

SIR ARTHUR LEWIS COMMUNITY COLLEGE

FACULTY OF ENGINEERING

ACADEMIC YEAR (2024/2025) - SEMESTER TWO

END OF SEMESTER EXAMINATION

LECTURER(S)	:	Mr Percival Beausoleil
PROGRAMME TITLE	:	Electrical Installation
COURSE TITLE	:	Basic Refrigeration
COURSE CODE	:	EGP 130
LEVEL	:	Certificate/Part 2
DATE	:	Tuesday, 6 th May 2025
COMMENCEMENT TIME	:	9:00 a.m.
DURATION	:	2 hours
INVIGILATOR (S)	:	K. Emmanuel; Ana-Elisa. C-Paul; A. S-Rojo; C. Fevrier; P. Jn Francois.
ROOM(S)	:	LFT-1R-05

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consists of **Three (3) Sections**. You are required to answer all questions. Use the answer sheet provided.
- **Section A** consists of Forty (40) Multiple Choice Questions. One mark will be awarded for each correct answer.
- **Section B** consist of Ten (10) Fill in the Blanks. One mark is awarded for each correct answer.
- **Section C** consist of Five (5) Short Answer Questions. Two (2) arks are awarded for each correct answer.
- Students must sign **IN** and **OUT** on the examination class list.
- Students must **not** write their names on their answer sheets, only their **ID number**
- Students are reminded to read **all** questions and instructions in each section very carefully
- Please number your responses accordingly

Notes:

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

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

**DO NOT TURN THIS COVER SHEET UNTIL
YOU ARE TOLD TO DO SO!!!**

SECTION A - Multiple Choice Questions.

Answer all questions. (One mark awarded for each correct answer)

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. 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

7. Heat transfer through a copper pipe is an example of which type of heat transfer
 - A. Convection
 - B. Conduction
 - C. Radiation
 - D. Condensation

8. The heat content in a substance is measured in:
- A. Degrees Fahrenheit
 - B. Degrees Celsius
 - C. British Thermal Unit
 - D. Temperature
9. The state of matter that has the weakest molecular bond is:
- A. Fluids
 - B. Solids
 - C. Gases
 - D. Liquid
10. A gauge reading of 30 psig is equivalent to ____ absolute pressure:
- A. 15 Pisa.
 - B. 30 Pisa
 - C. 45 Pisa
 - D. 60 Pisa
11. How many ozone molecules can one chlorine atom destroy?
- A. 1.
 - B. 10.
 - C. 1,000.
 - D. 100,000.
12. The system component that changes refrigerant from low-pressure liquid to a low-pressure vapour is the:
- A. Compressor
 - B. Condenser
 - C. Metering device
 - D. Evaporator
13. The refrigerant line that connects the condenser to the metering device is the _____ line
- A. Discharge
 - B. Expansion
 - C. Liquid
 - D. Suction
14. How many watts of electrical power are equal to one horsepower?
- A. 33,000
 - B. 15,000
 - C. 746
 - D. 640

15. The unit of energy the power company uses to charge customers is the:
- A. British thermal unit.
 - B. Joule
 - C. Horsepower.
 - D. Kilowatt-hour
16. R-134a is a refrigerant most commonly used in systems.
- A. Medium temperature
 - B. Residential air-conditioning
 - C. Primarily low- temperature
 - D. All of the above
17. Heat transfer through a vacuum or transparent medium, (without heating the medium), is:
- A. Convection
 - B. Conduction
 - C. Radiation
 - D. Condensation
18. Good ventilation is important when working around refrigeration equipment because modern refrigerants:
- A. Are toxic and can poison you.
 - B. Have a very unpleasant odour.
 - C. May get on your skin and cause a rash.
 - D. Are heavier than air and displace the oxygen around you.
19. The temperature reading of 50 degrees Celsius is the same as _____ degrees Fahrenheit.
- A. 10
 - B. 50
 - C. 122
 - D. 212
20. The temperature reading of 23.8 degrees Celsius is the same as _____ degrees Fahrenheit.
- A. 144
 - B. 90
 - C. 75
 - D. 100
21. Sub-cooled refrigerants is always at a temperature that is _____ saturation temperature:
- A. Lower than the condenser
 - B. Higher than the condenser
 - C. Lower than the evaporator
 - D. Higher than the evaporator

22. The temperature reading of 0 degrees Celsius is the same as _____ degrees Fahrenheit.
- A. 24
 - B. 48
 - C. 32
 - D. 72
23. The temperature reading of 17.8 degrees Celsius is the same as _____ degrees Fahrenheit.
- A. 24
 - B. 16
 - C. 0
 - D. 32
24. 4.4°C converted to degrees Fahrenheit equals:
- A. 55
 - B. 32
 - C. 40
 - D. 75
25. 212°F converted to degrees Celsius equals:
- A. 100
 - B. 22.6
 - C. 98.6
 - D. 100
26. Celsius absolute scale is called _____.
- A. Rankine
 - B. Kelvin
 - C. Hg
 - D. Fahrenheit
27. The second law of thermodynamics states that:
- A. Water will freeze at 32 degrees Fahrenheit
 - B. Heat travels from a cooler substance to a warmer substance.
 - C. Water will boil at 212 degrees Fahrenheit
 - D. Heat travels from a warmer substance to a cooler substance.
28. Refrigerant is said to be saturated when it is:
- A. 100% liquid
 - B. 100% vapour
 - C. A mixture of liquid and vapour
 - D. Sub cooled

29. Refrigerant is said to be superheated when it is:
- A. Heated above its saturated temperature
 - B. Cooled below its saturated temperature
 - C. Located at the outlet of the condenser
 - D. Located at the inlet of the metering device
30. The method of heat transfer that results from heat energy being transferred between molecules of a substance is:
- A. Convection
 - B. Conduction
 - C. Radiation
 - D. Condensation
31. Latent heat transfers cause:
- A. A change of state with no change in temperature
 - B. A change of state and a change in temperature
 - C. A change in temperature with no change of state
 - D. Neither a change in state nor a change in temperature
32. BTUs required to change the temperature of one pound of a substance is referred to as _____ heat.
- A. Latent
 - B. Sensible
 - C. Specific
 - D. Hidden
33. High-temperature refrigeration is that produced by:
- A. Heat from a furnace
 - B. An air-conditioning system
 - C. The vegetable cooling system of a refrigerator.
 - D. The freezer section of a refrigerator
34. States that the volume of a gas varies inversely with the absolute pressure provided the temperature remains constant.
- A. Boyle's Law
 - B. Dalton's Law
 - C. Charles' Law
 - D. Thermodynamics Law
35. The component responsible for absorbing heat into the system is the:
- A. Compressor
 - B. Condenser
 - C. Evaporator
 - D. Expansion device

36. Refrigerant leaves the compressor through the _____ line:
- A. Suction
 - B. Expansion
 - C. Liquid
 - D. Discharge
37. Temperature is defined as:
- A. How hot it is.
 - B. The level of heat.
 - C. How cold it is.
 - D. The amount of heat.
38. A rise in sensible heat causes:
- A. A rise in a thermometer.
 - B. A fall in thermometer.
 - C. No change in a thermometer.
 - D. Ice to melt.
39. Evaporative pressure must be _____ so that the liquid refrigerant boils at the correct temperature.
- A. Low enough
 - B. High enough
 - C. Twice the low-side pressure
 - D. None of the above
40. 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.
- A. 100
 - B. 105
 - C. 115
 - D. 125

(40 Marks)

SECTION B: Fill in the Blanks.

Answer all questions (One mark awarded 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

(10 Marks)

Section C: Short Answer Questions

Answer all questions. (2 marks awarded for each correct answer).

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?

(10 Marks)

[Total 60 Marks]

END OF EXAMINATION!!!