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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2011 SESSION

SUBJECT CODE	:	FMB 11203
SUBJECT TITLE	:	PNEUMATIC AND HYDRAULIC TECHNOLOGY
LEVEL	:	BACHELOR
TIME / DURATION	:	3.30pm – 6.00pm (2.5 HOURS)
DATE	:	09 MAY 2011

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 5 questions. Choose and answer 4 (FOUR) questions only.
6. Answer all questions in English.

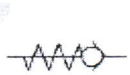
THERE ARE 5 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTION: Answer FOUR (4) questions only.

Answer on the answer booklet provided

Question 1

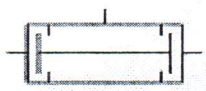
(a) Name the component for the following pneumatic symbols;

i. 

(2 marks)

ii. 

(2 marks)

iii. 

(2 marks)

(b) Draw the symbols for the following pneumatic components;

i. One way flow control valve

(2 marks)

ii. 4/2 way directional control valve, single solenoid, return by spring

(2 marks)

(c) A double acting cylinder is used to transfer work-pieces in a production machine. If the force needed for both extend and retract strokes is 3600 N and the working pressure used are 6 bars. Determine the suitable piston diameter for the cylinder. Given that frictional force is 10% from the theoretical force.

(15 marks)

Question 2

(a) Draw the symbols for the following hydraulic components

i. Accumulator

(2 marks)

ii. Flow meter

(2 marks)

iii. Two way hydraulic pump

(2 marks)

(b) A double acting hydraulic cylinder has a bore of 100mm. The rod is 40mm diameter and the stroke is 120mm. It must produce a pushing force of 12kN. The flow rate available in both directions is 12dm^3/min.

Determine :

i. The pressure needed for this case.

(4 marks)

ii. The extend force

(4 marks)

iii. Speed during the forward stroke

(4 marks)

iv. The retract speed

(4 marks)

v. The power used on the outstroke

(3 marks)

Question 3

(a) Explain briefly the oil flow in Pressure regulators valve below (***Figure 1a and 1b***):

(3 marks)

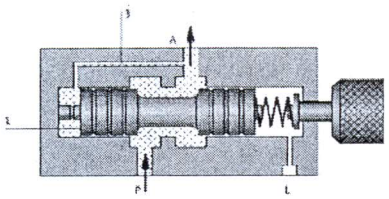


Figure 1a

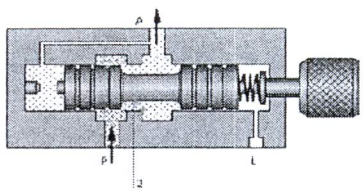


Figure 1b

(b) Briefly explain the functions of filter in hydraulic systems.

(4 marks)

(c) Explain the difference between laminar flow and turbulence flow.

(4 marks)

(d) Explain the mechanism of one way flow control valve in hydraulic system

(4 marks)

(e) List two functions of hydraulic fluids in the power supply section.

(4 marks)

(f) Briefly explain the importance of maintaining the viscosity in the hydraulic system.

(3 marks)

(g) Explain the different function between non return valve and one way flow control valve.

(3 marks)

Question 4

A hydraulic system shown in ***figure 2*** is used in a production line with circuit diagram. Answer the following questions based on the circuit diagram;

(a) Name the component **A, B** and **C**

(6 marks)

(b) State the function of component **D** in the system.

(3 marks)

(c) Explain the function of component **E** in the system.

(4 marks)

(d) List ***three*** types of arrangement that exist for component **A.**

(6 marks)

(e) State ***two*** function of component **C** other than storage for pressure medium.

(4 marks)

(e) Explain in detail the function of solenoid in component **J.**

(2 marks)

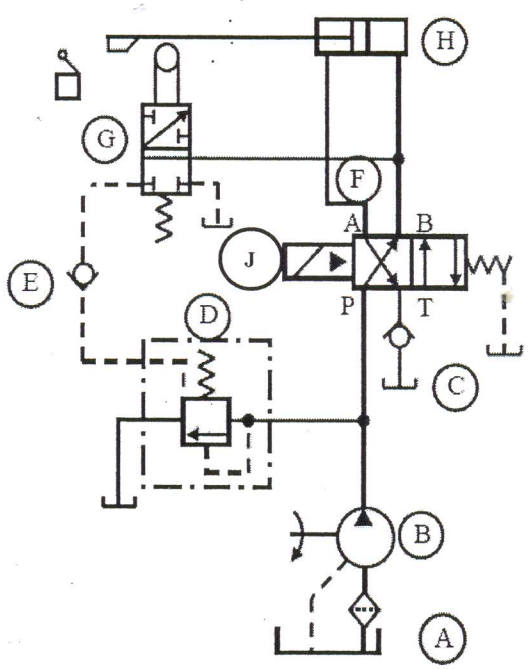


Figure 2

Question 5

Strips of metal (X) in ***figure 3*** are bent using a bending tool. The strip is inserted by hand. Once the **START** button has been pressed, **cylinder (1A)** clamps the work piece. **Cylinder (2A)** bends the part by 90° and retracts again immediately. **Cylinder (3A)** finishes the bending process and retracts instantly. Then **cylinders (1A)** will retract back to its initial position. The formed work piece is removed by hand.

(a) Draw the displacement step diagram.

(5 marks)

(b) Design the ***electro-pneumatic*** circuit diagram.

(20 marks)

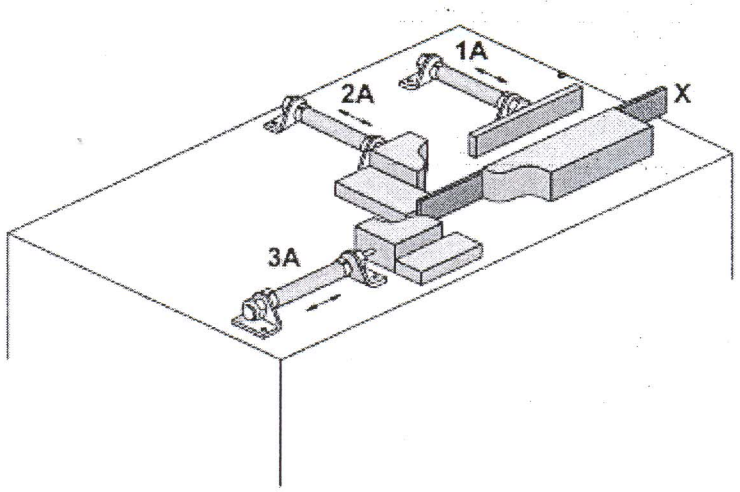


Figure 3

END OF QUESTION