs

22. A hospital operation theatre requires extremely clean air with minimal dust and microorganisms. Which filter is the most appropriate?

- A) Mesh filter
- B) HEPA filter
- C) Nylon filter
- D) Carbon screen

23. A warehouse has no windows and experiences poor air circulation. Which ventilation system is the most suitable?

- A) Natural ventilation only
- B) Mechanical ventilation with exhaust and supply fans
- C) Open roof only
- D) Skylights only

24. An office building maintains a temperature of 25°C but employees still feel uncomfortable because the relative humidity is 85%. Which equipment should be used?

- A) Humidifier
- B) Dehumidifier
- C) Boiler
- D) Radiator

25. A refrigeration technician observes that the refrigerant is not being compressed properly. Which component is most likely faulty?

- A) Compressor
- B) Air filter
- C) Thermostat
- D) Evaporator fan

26. A shopping mall requires continuous circulation of large quantities of air at low pressure. Which equipment should be selected?

- A) Boiler
- B) Fan
- C) Compressor
- D) Radiator

27. A textile factory generates dust during production. To improve indoor air quality and protect workers, the ventilation system should include:

- A) Decorative grilles only
- B) Air filters with mechanical ventilation
- C) Additional lighting
- D) Roof insulation only

28. A homeowner wants to heat only one bedroom during winter without heating the entire house. Which system is most economical?
- A) Central heating
 - B) Local heating using an electric room heater
 - C) Steam boiler system
 - D) Heat distribution ducts throughout the house
29. During winter, occupants complain of dry skin and throat irritation after the heating system operates continuously. What is the best solution?
- A) Increase heating temperature further
 - B) Install a humidifier
 - C) Replace the air filter only
 - D) Increase fan speed continuously
30. A multi-storey office building requires uniform heating in all rooms with automatic temperature control. Which combination is most appropriate?
- A) Portable electric heaters in every room
 - B) Central heating system with boilers and thermostats
 - C) Natural ventilation only
 - D) Window air conditioners only

UNIT III

Multiple Choice Questions

1. Air conditioning is the process of controlling:
- A) Temperature only
 - B) Humidity only
 - C) Temperature, humidity, air purity, and air movement
 - D) Lighting only
2. Which component compresses the refrigerant in an air-conditioning system?
- A) Evaporator
 - B) Condenser
 - C) Compressor
 - D) Expansion valve
3. The main function of the evaporator is to:
- A) Reject heat to the atmosphere
 - B) Compress refrigerant
 - C) Absorb heat from indoor air
 - D) Store refrigerant
4. Which air-conditioning system is most suitable for cooling a single room?
- A) Chilled water system
 - B) Package unit
 - C) Window air conditioner
 - D) Central air-conditioning system

5. A split air conditioner consists of:

- A) One indoor unit only
- B) One outdoor unit only
- C) Indoor and outdoor units
- D) A cooling tower only

6. In a Direct Expansion (DX) system, the refrigerant:

- A) Cools water first
- B) Directly cools the air in the evaporator
- C) Produces steam
- D) Passes through a cooling tower only

7. Which air-conditioning system is commonly used in hospitals and large commercial buildings?

- A) Window AC
- B) Split AC
- C) Chilled water system
- D) Portable AC

8. The primary purpose of air ducts is to:

- A) Carry water
- B) Distribute conditioned air
- C) Store refrigerant
- D) Reduce humidity only

9. A Fan Coil Unit (FCU) mainly consists of:

- A) Compressor and condenser
- B) Fan and cooling/heating coil
- C) Cooling tower and pump
- D) Diffuser and filter only

10. Diffusers are used to:

- A) Compress refrigerant
- B) Distribute conditioned air evenly
- C) Remove dust from water
- D) Store air

11. Cooling towers are mainly used in:

- A) Window AC units
- B) Split AC units
- C) Chilled water systems
- D) Portable air coolers

12. Which device provides centralized monitoring and control of building services?

- A) CCTV
- B) BMS
- C) FCU
- D) DX System

13. The primary purpose of an access control system is to:

- A) Improve lighting
- B) Restrict entry to authorized persons
- C) Increase ventilation
- D) Reduce humidity

14. CCTV stands for:

- A) Central Camera Television Technology
- B) Closed-Circuit Television
- C) Computer Controlled Television
- D) Central Control Video Terminal

15. Which CCTV camera is commonly installed on ceilings in offices and malls?

- A) Hidden camera
- B) Dome camera
- C) Bullet (wall) camera
- D) PTZ camera

16. Which CCTV camera is generally used for long-distance outdoor surveillance?

- A) Dome camera
- B) Hidden camera
- C) Wall (Bullet) camera
- D) Web camera

17. Which device stores CCTV recordings?

- A) Thermostat
- B) DVR/NVR
- C) Compressor
- D) Diffuser

18. Intruder alarms are mainly used to:

- A) Improve cooling efficiency
- B) Detect unauthorized entry
- C) Reduce electricity consumption
- D) Control humidity

19. Which of the following is a biometric access control method?

- A) Password only
- B) Fingerprint recognition
- C) CCTV recording
- D) Security fencing

20. Which system is responsible for controlling HVAC, lighting, fire alarms, and security from one location?

- A) DX System
- B) BMS
- C) Split AC
- D) Cooling tower

21. One major benefit of a Building Management System (BMS) is:

- A) Increased fuel consumption
- B) Reduced energy consumption
- C) Increased maintenance cost
- D) Elimination of air conditioning

Analytical MCQs

22. A five-star hotel requires centralized cooling for hundreds of rooms with efficient energy management. Which air-conditioning system is most suitable?
- A) Window AC
 - B) Split AC
 - C) Chilled water system
 - D) Portable air conditioner
23. A homeowner wants an air conditioner that is quiet, aesthetically pleasing, and suitable for a bedroom. Which system should be recommended?
- A) Package AC
 - B) Split AC
 - C) Window AC
 - D) Chilled water system
24. During maintenance, technicians find that conditioned air is not reaching several rooms because of leakage in the air distribution system. Which component should be inspected?
- A) Cooling tower
 - B) Ducts
 - C) Compressor
 - D) Condenser
25. A shopping mall wants to maintain uniform cooling while minimizing energy consumption across multiple floors. Which system is the best choice?
- A) Window AC units in every shop
 - B) Chilled water central air-conditioning system
 - C) Portable air coolers
 - D) Room heaters
26. A residential apartment owner wants to monitor visitors, entrances, and parking areas remotely using a smartphone. Which security system should be installed?
- A) Fire extinguisher
 - B) CCTV system with internet-enabled DVR/NVR
 - C) Smoke detector only
 - D) Window AC
27. A bank requires that only authorized employees can enter the vault using fingerprint authentication. Which system is most appropriate?
- A) Intruder alarm
 - B) Access control system with biometric authentication
 - C) Dome camera only
 - D) Fire alarm system
28. An office building wants to automatically control HVAC, lighting, elevators, and security from a central computer. Which system should be implemented?
- A) Package AC
 - B) Building Management System (BMS)
 - C) Split AC system
 - D) Exhaust ventilation system

29. A warehouse manager wants to detect unauthorized entry at night and immediately trigger a siren. Which security device is most suitable?

- A) Fan Coil Unit
- B) Intruder alarm with motion sensors
- C) Cooling tower
- D) Diffuser

30. A factory requires outdoor surveillance over a long boundary wall with weather-resistant cameras. Which CCTV camera type is the best choice?

- A) Hidden camera
- B) Dome camera
- C) Wall (Bullet) camera
- D) Webcam

UNIT IV

Multiple Choice Questions

1. Fire is a rapid chemical reaction involving:

- A) Water and oxygen
- B) Fuel, oxygen, and heat
- C) Nitrogen and carbon dioxide
- D) Air and steam

2. The three essential elements required for a fire are collectively known as the:

- A) Fire Circle
- B) Fire Triangle
- C) Safety Triangle
- D) Combustion Cycle

3. Which of the following is the most common cause of fire in buildings?

- A) Proper ventilation
- B) Electrical short circuits
- C) Rainwater leakage
- D) Air conditioning

4. Fire spreads mainly through:

- A) Conduction, convection, and radiation
- B) Evaporation and condensation
- C) Diffusion only
- D) Reflection only

5. The primary objective of fire protection is to:

- A) Increase building height
- B) Protect life and property
- C) Improve ventilation
- D) Reduce humidity

6. Which fire extinguisher is commonly used for electrical fires?

- A) Water extinguisher
- B) Foam extinguisher
- C) CO₂ extinguisher
- D) Sand only

7. Which extinguisher is suitable for Class A fires involving wood and paper?

- A) Water extinguisher
- B) CO₂ extinguisher
- C) Dry powder only
- D) Halon extinguisher

8. Fire resistance of a building material refers to its ability to:

- A) Conduct electricity
- B) Resist fire for a specified time
- C) Absorb moisture
- D) Prevent corrosion

9. Combustible materials are materials that:

- A) Cannot burn
- B) Burn easily when exposed to heat or flame
- C) Dissolve in water
- D) Conduct heat rapidly

10. Which equipment supplies water through pipelines for firefighting in multi-storey buildings?

- A) Wet riser
- B) Fire bucket
- C) Smoke detector
- D) Fire blanket

11. A dry riser is:

- A) Always filled with water
- B) Filled with sand
- C) Normally empty and charged with water during firefighting
- D) Used only for drainage

12. Automatic sprinklers operate when:

- A) Smoke is detected anywhere in the building
- B) The sprinkler head reaches a preset temperature
- C) The fire alarm is switched on manually
- D) The building power fails

13. Smoke detectors are primarily used to:

- A) Extinguish fire
- B) Detect smoke at an early stage of fire
- C) Supply water
- D) Block escape routes

14. Fire dampers are installed in:

- A) Water tanks
- B) Air-conditioning ducts
- C) Lift cars
- D) Staircases only

15. The main purpose of a fire door is to:
- A) Improve ventilation
 - B) Prevent the spread of fire and smoke
 - C) Decorate the building
 - D) Reduce lighting
16. Fire curtains are mainly used to:
- A) Block sunlight
 - B) Prevent the spread of fire and smoke between spaces
 - C) Reduce noise
 - D) Improve cooling
17. The National Building Code (NBC) provides:
- A) Agricultural regulations
 - B) Building safety and fire safety guidelines
 - C) Railway regulations
 - D) Traffic rules only
18. A fire escape route should be:
- A) Locked during working hours
 - B) Clearly marked and unobstructed
 - C) Used for storage
 - D) Accessible only to security staff
19. Which of the following is an element of a fire escape system?
- A) Emergency staircase
 - B) Cooling tower
 - C) Fan coil unit
 - D) Split AC
20. Which fire protection system activates automatically without human intervention?
- A) Fire bucket
 - B) Automatic sprinkler system
 - C) Hose reel only
 - D) Fire blanket
21. The main purpose of fire safety planning in building design is to:
- A) Reduce construction cost only
 - B) Ensure safe evacuation and minimize fire damage
 - C) Increase floor area
 - D) Improve aesthetics only

Analytical MCQs

22. A fire starts in an electrical control room containing live electrical equipment. Which extinguisher should be used first?
- A) Water extinguisher
 - B) Foam extinguisher
 - C) CO₂ extinguisher
 - D) Sand bucket filled with water

23. A 15-storey commercial building requires a permanent water supply system for firefighters. Which installation is most appropriate?

- A) Dry riser only
- B) Wet riser system
- C) Fire bucket system
- D) Portable extinguisher only

24. During a fire, smoke begins spreading rapidly through the air-conditioning ducts into other rooms. Which safety device helps prevent this spread?

- A) Smoke detector
- B) Fire damper
- C) Fire blanket
- D) Hose reel

25. A shopping mall requires automatic fire suppression even when no one is present. Which system should be installed?

- A) Manual fire buckets
- B) Automatic sprinkler system
- C) Portable extinguishers only
- D) Sand buckets only

26. During an emergency evacuation, people must leave the building quickly without confusion. Which design feature is most important?

- A) Decorative lighting
- B) Clearly marked and unobstructed fire escape routes
- C) Large windows only
- D) Carpeted corridors

27. A hospital requires doors that can delay the spread of fire and smoke between wards, allowing more time for evacuation. Which doors should be installed?

- A) Sliding glass doors
- B) Fire-rated doors
- C) Wooden panel doors
- D) Revolving doors

28. A warehouse stores highly combustible materials such as paper and cardboard. Which preventive measure is most important?

- A) Increase storage density
- B) Install automatic sprinklers and smoke detectors
- C) Keep emergency exits locked
- D) Turn off ventilation permanently

29. A residential apartment building wants to detect fire at the earliest stage before flames become visible. Which device should be installed?

- A) Fire hose reel
- B) Smoke detector
- C) Wet riser
- D) Fire curtain

30. While designing a high-rise office building, the engineer must comply with Indian fire safety regulations regarding fire exits, fire resistance, and firefighting systems. Which document should be followed?

- A) Indian Penal Code (IPC)
- B) National Building Code (NBC) of India

- C) Motor Vehicles Act
- D) Factories Act only

UNIT V

Multiple Choice Questions

1. Building acoustics deals with the:
 - A) Strength of buildings
 - B) Behaviour and control of sound in buildings
 - C) Water supply system
 - D) Electrical wiring
2. The unit of sound intensity level is:
 - A) Watt
 - B) Decibel (dB)
 - C) Pascal
 - D) Newton
3. The audible frequency range for a healthy human ear is approximately:
 - A) 2–200 Hz
 - B) 20–20,000 Hz
 - C) 200–2,000 Hz
 - D) 2,000–50,000 Hz
4. Which characteristic of sound determines whether it is high-pitched or low-pitched?
 - A) Loudness
 - B) Frequency
 - C) Intensity
 - D) Echo
5. Loudness of sound mainly depends on its:
 - A) Frequency
 - B) Amplitude
 - C) Wavelength
 - D) Velocity
6. Which of the following is NOT an acoustic defect?
 - A) Echo
 - B) Reverberation
 - C) Flutter echo
 - D) Illumination
7. Echo occurs when reflected sound reaches the listener after approximately:
 - A) Less than 0.01 s
 - B) More than 0.1 s
 - C) More than 1 minute
 - D) More than 5 minutes

8. Excessive persistence of sound after the source has stopped is called:

- A) Reflection
- B) Reverberation
- C) Refraction
- D) Diffraction

9. Which material is commonly used for sound absorption?

- A) Concrete
- B) Glass wool
- C) Granite
- D) Steel plate

10. Acoustic tiles are mainly installed to:

- A) Increase room temperature
- B) Absorb sound and reduce reverberation
- C) Improve lighting
- D) Support the roof

11. Which material has good sound insulation properties?

- A) Hollow plywood sheet
- B) Dense brick wall
- C) Thin metal sheet
- D) Wire mesh

12. The main purpose of sound insulation is to:

- A) Increase sound within a room
- B) Prevent sound transmission between spaces
- C) Improve ventilation
- D) Reduce lighting intensity

13. Which building requires the highest level of acoustic treatment?

- A) Warehouse
- B) Cinema theatre
- C) Parking garage
- D) Workshop

14. Reverberation time should generally be:

- A) Excessively long
- B) Optimized according to room function
- C) Zero in every building
- D) The same for all buildings

15. Which room requires excellent speech clarity?

- A) Cold storage
- B) Seminar hall
- C) Garage
- D) Boiler room

16. In a conference hall, sound-absorbing materials are mainly provided on:

- A) Floors only
- B) Walls and ceilings
- C) Roof only
- D) Windows only

17. Which building requires sound insulation to protect stored products from external noise and vibration?

- A) Cold storage unit
- B) Bus stand
- C) Warehouse yard
- D) Parking area

18. Noise control in buildings can be achieved by:

- A) Increasing openings
- B) Using sound-absorbing materials
- C) Removing wall finishes
- D) Using thinner walls

19. Which of the following is an example of a sound-absorbing material?

- A) Acoustic foam
- B) Marble slab
- C) Steel plate
- D) Aluminium sheet

20. Practical noise control includes:

- A) Sealing gaps around doors and windows
- B) Increasing traffic around the building
- C) Removing insulation materials
- D) Installing reflective metal panels everywhere

21. During the preparation of an acoustic layout for a lecture hall, the seating arrangement should ensure:

- A) Maximum echo
- B) Clear sound distribution to all listeners
- C) Minimum visibility of the speaker
- D) Uneven sound reflection

Analytical MCQs

22. A newly constructed cinema theatre has excessive echo, making dialogues difficult to understand. Which corrective measure is most appropriate?

- A) Install polished granite wall panels
- B) Add acoustic panels and sound-absorbing ceiling materials
- C) Increase ceiling height only
- D) Replace seats with metal chairs

23. A lecture hall experiences excessive reverberation during classes. Which solution will improve speech clarity?

- A) Install glass wall panels
- B) Provide acoustic ceiling tiles and wall absorbers
- C) Increase loudspeaker volume only
- D) Remove curtains and carpets

24. A conference room is located beside a busy highway. To minimize traffic noise inside the room, which design feature is most effective?

- A) Thin glass windows
- B) Double-glazed windows with insulated walls
- C) Open windows for ventilation
- D) Metal partitions only

25. A concert hall is being designed to provide excellent music quality. Which acoustic factor should receive the greatest attention?
- A) Reverberation time appropriate for music
 - B) Maximum room temperature
 - C) Bright wall colours
 - D) Floor slope only
26. A cold storage facility is located next to a noisy industrial area. Which measure helps reduce external noise entering the building?
- A) Lightweight partitions only
 - B) Sound-insulated walls and doors
 - C) Large ventilation openings
 - D) Removing wall insulation
27. During the design of a seminar hall, the architect wants every participant to hear the speaker clearly without distortion. Which layout feature is most important?
- A) Proper seating arrangement with suitable acoustic treatment
 - B) Highly reflective wall finishes throughout
 - C) Large empty hall without furnishings
 - D) Metal ceiling panels only
28. An office meeting room shares a wall with a noisy generator room. Which construction method will best reduce sound transmission?
- A) Single-layer plywood partition
 - B) Thick insulated wall with sound-absorbing material
 - C) Glass partition only
 - D) Open partition with curtains
29. A building owner wants to reduce indoor noise from HVAC equipment. Which measure is most appropriate?
- A) Install vibration isolators and acoustic duct lining
 - B) Increase fan speed continuously
 - C) Remove duct insulation
 - D) Use thinner ducts
30. While preparing the layout of a lecture hall, the engineer must ensure good visibility, proper seating, and uniform sound distribution. Which design approach best satisfies these requirements?
- A) Flat floor with no acoustic treatment
 - B) Sloped seating with sound-absorbing walls and ceiling, and properly positioned loudspeakers
 - C) Metal walls with reflective ceiling only
 - D) Speaker placed behind the audience

PART B

UNIT I

1. Explain the different components of lift. (10 Marks)
2. Explain the various types of lift. (10 Marks)
3. Explain the different types of conveyor. (10 Marks)
4. Discuss in detail the classification of escalator. (10 Marks)

Analytical question

1. a) Arrange the following construction activities in correct order: (5 marks)

- I. Construct lift pit
- II. Construct lift shaft
- III. Install guide rails
- IV. Install lift machine
- V. Install lift car
- VI. Electrical wiring
- VII. Trial run

b) A proposed hospital has: (5 marks)

- Ground + 8 Floors
- OP Block
- ICU
- Emergency Ward
- 600 daily visitors

Determine

- i. suitable lift types
- ii. lift locations

Justify your answer.

UNIT II

10-Mark Questions

1. Explain types of ventilation in buildings. (10 Marks)
2. Explain the mechanical ventilation in buildings in detail. (10 Marks)
3. Discuss the different types of heating equipments. (10 Marks)
4. Define heating and explain the different types of heating. (10 Marks)

Analytical Question

1. a) An air filter has the following specifications: (4 marks)

- Dust Removal Efficiency = 90%
- Service Life = 12 months

Can the filter be safely used after 18 months? Justify your answer.

b) With the details provided below, identify which room requires mechanical ventilation and justify your answer based on comfort conditions. (6 marks)

Room	Occupancy	Window Area (m ²)	Indoor Temperature (°C)	Relative Humidity (%)
Office	10	8	28	60
Classroom	60	12	34	75
Hospital Ward	25	10	24	50

UNIT III

10-Mark Questions

1. A). What is refrigeration? Explain the refrigeration cycle. (5 Marks)
B) Explain the need for security systems. (5 Marks)
2. Explain the Various Systems of Air Conditioning (10 Marks)
3. Explain the Components of CCTV Camera (10 Marks)
4. What is a Building Management System (BMS)? Explain its functions and the benefits. (10 Marks)

Mark Analytical Question

1. a) A new **five-storey hospital** requires: (8marks)

- Operation theatres
- ICU
- Patient wards
- Pharmacy
- Waiting hall
- CCTV surveillance
- Access control
- Building Management System (BMS)

For the above requirements give your recommendation for the following with justification

- i. Suitable AC system
- ii. CCTV types
- iii. Access control system
- iv. BMS functions

b) **Assertion (A):** A chilled water system is more suitable for large commercial buildings than a split AC system.

Reason (R): Chilled water systems provide centralized cooling with better efficiency for large cooling loads.

Choose the correct answer:

- a) Both A and R are true, and R is the correct explanation.
- b) Both A and R are true, but R is not the correct explanation.
- c) A is true, R is false.
- d) A is false, R is true.

(2 marks)

UNIT IV

10-Mark Questions (Descriptive)

1. A) Explain the different methods by which fire spreads in buildings. (5 marks)

B)Explain the fire safety provisions according to the National Building Code (NBC). (5 marks)

2. Describe various fire-fighting equipment

3.explain different methods of extinguishing fire with suitable examples.
(10 Marks)

4. Write short notes on

- a) Sprinkler System (5 Marks)
- b) Smoke Detectors (5 Marks)

Analytical 10 Mark Question

1.a) With the details provided below, Recommend additional fire protection systems required for each building according to NBC and justify your answer. (8 marks)

Building Type	Height (m)	Occupancy	Existing Fire Protection
School	12	500	Fire Extinguishers
Hospital	28	800	Wet Riser + Sprinklers
Shopping Mall	36	2500	Sprinklers + Smoke Detectors
Office	18	700	Dry Riser

b) Arrange the following fire safety planning activities in the correct order: (2 marks)

- i. Identify Fire Hazards
- ii. Select Fire Protection System
- iii. Plan Fire Escape Routes
- iv. Install Fire Safety Equipment
- v. Conduct Inspection and Testing
- vi. Emergency Evacuation Plan

UNIT V
10 Mark Questions

1. discuss the principles of acoustics in buildings. (10 Marks)
2. Explain various acoustic defects in buildings and describe methods to control them. (10 Marks)
3. Describe the acoustic treatment required for cinema theatres and cold storage units. (10 Marks)
4. Write short notes (10 Marks)
 - a) Explain sound insulation
 - b) sound absorption

Analytical 10 Mark Question

1. a) A college is constructing a new academic block containing: (6 marks)
 - Seminar Hall
 - Lecture Hall
 - Conference Hall
 - Auditorium

Prepare a proposal recommending:

- i. Acoustic treatment
- ii. Sound insulation
- iii. Suitable sound-absorbing materials
- iv. Noise control measures
- v. Layout considerations

Justify your recommendations.

b) Arrange the following stages in the correct order: (4 marks)

- i. Identify Building Function
- ii. Estimate Noise Sources
- iii. Select Acoustic Materials
- iv. Design Room Layout
- v. Install Sound Insulation
- vi. Performance Testing

