

18 Question bank

Learning objectives

Study of this chapter will enable the reader to:

1. practice answering short questions from a multiple choice of answers;
2. prepare for tests, assignments and written examinations where this form of questioning is provided;
3. evaluate why some answers are not entirely correct for the question;
4. have discussions with peers and instructors over the meaning of the incorrect answers;
5. lead into further study and investigation;
6. answer a range of questions from the fifth edition.

Key terms and concepts

acronyms 393; data transmission 394; greenhouse 393; heat transfer 394; humidity 394; hydrocarbons 394; insulation 395; inverter 392; low-energy building 393; obesity 393; odours 395; refrigeration 396; sustainability 393; temperature 394; thermal comfort 395.

Introduction

This is a general knowledge section of questions covering topics within the fifth edition. Some questions may require the reader to look up answers in additional resources or use the internet with a search engine. There is only one correct answer to each question unless specified as having more. Incorrect answers may be partially true but not considered by the author to be the entirely correct response for the purpose of this book; these may stimulate additional study, discussion, questioning with peers or the instructor.

Question bank

1. What does inverter mean?
 1. Alternating current phases are reversed.
 2. It is an electronic soft starter for a three-phase motor.

3. Incoming 50 Hz alternating current is digitally reformed into an output frequency to a motor in the range from 0 to 20 000 Hz.
 4. Incoming 50 Hz alternating current is digitally reformed into an output frequency to a motor in the range from 0 to 50 Hz.
 5. Alternating current is electronically converted into direct current to drive a motor.
2. Which of these acronyms is correct?
1. ASHRAE means Australian Society for Heating, Refrigerating and Air Engineering.
 2. AIRAH means American Institute for Refrigeration and Air Heating.
 3. CIBSE stands for The Chartered Institution of Building Services Engineers.
 4. BSRIA stands for British Services Refrigeration Institute for Air Conditioning.
 5. CIC is the Council for Industry and Construction.
3. Does air conditioning lead to obesity? Which of these may not be a valid argument?
1. Obesity is due to overeating.
 2. Obesity is due to working at computers too long each day.
 3. Humans need outdoor environment exposure to regulate body temperature.
 4. Metabolism slows and we eat more in air-conditioned environments.
 5. People eat less when the air around us is very warm.
4. CFD stands for:
1. Comfort for disabled people.
 2. Computational fluid dynamics.
 3. Computer fluid dynamics.
 4. Comfort frequency diagram.
 5. Computer flow diagnostics.
5. What does BREEAM stand for?
1. Building Rehabilitation Electrical Energy Alternative Methodology.
 2. Building Research Establishment Energy Audit Methodology.
 3. Building Recycling Energy Effectiveness Association Member.
 4. Brick Recycling Energy and Environment Assessment Method.
 5. Building Research Establishment Environmental Assessment Method.
6. What does greenhouse rating of a building stand for?
1. The higher the greenhouse gas production due to the building, the higher the greenhouse rating.
 2. A 10-star building produces no greenhouse gases.
 3. Assessed greenhouse gas emission standard of a building.
 4. Greenhouse rating stars awarded are inversely proportional to the tonnes of carbon dioxide created by the building.
 5. An emission standard applied to all types of buildings.
7. What does sustainability mean for low-energy buildings?
1. No such thing as a modern sustainable building.
 2. Everything used in the building's service life comes from globally sustainable resources.
 3. This building is an example of good modern design practice.
 4. All waste output from this building is recycled.
 5. The building has been constructed from organically grown materials.

8. Which correctly describes heat transfer?
 1. Sensible heat transfer comprises all types.
 2. Latent heat transfer raises temperature.
 3. Sensible heat transfer is logged by a thermocouple and thermistor.
 4. Latent heat transfer is hidden from view.
 5. Sensible heat transfer only takes place through conduction and convection.
9. What are fluorinated hydrocarbons used for?
 1. Swimming pool water treatment.
 2. Biocide decontamination of cooling towers.
 3. Ozone-depleting refrigerants.
 4. Non-CFC foam insulation and furnishings.
 5. Combustible gaseous fuel.
10. Which of these is not a common standard for data transmission?
 1. Ethernet.
 2. RS484.
 3. RS232.
 4. RS124.
 5. C-bus.
11. Which is correct about the density of humid air?
 1. Decreases with increasing pressure.
 2. Increases with increasing air temperature.
 3. Varies with air temperature and pressure.
 4. Not affected by humidity.
 5. Increases as air velocity increases.
12. Which is correct about Kelvin?
 1. Name of the engineer who designed the first steam engine.
 2. Unit of heat.
 3. Measured in kJ/kg s.
 4. Temperature scale.
 5. Absolute temperature.
13. Which is correct about low-energy buildings?
 1. A low-energy building is one that requires the minimum amount of primary resource energy to build it.
 2. A low-energy building may consume more energy to construct.
 3. A low-energy building consumes less energy during its 100+ years of use than an equivalent building.
 4. We have no idea what an equivalent building is for a specific site.
 5. All buildings consume uncontrolled amounts of energy.
14. Which of these is where indoor odours, vapours and gases come from? More than one correct answer.
 1. Cleaning fluids used overnight.
 2. New furniture, carpets, floor coverings, sealants and adhesives.

3. Old furniture, carpets and floor coverings.
 4. Personal hygiene products.
 5. Cigarette smoke, diesel engine exhaust, road tar, painting work being done and creosote used on roofing.
15. We sense odours by:
1. Identifying smells.
 2. Breathing onto others.
 3. A measuring instrument.
 4. Tasting them in our mouth.
 5. Olfactory response.
16. Satisfactory air quality may be deemed when:
1. 100% of the full-time occupants are satisfied.
 2. 85% of the full-time occupants are satisfied.
 3. 50% of the full-time occupants are satisfied.
 4. Complaints cease.
 5. Odours have been eliminated.
17. Which is correct about low-energy building designs in the UK?
1. Are always modern and look impressive.
 2. Are always found to be ideally comfortable by users.
 3. Must have large windows and glazed walling.
 4. Must have small windows and high levels of thermal insulation.
 5. Should consume a minimum of primary energy when compared with similar types and sizes of buildings.
18. Thermal comfort *PPD* means?
1. Personal preferences determined.
 2. Personal preferences determination.
 3. Has no meaning.
 4. Percentile people dissatisfied.
 5. Predicted percentage of dissatisfied people.
19. Which of these is economic thickness of thermal insulation?
1. Found by calculation and intersecting lines on a graph for an application.
 2. When graph of capital cost of additional thermal insulation becomes horizontal.
 3. When a graph of energy savings value reaches a peak.
 4. Always occurs when payback from energy cost savings reaches two and a half years.
 5. Thickest amount the building designer can accommodate.
20. What does sustainability mean for low-energy buildings?
1. The mechanical and electrical services within this building all have a low maintenance requirement.
 2. All the water, sewerage, paper and plastic waste output from this building go to recycling.
 3. All the light bulbs and tubes from this building are recyclable.
 4. Somebody has found a good argument why this design of building is less harmful to the global environment than competitive designs.

5. This building has consumed, and will continue to consume, more of the earth's physical resources than it can ever put back.
21. Which might be a means of reducing the refrigeration system energy usage in a small retail premises where food refrigeration, deep freezers and reverse cycle air conditioning are all needed?
1. Install smallest capacity compressors possible.
 2. Carry out frequent maintenance checks and parts replacement.
 3. Switch reciprocating compressors off for as long as possible and maintain wide temperature differentials.
 4. Use same outdoor air-cooled condenser for all three systems.
 5. Variable refrigerant volume scroll compressor with software-controlled digital operation programmable for all variations in year round duties.
22. What have I learnt from this study?
1. Nothing, it is all a fog to me!
 2. Mechanical and electrical services within a building are not very important to the overall concept of the design and construction.
 3. I can design or construct buildings; someone else must worry about the fiddly bits.
 4. The building will work without the mechanical and electrical services anyway.
 5. I now appreciate the importance and main features of the essential and desirable building services!