



UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JULY 2010 SESSION

SUBJECT CODE : FCB 20703
SUBJECT TITLE : STUDY OF AIR CONDITIONING EQUIPMENT & SYSTEMS
LEVEL : BACHELOR
DURATION : 9.00 am – 11.00 am
(2 hours)
DATE / TIME : 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. Answer all questions in English.
 6. Formulae are appended.
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THERE ARE 4 PAGES OF QUESTIONS AND 1 PAGE OF APPENDIX, EXCLUDING THIS PAGE.

Question 1

INSTRUCTION : Answer ALL questions.

Please use the answer booklet provided.

Lithium Bromide-Water Absorption Chiller

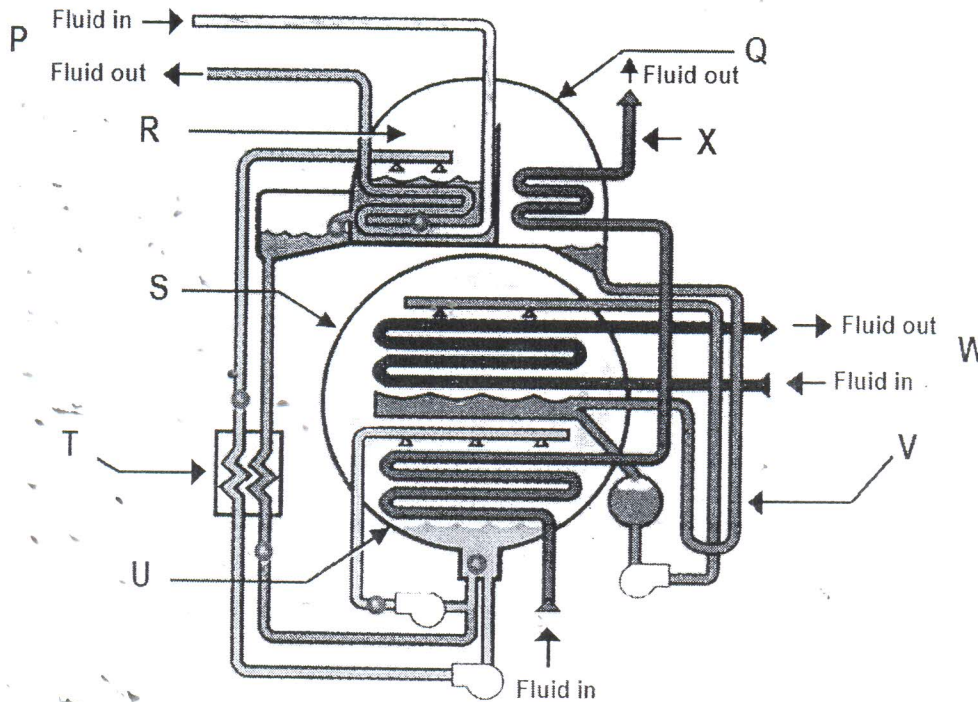


Figure 1. Lithium bromide – water absorption chiller.

a) Identify components and fluids in Figure 1. Reproduce in answer booklet.

- P (1 marks)
- Q (1 marks)
- R (1 marks)
- S (1 marks)
- T (1 marks)
- U (1 marks)
- V (1 marks)
- W (1 marks)
- X (1 marks)

- b) What are the functions of generator, condenser, expansion device and absorber in the Lithium Bromide - Water Absorption chiller? Explain your answer.
(9 marks)
- c) Give four (4) basic types of air conditioning systems used in the industry.
(4 marks)
- d) As a designer, what type of air conditioning system would you choose for shopping complex which requires cooling system? Explain why?
(4 marks)
- e) Give two (2) types of occupancies in a building.
(3 marks)
- f) You are working as a consulting engineer in an established consulting firm. Your client asked you to provide design criteria for an air conditioning system for high rise five-star hotel. Explain your answer.
(4 marks)
- g) What is a method of rejecting unwanted heat from the refrigeration machine in place of the cooling tower?
(3 marks)
- h) Normally in a high rise or a large scale building, there is a system used to control and monitor an air conditioning central system. What do you call the system and give the benefits of the system?
(4 marks)
- i) 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 in order to solve this problem and describe your answer briefly.
(5 marks)

Question 2.**It is required :**

- That the technical vocabulary used is correct.
- That the function of each apparatus is clearly explained.

You are given :

- Referring to the Air Handling Unit (Figure 2) for the operation of cooling coil:
 - indoor design condition : 25 °C DB, 50 % RH
 - outdoor condition : 34 °C DB, 80 % RH
 - fresh air intake = 10% of supply air
 - average temperature of cooling coil = 10.5 °C DB
 - supply air temperature = 14 °C
 - assume specific heat capacity for dry air at 14 °C = 1.02 kJ/kg K
 - assume specific volume of dry air at room condition = 0.85 m³/kg
 - room sensible cooling load = 130 kW
- A psychrometric chart (Chart 1).

You are asked :

- To plot the air conditioning process on the psychrometric chart (Chart 1). **(To be returned)**
(20 marks)
- To calculate the supply air volume delivered to space in m³/s.
(15 marks)

It is required :

- That the cycle of air is correctly plotted in the psychrometric chart.
- That the calculations are correct.

Question 3

- a) List the 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 HVAC&R designer, what type of air conditioning system you choose for a thirty-storey 5-star hotel building which requires cooling system? Explain why? (5 marks)
- d) What is an air conditioning? Explain the process involved. (5 marks)

END OF QUESTIONS

CIBSE PSYCHROMETRIC CHART

BASED ON A BAROMETRIC
PRESSURE OF 101.325 kPa

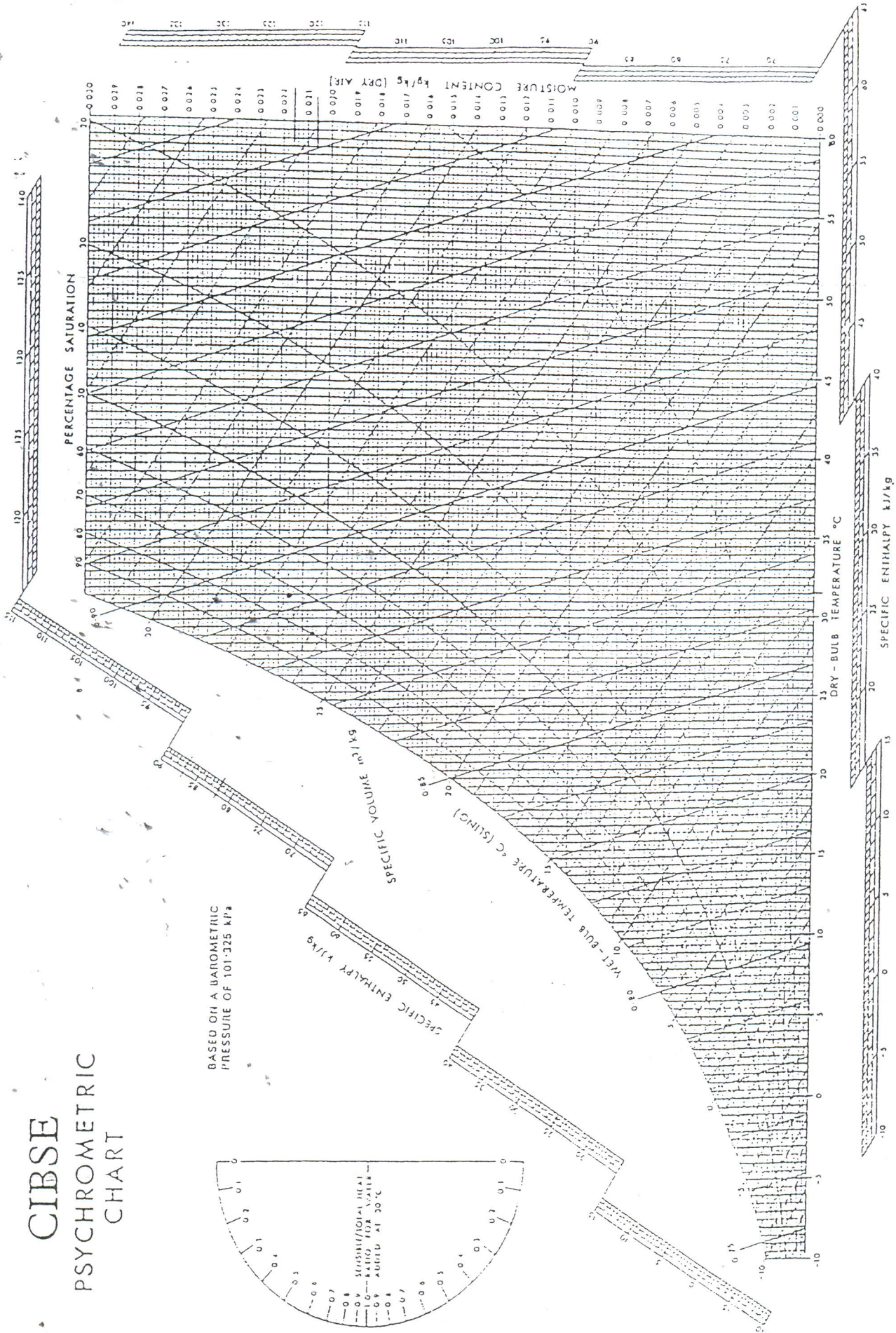
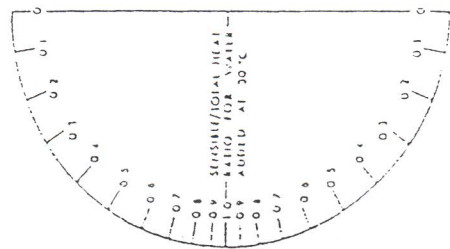


Fig. C1.2. CIBSE Psychrometric Chart (-10°C to 60°C).

Pads of 50 charts (A3 size) are available from the CIBSE, Delta House, 222 Balfour High Road, London SW12 9BS