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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION

JULY 2010 SESSION

SUBJECT CODE	:	FCB 20302
SUBJECT TITLE	:	FLUID DYNAMICS
LEVEL	:	BACHELOR
TIME / DURATION	:	9.00am – 12.00pm (3 HOURS)
DATE	:	19 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.
6. Answer all questions in English.
7. Formulae are appended

THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer ALL questions.

Please use the answer booklet provided.

Question 1

(a) List down two (2) principles of Pascal's Law

(5 marks)

(b) Describe the meaning of below

i. Inviscid flow

ii. Compressible flow

iii. Boundary layer

(5 marks)

Question 2

Refer to Figure Q2. Calculate the pressure at point A if the pressure at B is 22.40psig. h_{B-1} = 30in and h_{2-3}= 4in.

(10 marks)

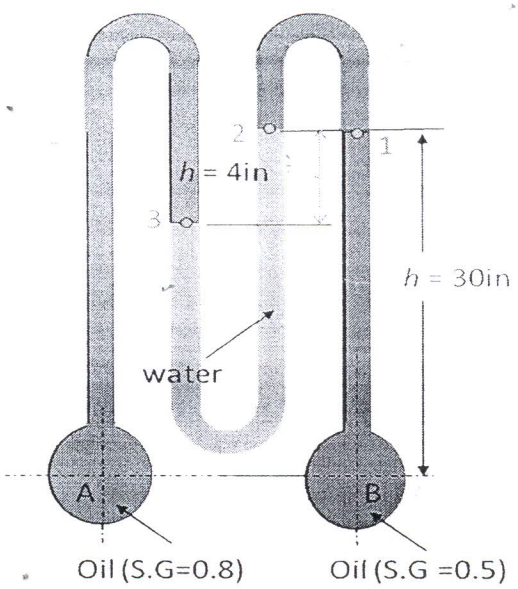

Figure Q2: Manometer

Question 3

Refer to Figure Q3. A container of liquid with a movable piston supporting a load.
Determine the pressure in the liquid under the piston if the total weight of the piston and the load is 500N and the area of the piston is 2500mm^2

(10 marks)

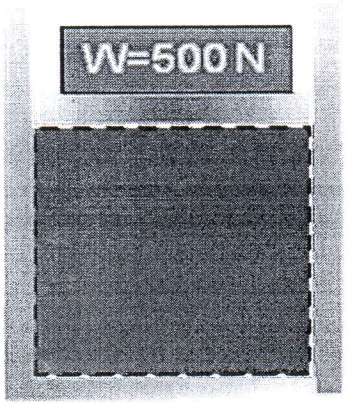

Figure Q3: Liquid static pressure

Question 4

Refer to Figure Q4. Determine the depth of the oil, h, if the reading of the bottom pressure gage is 40.0psig, the top of the tank is sealed, and the top gage reads 25.0 psig.

(10 marks)

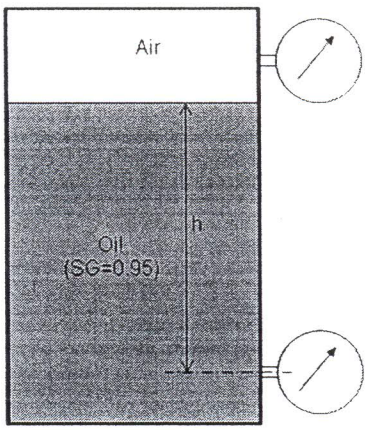

Figure Q4: Liquid static pressure

Question 5

Refer Figure Q5. The Model of a water cooled packaged chiller with reciprocating compressor. Condenser water supply is flowing at 38°C through a 4" schedule 40 steel pipe to cooling tower. The condenser water return is flowing at 30°C with flow rate of 30 L/s.

Assume that all the elbows are standard and all the butterfly valves are fully open, all check valves are a ball type and the pipe entrance from the evaporator and AHU Coil is a square edge inlet type.

(a) Estimate density and dynamic viscosity for supply and return condenser water

(5 marks)

(b) Calculate the Reynolds number for supply and return condenser water pipe

(5 marks)

(c). Calculate the friction factor and friction loss for supply condenser water pipe

(10 marks)

(d). Plot and find the friction factor and friction loss for return condenser water pipe by Moody's Diagram

(5 marks)

(e). The Total Energy Losses in the system

(10 marks)

(f). Calculate the energy needed for the system in kW if pump efficiency is 80%

(5 marks)

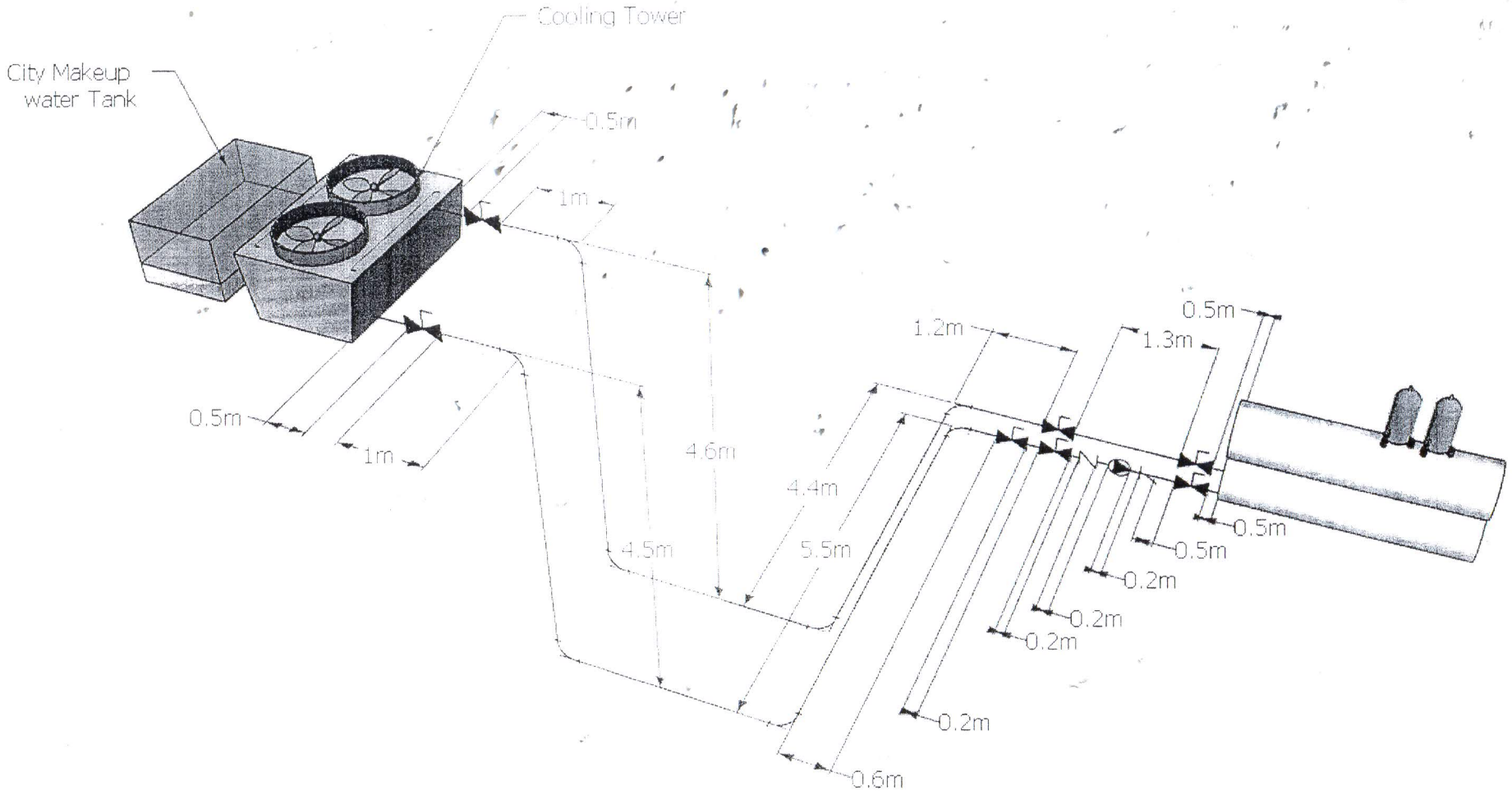

Figure Q5: Chilled Water System

END OF QUESTION