

071305T4RAC

Refrigeration and air conditioning craftsperson Level 5

ENG/OS/RAC/CR/03/5/A

Service and Repair Automobile Air Conditioning Units

July/August 2023



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

Time: 3 hours

Instructions:

1. This paper has three sections A, B and C. Attempt questions in each section as per instructions given in the section
2. You are provided with a separate answer booklet.
3. Marks for each question are indicated in the brackets.
4. Do not write on the question paper

**This paper consists of SIX (6) printed pages
Candidate should check the question paper to ascertain that all pages are printed as
indicated and that no questions are missing**

SECTION A: (20 MARKS)

Attempt ALL questions in this section.

1. _____ is not a material used in automobile air conditioning.
 - A. Insulator
 - B. Refrigerant
 - C. Lubricating oil
 - D. Multi meter
2. Identify a semi-conductor material.
 - A. Silicon
 - B. Asbestos
 - C. Glass
 - D. Rubber
3. The following are protective clothing except _____.
 - A. Plastic shoes
 - B. Dust coat
 - C. Gloves
 - D. Eye shields
4. _____ is a unit of electric current.
 - A. Kilowatt
 - B. Microfarad
 - C. Ampere
 - D. Volt
5. A capillary tube is a refrigerant control device for _____.
 - A. Temperature
 - B. Volume
 - C. Pressure
 - D. Safety
6. _____ is an element that automatically switches to 'off' during an overload.
 - A. Fuse
 - B. Circuit breaker
 - C. Thermistor

- D. Capacitor
7. In air conditioning systems _____ maintains the quality of air.
- A. Fans
 - B. Air filters
 - C. Cooling fins
 - D. Condenser
8. Central air conditioning controls _____.
- A. Humidity
 - B. Freezing point
 - C. Boiling point
 - D. Water vapour
9. The following are types of compressors used in automobile except _____.
- A. Reciprocating
 - B. Swash-plate
 - C. Scotch yoke
 - D. Scroll
10. _____ is the function of a power transformer.
- A. Lighting generation
 - B. Power generation
 - C. Stepping voltage
 - D. Stopping voltage
11. The following are sheet metal joints except _____.
- A. Seam joint
 - B. Butt joint
 - C. Lap joint
 - D. Tenon joint
12. Identify the appropriate tool used to measure the external diameter of air conditioning pipes from the following:
- A. Tape measure
 - B. Micrometer screw gauge
 - C. Vernier caliper
 - D. Precision ruler

13. In power supply system, the abbreviation D.C means _____.
- A. Double current
 - B. Distant current
 - C. Direct current
 - D. Disconnected current
14. The following are components of an automotive air conditioner except _____.
- A. Sight glass
 - B. Receiver
 - C. Fan
 - D. Air washer
15. The study of the properties of air and water vapour mixture is known as _____.
- A. Thermometry
 - B. Psychrometry
 - C. Calorimetry
 - D. Hydrometry
16. In air conditioning maintenance, a vacuum pump is used for _____.
- A. Lubrication
 - B. Purging
 - C. Evacuation
 - D. Charging
17. The following are work holding devices a part from _____.
- A. Pliers
 - B. Box spanner
 - C. Bench vice
 - D. G-clamp
18. The following are parts of a hand drill except _____.
- A. Chuck
 - B. Motor
 - C. Handle
 - D. Guard

19. Other than _____, the following are automotive air conditioning tools.
- A. Clutch tool kit
 - B. Hose cutter
 - C. Spirit level
 - D. Valve core remover
20. Other than _____, the following are major compressor oils used in automobile air conditioning.
- A. Mineral oil
 - B. PAG oil (Poly-alkaline-glycol)
 - C. POE oil (Poly-ol-ester)
 - D. Crude oil

SECTION B: (40 MARKS)

Attempt ALL questions in this section.

21. Distinguish between air conditioning and refrigeration. (5 marks)
22. (a) Outline FOUR causes of overheated condenser in automobile air conditioning. (4 marks)
- (b) Identify FIVE possible solutions of an overheated condenser. (5 marks)
23. Outline FOUR manufacturer's data on a package type air conditioner. (2 marks)
24. Outline FOUR safety precautions while charging or recovering refrigerant. (4 marks)
25. State TWO types of packaged air conditioner. (2 marks)
26. A fan used in air conditioner is rated 350 W of electrical power. How much electrical energy is used in 10 minutes? (4 marks)
27. During your field work you came across a client whose vehicle a/c system is noisy. Highlight FOUR reasons for this problem. (4 marks)

28. Highlight FOUR ways in which heat gets inside a vehicle. (4 marks)
29. State FOUR safety precautions to observe when servicing a vehicle air conditioning system. (4 marks)
30. State TWO functions of receive drier in an automobile air conditioning system. (2 marks)

SECTION C: (40 MARKS)

Attempt any TWO questions in this section

31. The primary function of an air conditioning system is to cool the surroundings to comfort the people around. With an air conditioning system, one gets cooler and more comfortable when the scorching sun of summer prevails. With aid of a diagram, discuss the operation of the vehicle air conditioning system. (20 marks)
32. (a) Explain FIVE methods used for defrosting a refrigerating system. (10 marks)
- (b) Outline the types of evaporator according to: (10 marks)
- (i) Type of construction
- (ii) Operating conditions
33. (a) An Electrical load is a device that uses electrical energy to do work. Compressor is the biggest load in an air conditioning system. Explain FIVE possible cause and remedy of an air conditioner that the compressor and the condenser fan will not start. ✓ (10 marks)
- (b) Explain FIVE methods used for testing refrigerant leakage. ✓ (10 marks)

- Using Soap Solution.
- using electric load dec.
- oil in the system