



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2014 SESSION

SUBJECT CODE : FCD30103
SUBJECT TITLE : RAC SYSTEM STUDIES
LEVEL : DIPLOMA
TIME / DURATION : **3.30 pm - 6.00 pm**
(2.5 HOURS)
DATE : 29 MAY 2014

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper **CAREFULLY**.
 2. This question paper is printed on both sides of the paper.
 3. Please write your answers on the answer booklet provided.
 4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
 5. This question paper consists of **TWO (2)** sections. Section A and B. Answer all questions in Section A. For Section B, answer two (2) questions only.
 6. Answer all questions in English.
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THERE ARE 7 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)

INSTRUCTION: Answer ALL questions.
Please use the answer booklet provided.

Question 1

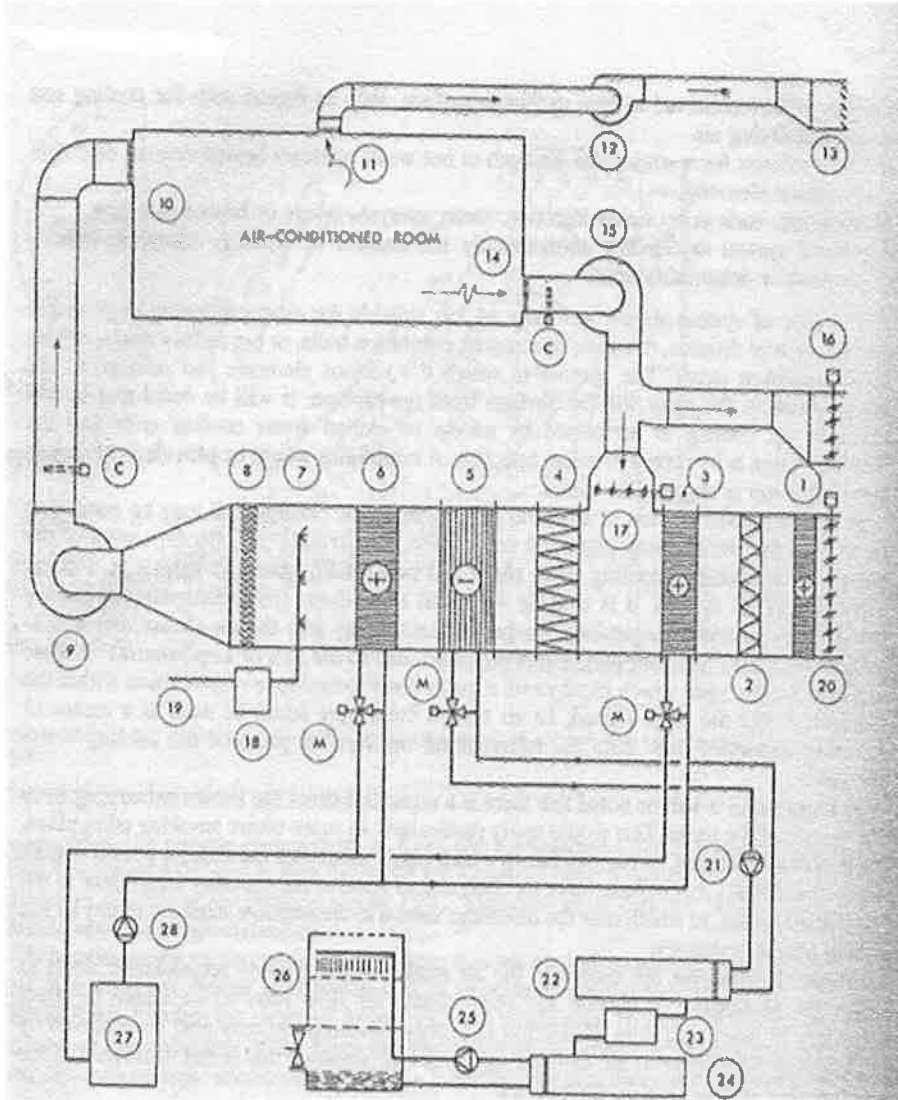


Figure Q1. The schematic of a central air conditioning plant.

Referring to Figure Q1,

(a) Name and explain the function of each apparatus (from 1 to 28) on the schematic layout of the air conditioning central plant system.

(15 marks)

(b) List five (5) suitable buildings that use this type of system.

(5 marks)

Question 2.

- (a) List five (5) air qualities which control the air conditioning system.
(5 marks)
- (b) Draw the four basic components of a refrigeration cycle connected by refrigeration piping. Label each component and refrigeration line. Put arrows on the refrigeration lines to show the direction of flow in the system.
(5 marks)
- (c) As a consulting engineer in an established consulting firm, your client asked you to furnish with design criteria for air conditioning system for high rise office building in Kota Bharu. Give a proposal of the air conditioning system that has the most economical for the office building. Explain your answer.
(5 marks)
- (d) You are working as a maintenance engineer in an Intelligent building in Kuala Lumpur. To sustain good internal air quality in the building, you must ensure that your pre-filter and secondary air filters need to be changed instantaneously when required. Give two (2) methods to solve dirty filters problem. Describe your answer briefly.
(5 marks)

Question 3.

For the operation of cooling coil, parameters below are used:

- (a) indoor design condition : 25 °C DB, 55 % RH
- (b) outdoor condition : 34 °C DB, 80% RH
- (c) fresh air intake = 30% of supply air
- (d) average temperature of cooling coil (Apparatus Dew Point - ADP) = 10.5 °C DB
- (e) supply air temperature = 14 °C
- (f) assume specific heat capacity for dry air at 14 °C = 1.02 kJ/kg K
- (g) assume specific volume of dry air at room conditithe on = 0.85 m³/kg
- (h) room sensible cooling load = 350 kW

You are asked for:

- (a) To plot the air conditioning process on the Psychrometric Chart given in Appendix 1.

(10 marks)

- (b) To calculate the supply air volume delivered to space in m³/s.

(10 marks)

SECTION B (Total: 40 marks)**INSTRUCTION: Answer only TWO questions.****Please use the answer booklet provided.****Question 4**

- (a) Give two (2) methods of rejecting unwanted heat from the refrigeration machine.
(5 marks)
- (b) Normally in a high rise or a large scale building, there is a system used to control and monitor the air conditioning central system. Give the name of the system?
(5 marks)
- (c) Give two (2) types of occupancies in the buildings and state examples.
(5 marks)
- (d) As a consulting engineer in an established consulting firm, your client asked you to provide design criteria for air conditioning system for high rise office building in Kuala Terengganu. Explain your answer.
(5 marks)

Question 6

(a) Describe the characteristics of Lithium Bromide?

(5 Marks)

(b) What are dilute solution, concentrated solution and intermediate solution?

(5 Marks)

(c) What are the two fundamental differences between the absorption refrigeration cycle and the vapor compression cycle?

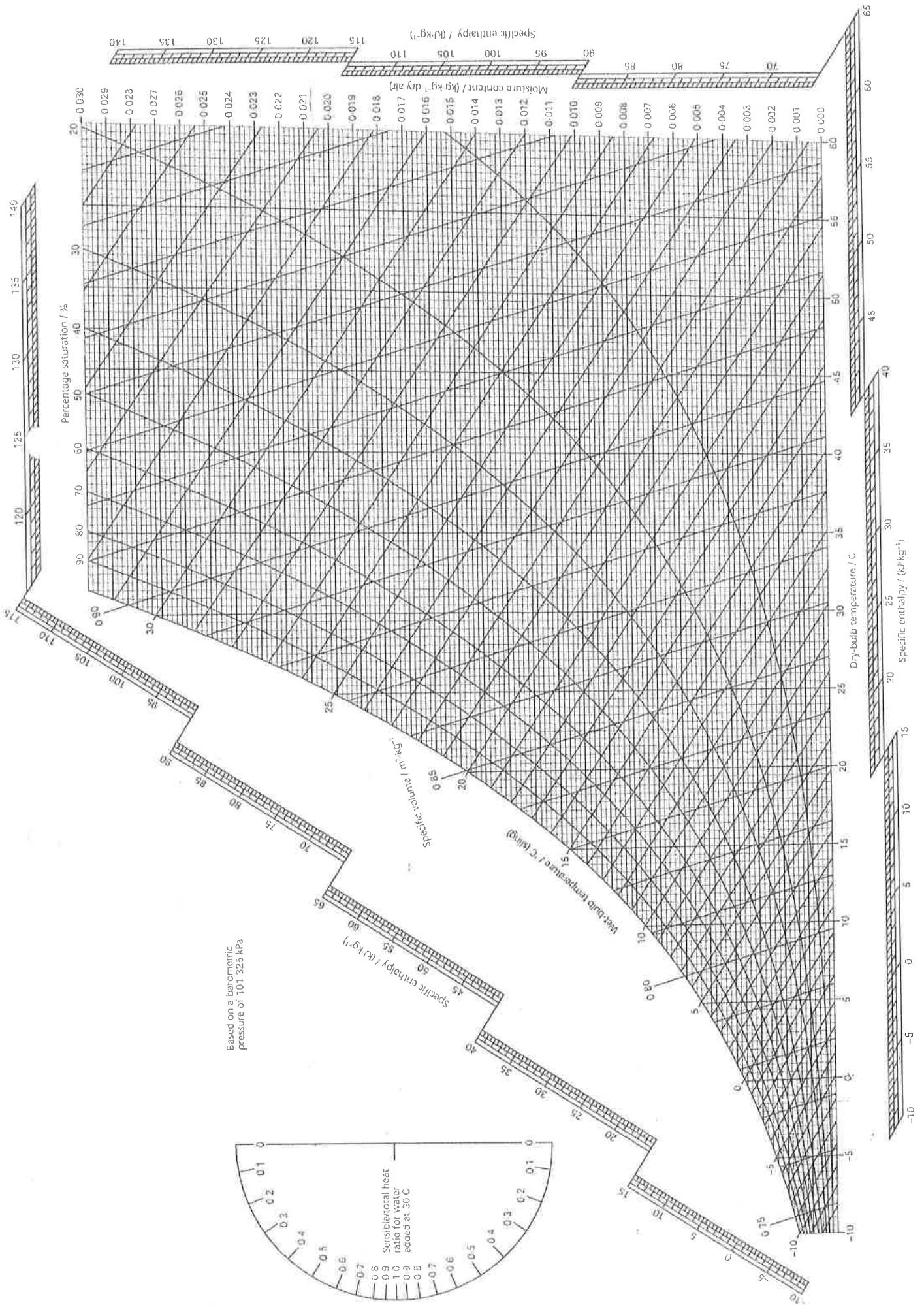
(5 Marks)

(d) Give three examples of the halocarbon uses in the vapor-compression refrigeration cycle

(5 Marks)

END OF QUESTIONS

APPENDIX



Based on a barometric pressure of 101.325 kPa

Figure C1.2 CIBSE psychrometric chart (-10 to +60 °C) (CIBSE Guide C) - dry-bulb charts for temperature ranges -10 to +60 °C and +10 to +10 °C