

071305T4RAC

REFRIGERATION AND AIR CONDITIONING LEVEL 5

ENG/OS/RAC/CR/03/5/B

INSTALL, SERVICE AND REPAIR AIR-CONDITIONING UNITS

July/August 2024



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

CANDIDATE WRITTEN ASSESSMENT

Instructions to Candidates

1. This paper consists of TWO sections: A and B.
2. Attempt ALL questions from section A and any THREE questions from section B.
3. Answer the questions in the provided separate answer booklet.
4. Do not write on the question paper

This paper consists of TEN (5) printed pages

Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing

SECTION A: (40 MARKS)

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Attempt all questions from this section

1. Different tools used are during installation of air conditioning systems. Identify FOUR tools you can use during installation of air conditioning machines. (4 Marks)
2. During installation of an air conditioning unit care should be taken to prevent system leaks. State FOUR methods you can apply to detect leaks. (4 Marks)
3. A split air-conditioning system has its components split into two or more separate locations. Identify FOUR components you can find in the out-door unit of a split air conditioning system. (4 Marks)
4. Identify FOUR types of metering devices you can find in an air conditioning system (4 Marks)
5. Air conditioning technicians perform various checks after installation of an air conditioning unit. State FOUR checks you can perform on an installed unit (4 Marks)
6. Safe handling of hydrocarbon refrigerants when charging an air conditioning system is important to prevent hazardous situations. State FOUR safety precautions you should observe when charging a unit with hydrocarbons. (4 Marks)
7. Various types of condensers are used in air conditioning systems. Illustrate the counter flow of refrigerant in tube-in-tube condenser. (4 Marks)

8. Proper electrical wiring during an air conditioning installation plays a critical role in proper functioning and safety of the unit. State FOUR electrical wiring requirement you should ensure in an air conditioning unit. (4 Marks)

9. Outline FOUR commissioning checks to carry out before attempting to start an installed compressor. (4 Marks)

10. Evacuating an air conditioning system is important to ensure effective and efficient system performance. Explain TWO procedures you can apply in Evacuation a system (4 Marks)

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SECTION B: (60 MARKS)

Answer any **THREE** questions from this section.

11. The behaviour of lubricating oil in an air conditioning circuit and its physical interaction with the refrigerant itself is an important factor in the design of circuits in general and evaporators in particular.

a) Explain SIX properties of an of an ideal lubricant oil (12 Marks)

b) Describe FOUR methods used to add refrigerant oil to a refrigeration system. (8 Marks)

12. For ease, economy, and safety of operation, and to assist the maintenance function, other system controls and components are fitted in an air conditioning system

a) Explain FIVE function of a back pressure control valve (10 Marks)

b) Describe FIVE system controls and components in an air conditioning plant (10 Marks)

13. Commissioning an air conditioning system is a systematic, documented, and collaborative process that includes inspection, testing and training conducted to confirm that a system is capable of being operated and maintained in accordance with the design intent.

a) Highlight FIVE requirements that the commissioning document should have. (10 Marks)

b) Discuss FIVE benefits of commissioning an installed air conditioning system (10 Marks)

14. Zeotropic refrigerants, such as R 410A, must be liquid charged into a system initially, the refrigerant is liquid charged into the high side of the system and then into the low side of the system.

a) Sketch a well labeled diagram of refrigerant charging in the liquid mode. (10 Marks)

- b) Explain FIVE Symptoms that can indicate that a system needs to be charged with additional refrigerant. (10 Marks)

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