TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
DIPLOMA IN ELCTRICAL POWER ENGINEERING
(DEPE 6 Y3 S2)

EEP 2307
HEATING, REFRIGERATION AND AIR-CONDITIONING

END OF SEMESTER EXAMINATIONS

SERIES: MAY 2016

TIME: 2 HOURS

INSTRUCTIONS:

1. You should have the following for this examination:
   - Answer Booklet
   - Scientific Calculator
   - Drawing Instrument

2. This paper consists of **FIVE** questions
3. Answer Question **ONE,** which is **COMPULSORY,** and any other **TWO** Questions.
4. Question marks are as indicted in each question
5. Do not write on this question paper.

This paper consists of **FOUR** printed pages

QUESTION ONE

a) (i) Distinguish the following terms applied in Air-Conditioning

I. Dry-bulb Temperature
II. Wet-bulb Temperature
III. Relative humidity

(ii) Sketch to show the combined DB and WB Thermometers with typical readings, indicating in each case the Wet Bulb Depression, for the following conditions

I. Relative humidity is 100%
II. Relative humidity is 50%

(iii) Sketch and label to show a schematic diagram for a window type Air-Conditioner unit

(iv) Explain the functions of any FIVE of the cycle elements in (iii)

(30 Marks)

QUESTION TWO

a) (i) Sketch to show a block diagram for a domestic vapour compression refrigeration system

(ii) Explain the functions of each of the block elements in (i)

(iii) Explain how the tubing system for the domestic refrigerator is distinguished

(20 Marks)

QUESTION THREE

a) (i) Sketch to show a labelled TIG welding system set-up

(ii) Distinguish with the aid of sketches between Direct current straight polarity and Direct current reverse polarity as applied in Metal Manual Arc welding

(20 Marks)

QUESTION FOUR

a) Use Psychrometric chart, to determine the conditions given below

(i) A sample of moist air has a DBT of 30°C and Relative humidity 10%. Find

I. Specific humidity

II. Wet bulb temperature
III. Dew point

(ii) A sample of moist air has DBT of 25°C and at saturation state. Find

I. Dew point temperature
II. Specific humidity
III. Relative humidity

b) Distinguish with the aid of sketches the following types of compressors

I. Haematic type
II. Open type

(20 Marks)

QUESTION FIVE

a) Explain the following good refrigeration repair practices

I. Recovery
II. Recycling
III. Reclaim

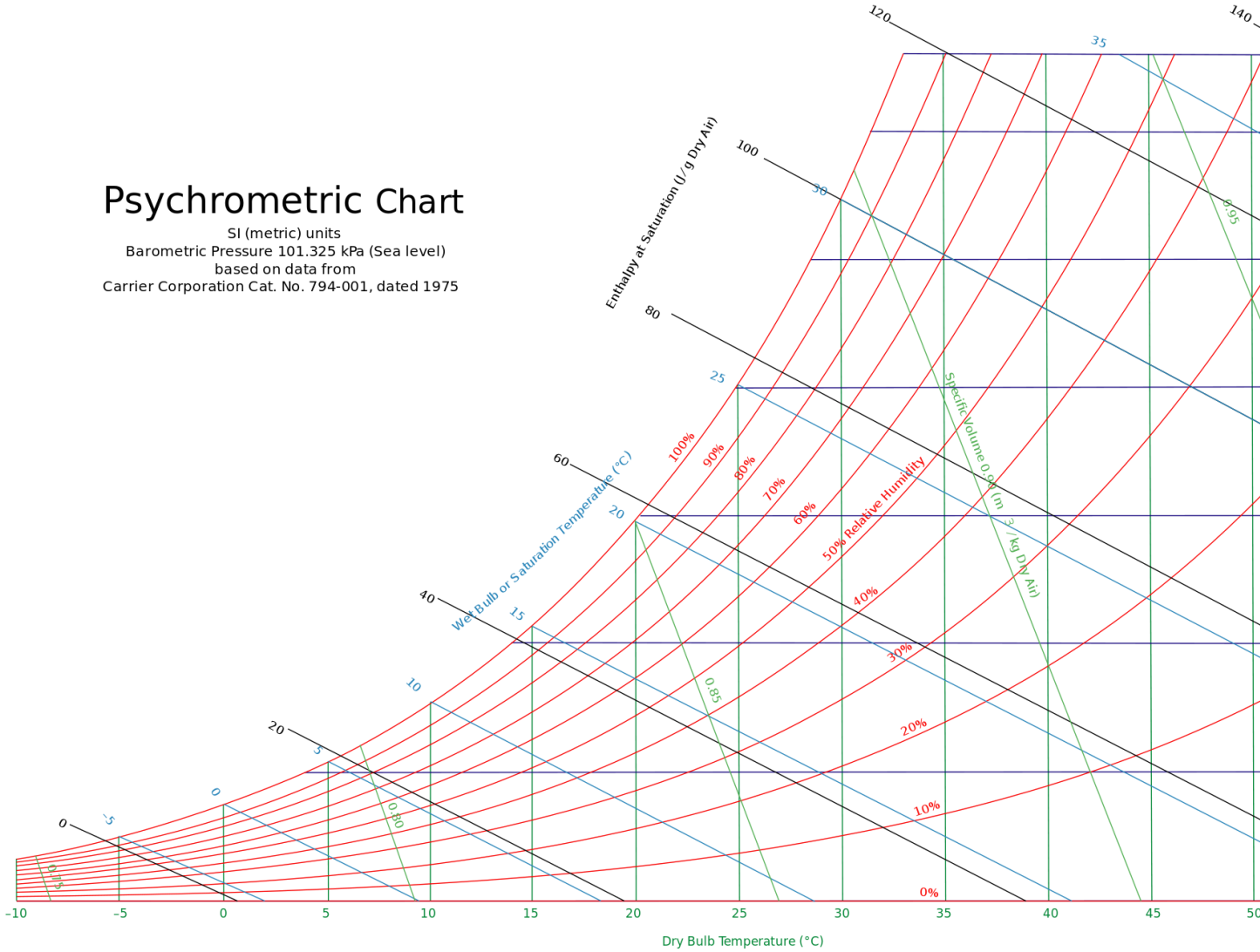
(6 Marks)

b) (i) State and explain any FOUR desirable properties of an ideal refrigerant

(ii) Calculate to establish the refrigerant structure type and sketch to show the refrigerant structure for the following refrigerants

I. R114
II. R134a
III. R22
IV. R123

(14 Marks)


Psychrometric Chart
SI (metric) units
Barometric Pressure 101.325 kPa (Sea level)
based on data from
Carrier Corporation Cat. No. 794-001, dated 1975
Enthalpy at Saturation (J/g Dry Air)
Wet Bulb or Saturation Temperature (°C)
Specific Volume 0.90 (m 3/kg Dry Air)
50% Relative Humidity
100%
90%
80%
70%
60%
40%
30%
20%
10%
0%
Dry Bulb Temperature (°C)