

071306T4RAC

REFRIGERATION AND AIR CONDITIONING LEVEL 6

ENG/OS/RAC/CR/03/6/B

Design Refrigeration System

Nov/Dec 2024



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

PRACTICE

MENT

Time: 4 HOURS

INSTRUCTIONS TO CANDIDATE:

1. You are required to perform the following tasks

- a. *Design a water cooler with bare coil evaporator to be immersed in a water tank to cool 10 liters of water from 25°C to 5 °C in 2 hours.*

Given:

Specific heat capacity of water (4.186 kJ/kg°C)

Heat transfer coefficient $\left(\frac{W}{m^2}^{\circ}C\right)$, $U = 300 W/m^2^{\circ}C$

- i. *Determine R134a compressor capacity for the cooler*
 - ii. *Design and construct the evaporator*
- b. *Assemble the parts of the water-cooling system*
- c. *Perform insulation*

- d. *Installed the wiring system of the cooler*
- e. *Charge 100 g of refrigerant into the system*
- f. *Test run and commission the system.*

2. You have been provided with the following resources for the practical tasks:

- Compressor
- Filter drier
- Flexible cable 0.75mm
- Brazing torch and rod
- Appropriate flux
- 1/4-inch copper tube, suction 1.6 m
- 3/16-inch copper tube discharge 1.5 m
- Capillary tube 0.8 mm diameter, 1.5 m length
- Stainless steel Water tank 10 liters capacity,
- Digital thermostat with probe
- Refrigerant: R134a,
- Top plug
- Wire stripper
- Multimeter
- Air-cooled condenser
- Armaflex
- manifold gauges and hoses
- 1 m by 1m wooden board installation platform
- Vacuum pump
- Refrigerant R-134a
- Leak detection solution
- Nitrogen tank
- Personal Protective Equipment (PPE) –
- Overall/dust coats
- Goggles/Face shield

- Safety boots
- Gloves
- Screwdrivers flat and star
- Pipe cutter and reamer
- Pipe bender
- Wrenches and pliers
- Measuring tape
- Fast dry insulating form