



**UNIVERSITI KUALA LUMPUR
Malaysia France Institute**

**FINAL EXAMINATION
JULY 2010 SESSION**

SUBJECT CODE : FCD 30103
SUBJECT TITLE : RAC SYSTEM STUDIES
LEVEL : DIPLOMA
TIME / DURATION : 9.00 am – 12.00 noon
(3 HOURS)
DATE : 15 NOVEMBER 2010

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) question only.
6. Answer all questions in English.

THERE ARE 5 PAGES OF QUESTIONS AND ONE PAGE OF APPENDIX, EXCLUDING THIS PAGE.

SECTION A (Total: 60 marks)**INSTRUCTION: Answer ALL questions.****Please use the answer booklet provided.****Question 1**

Following data refers to an air conditioning system to be designed for an industrial process for hot and wet climate. An outside condition is 30°C DBT and 75% RH while the required inside conditions is 20°C DBT, 60% RH. The required condition to be achieved first by cooling and dehumidifying and then be heated. If 20 m³ of air is absorbed by the plant every minutes. By using the CIBSE psychometric chart, find the:-

- (a) Capacity of the cooling coil in tonnes of refrigeration. (10 marks)
- (b) Capacity of the heating coil in kW. (4 marks)
- (c) Amount of water removed per hour. (4 marks)

Question 2

Figure Q2: Absorption Refrigerant Cycle

Absorption Refrigeration Cycle

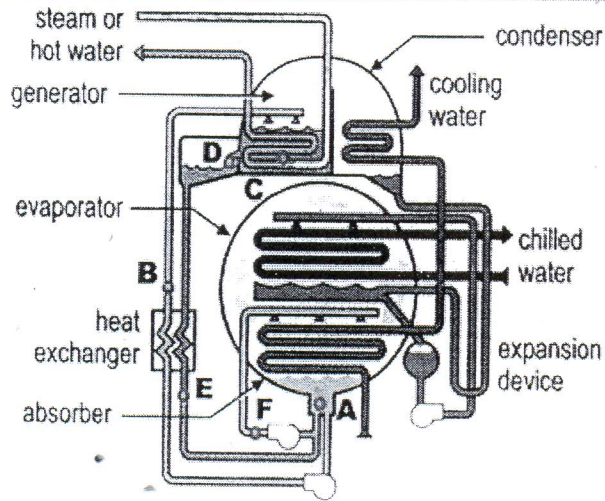


Figure Q2 shown the absorption refrigeration cycle. You are required to explain briefly the process in evaporator, absorber, pump, generator and condenser.

(15 marks)

Question 3

(a) What is SMACNA stand for?

(2 marks)

(b) Explain clearly the responsibility of SMACNA.

(4 marks)

(c) What are dilute solution, concentrate solution and intermediate solution in absorption chiller?

(3 marks)

(d) List down and explain the four (4) basic types of M & E drawing.

(4 marks)

Question 4

Compressor are largely classified either by compression methods such as volumetric or centrifugal compression or by its structure.

- (a) List down four (4) types of compressor under volumetric compression. (2 marks)
- (b) Explain briefly about scroll compressor. (6 marks)
- (c) What do you understand with semi-hermetic compressor? Explain it clearly. (6 marks)

SECTION B (Total: 40 marks)**INSTRUCTION: Answer TWO(2) questions only.****Please use the answer booklet provided.****Question 4**

Brief clearly the following terms related to the single and multiple zone type. You also required to sketch and label all the elements in the terms.

- (a) Single Zone System. (6 marks)
- (b) Dual Duct System. (7 marks)
- (c) Multizone System. (7 marks)

Question 5

- (a) A ventilation fan delivering 8000 CFM while running at a speed of 900 RPM and requiring 6.5 BHP. The operating engineer wants to increase the air supply to 9000 CFM. At what speed should the fan be operated? What must be checked first before making such a change? (10 marks)
- (b) Fan maybe classified into two (2) main types, centrifugal fan and axial flow fan which differ in the direction of air flow through the fan.
- i. Explain the different air flow in centrifugal and axial fan. (6 marks)
- ii. List down the classified in centrifugal and axial fan. (4 marks)

Question 6

- (a) Draw four (4) basic components of refrigerant cycle connected by refrigeration piping. Label each components and refrigeration line. Put arrow to show the direction of flow. You also need to explain the cycle.

(10 marks)

- (b) Explain clearly about four (4) basic types of air-conditioning systems used in the market.

(2 marks)

- (c) Explain briefly about Variable Air Volume.

(8 marks)

END OF QUESTION

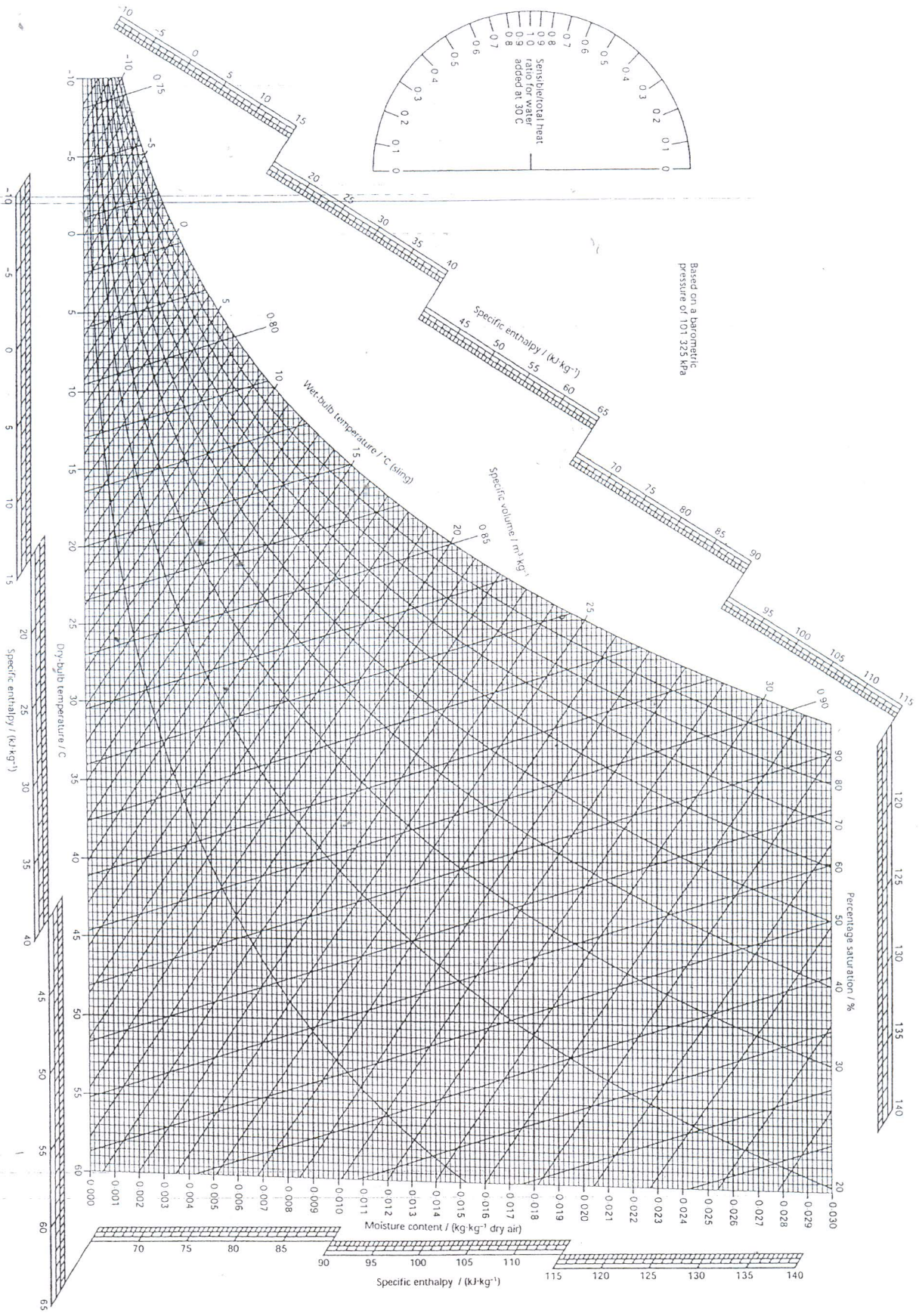


Figure C1.2 CIBSE psychrometric chart (-10 to +60 °C) (CIBSE Guide C includes charts for temperature ranges -10 to +60 °C and +10 to 110 °C)