CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

Technical and Vocational Education Examination

JUNE XXXX **INTERMEDIATE LEVEL**

Subject Title	**REFRIGERATION REPAIRS**
Subject Code No.	**5310**
Paper No.	**TWO**

Duration 3H

This paper has two parts (part 1 refrigeration) and (part 2 air conditioning). Answer only five questions of your choice in part 1 and only two question in part 2. All questions carry equal marks

You are reminded of the necessity for good English and orderly presentation in your answers.

PART 1: REFRIGERATION TECHNOLOGY

1) The figure below is an expanded view of an ice making machine. Identify and name the ten components

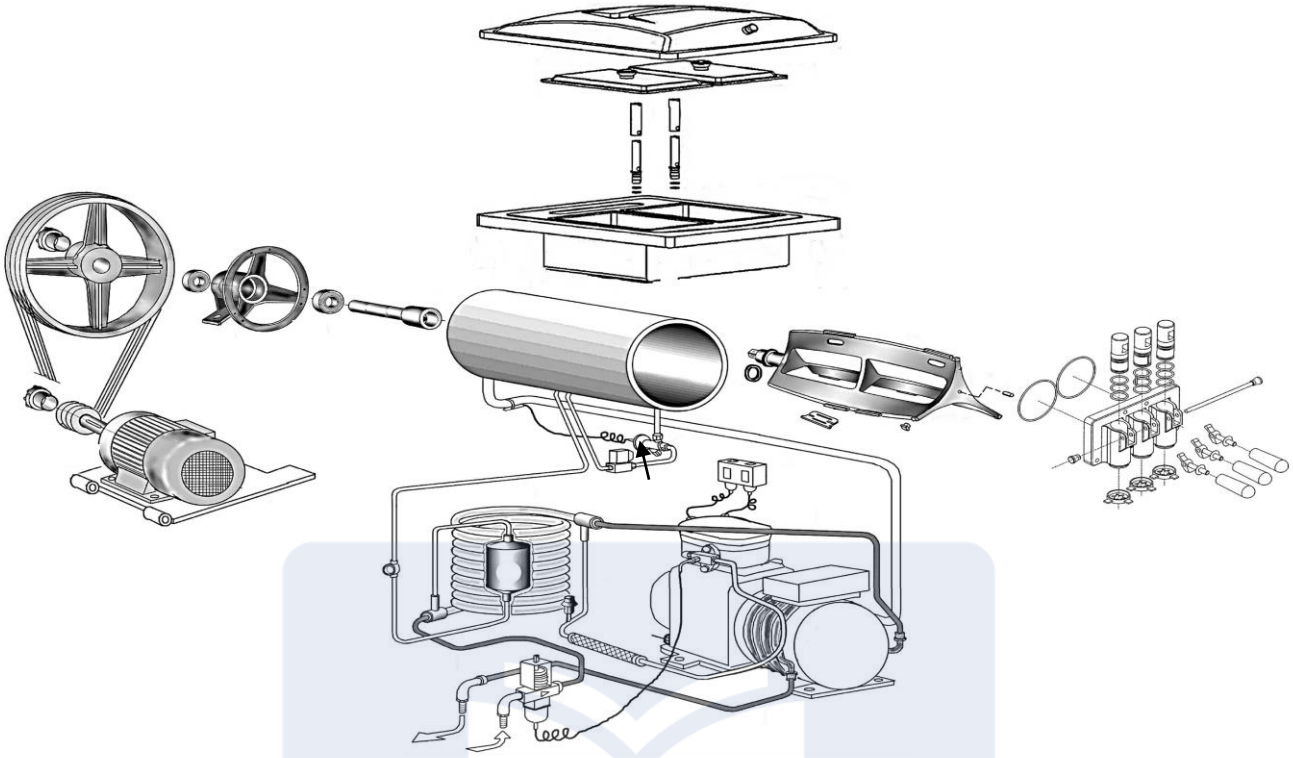

Figure 1: expanded view of an ice cream maker with a water cooled condenser

(0.5x10marks)

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2) Answer the following questions

(a) Cite three criteria for selecting refrigerants **(0.5x3marks)**

(b) Cite three thermodynamic or thermo-physical properties of a good refrigerant **(0.5x3marks)**

(c) Give the importance of lubricating refrigerant compressors and cite two ways by which these compressors are lubricated **(0.5x4marks)**

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3) Give the symbol of the following devices used in refrigeration and air conditioning systems and state which a safety device and which is an accessories device

-High pressure switch
-Low pressure switch
-One way valve
-Solenoid valve
- -Filter drier
-liquid receiver
-Sight glass
-Thermostat
Oil seperator

(5marks)

4) You are asked to do diagnostic and repair works on an air-conditioning and refrigeration system. After diagnostic you realise that there is a refrigerant leakage on the copper tubes of the evaporator that needs to be repaired.

a) Give a list of material and tools that will be necessary for the repairs
b) Enumerate the steps necessary before the leakage spot is welded

(5marks)

5) Study the figure below and answer the questions that follow

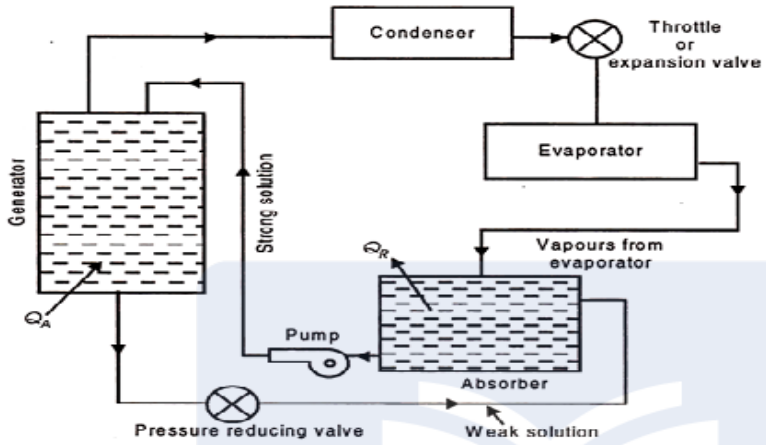


Figure 2: vapour absorption refrigeration cycle

a) Which elements replace the compressor as compared the vapour compression cycle?
b) What components are responsible for maintaining the high and low pressure side in the absorption cycle?
c) Which two fluids are the most commonly used in the absorption system
d) Explain briefly how the cycle functions

(5marks)

6) Figure 3 below shows an automatic expansion valve. Explain how it functions in a refrigerating installation

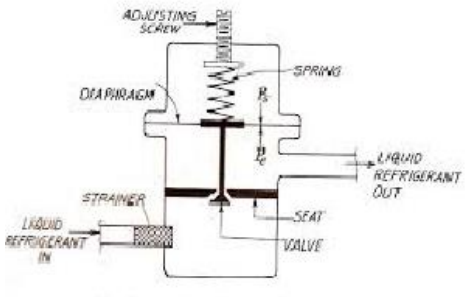


Figure 3: Schematic diagram of an automatic expansion valve

(5marks)

7)

a) What difference can you make between an internally equalized thermostatic expansion valve and an externally equalized thermostatic expansion valve? **(1mark)**

b) Name two type of evaporators used in refrigeration systems **(1mark)**

c) Copy the table below indicate by marking a cross (X) to which group thus the following refrigerants belong

refrigerant	CFC	HCFC	HFC
R12			
R22			
R134a			
R600a			

(3marks)

PART TWO: AIR CONDITIONING

1) a) Define air-conditioning and state five applications of its application **(1mark)**

b) What difference can you make between a windows air-conditioner and a split system air conditioner? **(1mark)**

c) Name any three parameters of ambient air that can be modified during the process of air-conditioning **(1mark)**

d) Name five psychometric processes that ambient air can undergo during the process of air conditioning **(2marks)**

2) Identify and name the parts of the figure below

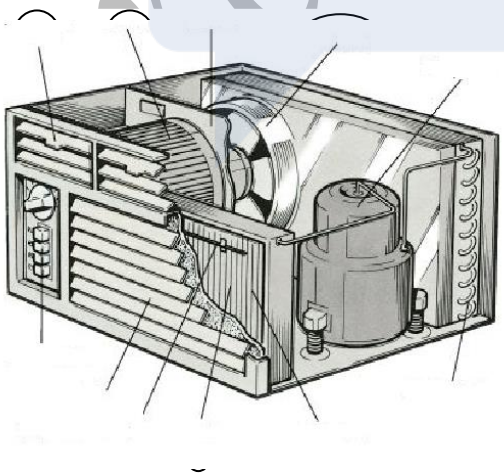
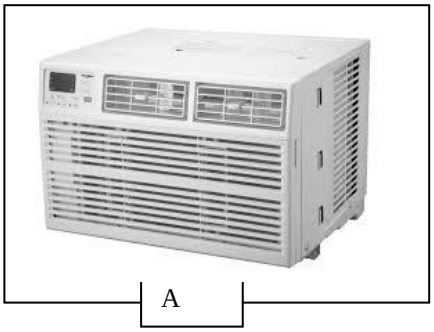


Figure 4: parts of a windows system air-conditioner

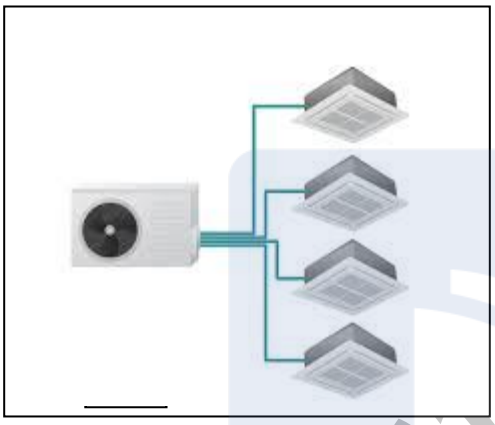
(5marks)

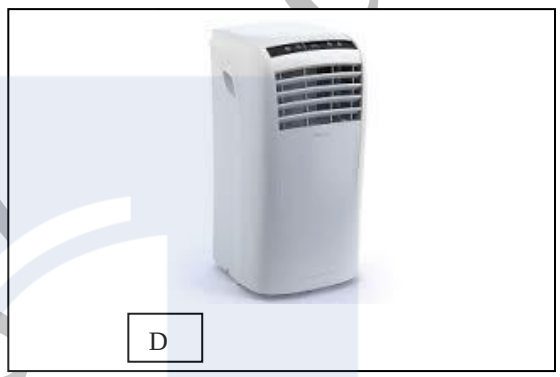
3) a) identify the various air-conditioners below



A

B





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b) Name three types of central air-conditioning systems that you know