

SIR ARTHUR LEWIS COMMUNITY COLLEGE
Department of Professional and Lifelong Learning

EXAMINATION SESSION : **Semester Two** (2024/25)
COURSE TUTOR : Mr. Percival Beausoleil
COURSE TITLE : Refrigeration Technology I
COURSE CODE : RAC103
DURATION : 2 HOURS
TIME : 4:00 pm to 6:00 pm
DATE : 30 April, 2025
ROOM : LFT-OR-02
INVIGILATOR : Daniel Jn. Baptiste

INSTRUCTIONS

Section 1: Multiple Choice (60 questions)

Answer all question, one mark for each correct answer.

Section 2: Fill in the blank lines, type Questions. (10 Questions)

Answer all question, one mark for each correct answer.

Section 3: Short answer type Questions.

Two mark for each correct answer. (10mks)

Notes:

$$(C \times \frac{5}{9}) + 32$$

$$\frac{9}{5} \times (F - 32)$$

Section 1 - Multiple Choice

One marks for each correct answer. Use the answer sheet provided. (60mks)

1. Which molecule(s) serve(s) as the base for most modern refrigerants?
 - a. Methane
 - b. Ethane
 - c. Octane
 - d. Both A and B
2. What does the term "dew point" refer to?
 - a. The temperature at which moisture freezes
 - b. The point at which dew forms.
 - c. The temperature at which moisture first starts to condense from the air.
 - d. None of the above
3. Power is defined as the amount of:
 - a. Work performed
 - b. Energy generated
 - c. Work performed per unit time
 - d. Energy generated per unit time
4. Absolute Zero is the temperature at which:
 - a. A substance freezes
 - b. All molecular motion within a substance stops
 - c. Water boils on the Celsius scale
 - d. Ice will melt at atmospheric pressure
5. Which statement is true regarding the atoms in various states of matter?
 - a. Liquids have less molecular attraction than solids
 - b. Fluids have less molecular attraction than vapours
 - c. Solids have less molecular attraction than gases
 - d. Solids and fluids have the same molecular attraction
6. States that the pressure of the gas varies directly with the absolute temperature provided the volume remains constant.
 - a. Boyle's Law
 - b. Dalton's Law
 - c. Charles' Law
 - d. Thermodynamics Law
7. Increased molecular motion in a substance is the result of _____ the substance.
 - a. Decreasing the pressure of
 - b. Heating
 - c. Cooling
 - d. Increasing the volume of
8. Heat transfer through a copper pipe is an example of which type of heat transfer
 - a. Convection
 - b. Conduction
 - c. Radiation
 - d. Condensation
9. The heat content in a substance is measured in:
 - a. Degrees Fahrenheit
 - b. Degrees Celsius
 - c. British Thermal Unit
 - d. Temperature
10. The state of matter that has the weakest molecular bond is:
 - a. Fluids
 - b. Solids
 - c. Gases
 - d. Liquid

11. A gauge reading of 30 psig is equivalent to ____ absolute pressure:
- 15 Pisa.
 - 30 Pisa
 - 45 Pisa
 - 60 Pisa
12. How many ozone molecules can one chlorine atom destroy?
- 1.
 - 10.
 - 1,000.
 - 100,000.
13. The system component that changes refrigerant from low-pressure liquid to a low-pressure vapour is the:
- Compressor
 - Condenser
 - Metering device
 - Evaporator
14. The refrigerant line that connects the condenser to the metering device is the _____ line
- Discharge
 - Expansion
 - Liquid
 - Suction
15. Sub-cooled refrigerants is always at a temperature that is _____ saturation temperature:
- Lower than the condenser
 - Higher than the condenser
 - Lower than the evaporator
 - Higher than the evaporator
16. Fahrenheit absolute scale is called _____.
- Rankine
 - Kelvin
 - Hg
 - Celsius
17. How many watts of electrical power are equal to one horsepower?
- 33,000
 - 15,000
 - 746
 - 640
18. The unit of energy the power company uses to charge customers is the:
- British thermal unit.
 - Joule
 - Horsepower.
 - Kilowatt-hour
19. The temperature reading of 0 degrees Celsius is the same as _____ degrees Fahrenheit.
- 24
 - 48
 - 32
 - 72
20. Work is equal to
- Force by power
 - Force by energy
 - Force by distance
 - Distance by energy

21. R-22 is/was a refrigerant most commonly used in _____ systems
- Residential air-conditioning
 - Light commercial refrigeration
 - Industrial refrigeration.
 - Household refrigeration
22. R-134a is a refrigerant most commonly used in systems.
- Medium temperature
 - Residential air-conditioning
 - Primarily low- temperature
 - All of the above
23. Heat transfer through a vacuum or transparent medium, (without heating the medium), is:
- Convection
 - Conduction
 - Radiation
 - Condensation
24. Good ventilation is important when working around refrigeration equipment because modern refrigerants:
- Are toxic and can poison you.
 - Have a very unpleasant odour.
 - May get on your skin and cause a rash.
 - Are heavier than air and displace the oxygen around you.
25. The temperature reading of 50 degrees Celsius is the same as _____ degrees Fahrenheit.
- 10
 - 50
 - 122
 - 212
26. The temperature reading of 23.8 degrees Celsius is the same as _____ degrees Fahrenheit.
- 144
 - 90
 - 75
 - 100
27. What is the dew point?
- The temperature at which moisture freezes
 - The point at which dew forms.
 - The temperature at which moisture first starts to condense from the air.
 - None of the above
28. The temperature reading of 20 degrees Celsius is the same as _____ degrees Fahrenheit.
- 72
 - 50
 - 68
 - 75
29. The temperature reading of 0 degrees Celsius is the same as _____ degrees Fahrenheit.
- 24
 - 48
 - 32
 - 72
30. The temperature reading of 17.8 degrees Celsius is the same as _____ degrees Fahrenheit.
- 24
 - 16
 - 0
 - 32
31. 4.4⁰C converted to degrees Fahrenheit equals:
- 55
 - 32
 - 40
 - 75

32. The state of the refrigerant at the outlet of the evaporator is:
- Low –pressure , low-temperature vapour.
 - Low –pressure , low-temperature liquid.
 - High –pressure , high-temperature vapour.
 - High –pressure , high-temperature
33. 70 °F converted to degrees Celsius equals:
- 21.1
 - 22.6
 - 98.6
 - 20.3
34. 212 °F converted to degrees Celsius equals:
- 100
 - 22.6
 - 98.6
 - 100
35. Celsius absolute scale is called _____.
- Rankine
 - Kelvin
 - Hg
 - Fahrenheit
36. 100 °F converted to degrees Celsius equals:
- 36.66
 - 35.76
 - 37.77
 - 38.82
37. 80 °F converted to degrees Celsius equals:
- 26.66
 - 28.00
 - 33.23
 - 27.77
38. The second law of thermodynamics states that:
- Water will freeze at 32 degrees Fahrenheit
 - Heat travels from a cooler substance to a warmer substance.
 - Water will boil at 212 degrees Fahrenheit
 - Heat travels from a warmer substance to a cooler substance.
39. What is the direction of heat flow?
- From a cold substance to warm substance.
 - Upward.
 - Downward.
 - From a warm substance to a cold substance.
40. States that the total pressure of a confined mixture of gases is the sum of the pressures of each of the gases in the mixture
- Boyle's Law
 - Dalton's Law
 - Charles' Law
 - Thermodynamics Law
41. Refrigerant is said to be saturated when it is:
- 100% liquid
 - 100% vapour
 - A mixture of liquid and vapour
 - Sub cooled

42. Refrigerant is said to be superheated when it is:
- Heated above its saturated temperature
 - Cooled below its saturated temperature
 - Located at the outlet of the condenser
 - Located at the inlet of the metering device
43. The method of heat transfer that results from heat energy being transferred between molecules of a substance is:
- Convection
 - Conduction
 - Radiation
 - Condensation
44. Latent heat transfers cause:
- A change of state with no change in temperature
 - A change of state and a change in temperature
 - A change in temperature with no change of state
 - Neither a change in state nor a change in temperature
45. BTUs required to change the temperature of one pound of a substance is referred to as _____ heat.
- Latent
 - Sensible
 - Specific
 - Hidden
46. High-temperature refrigeration is that produced by:
- Heat from a furnace
 - An air-conditioning system
 - The vegetable cooling system of a refrigerator.
 - The freezer section of a refrigerator
47. States that the volume of a gas varies inversely with the absolute pressure provided the temperature remains constant.
- Boyle's Law
 - Dalton's Law
 - Charles' Law
 - Thermodynamics Law
48. The component responsible for absorbing heat into the system is the:
- Compressor
 - Condenser
 - Evaporator
 - Expansion device
49. The process of refrigeration involves:
- Making a substance cold.
 - Transferring heat from one place where it is unwanted to a place when it is not objectionable.
 - Adding heat to a substance being cooled
 - Removing heat from a substance.
50. Refrigerant leaves the compressor through the _____ line:
- Suction
 - Expansion
 - Liquid
 - Discharge

51. Matter is commonly found in which three states?
- Solids, gases and vapours.
 - Solids, liquids and gases.
 - Vapours, gases and fluids.
 - Fluids, liquids and gases
52. The number of British Thermal Units required to melt one pound of ice at 32 degrees Fahrenheit is:
- 0.10
 - 5.0
 - 144.0
 - 220.0
53. 55 °F converted to degrees Celsius equals:
- 12.77
 - 13.00
 - 13.23
 - 12.33
54. The system component that is responsible for rejecting system heat is the:
- Compressor
 - Condenser
 - Evaporator
 - Metering device
55. Temperature is defined as:
- How hot it is.
 - The level of heat.
 - How cold it is.
 - The amount of heat.
56. A rise in sensible heat causes:
- A rise in a thermometer.
 - A fall in thermometer.
 - No change in a thermometer.
 - Ice to melt.
57. How can air be dehumidified?
- Chemical absorption
 - Filtration
 - Cooling
 - Both A and B
58. Which of the following is classified as an HFC refrigerant?
- R-11
 - R-22
 - R-123
 - R-134a
59. Evaporative pressure must be _____ so that the liquid refrigerant boils at the correct temperature.
- Low enough
 - High enough
 - Twice the low-side pressure
 - None of the above
60. A standard efficiency air-conditioning system operating with an outside temperature of 95 Fahrenheit degrees will have a condenser saturation temperature of about ___ degrees Fahrenheit.
- 100
 - 105
 - 115
 - 125

Section 2: Fill in the blank lines. One (1) mark for each correct answer.

- 1 Under standard conditions, water freezes at _____ °C.
- 2 If water weighs 8.34pounds per gallon, it will take _____ Btu to raise the temperature of 4gallons of water from 70 °F to 72 °F
- 3 To change from psig to psia you must add _____ to psig
- 4 Under standard conditions, water freezes at _____ °F
- 5 Specific heat is the amount of heat necessary to raise the temperature of 1lb of a _____ to 1°F
- 6 One British Thermal Unit will raise the temperature of ___ lb of water 1 °F
- 7 When a technician has is removed refrigerant from a system, he must _____ the refrigerant in a DOT tank
- 8 One ton of refrigeration is equal to : _____ Btu/24hr
- 9 Refrigerant leaves the compressor through the _____ line
- 10 The boiling point for water at stand conditions is _____ °C

Section 3: Short answer type Questions.

Two marks for each correct answer. (10mks)

1. What is the second law of thermodynamics?
2. What is meant by saturation temperature?
3. What is the function of the evaporator in the refrigeration or air-conditioning system?
4. What happens to the refrigerant in the condenser?
5. What is the relationship between pressure and the boiling point of liquids?