



**UNIVERSITI KUALA LUMPUR**  
**Malaysia France Institute**

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**FINAL EXAMINATION**  
**JANUARY 2010 SESSION**

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**SUBJECT CODE** : FMD 21203  
**SUBJECT TITLE** : PNEUMATICS AND HYDRAULIC  
**LEVEL** : DIPLOMA  
**TIME / DURATION** : 3.00pm – 5.30pm  
( 3 HOURS )  
**DATE** : 30 APRIL 2010

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**INSTRUCTIONS TO CANDIDATES**

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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 questions 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.

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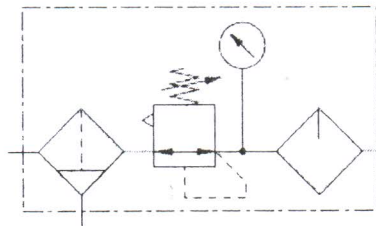
**SECTION A (Total: 60 marks)**

**INSTRUCTION: Answer ALL questions.**

**Please use the answer booklet provided.**

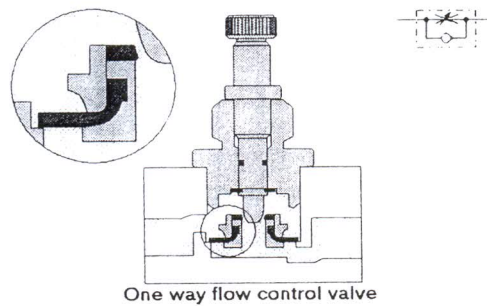
**Question 1**

- (a) State three applications of pneumatic systems in industry. (3 marks)
- (b) State three functions of service unit (FRL) that use in pneumatic system. (3 marks)
- (c) Explain briefly the functions of air drying in pneumatic system. (2 marks)
- (d) List two advantages and two disadvantages of using pneumatic system. (4 marks)
- (e) Simplified the service unit symbol below (Figure 1): (2 marks)



**Figure 1**

- (f) Explain briefly the air flow in one-way flow control valve below (Figure 2): (4 marks)



**Figure 2**

- (g) State the different function between one-way flow control valve and flow control valve. (2 marks)

## Question 2

- (a) A single acting cylinder with piston diameter **40mm** and rod diameter **10mm** is used to clamp work piece in a production machine. Calculate the extend force of the cylinder if working pressure used is **6 bar**. Assume that the frictional and spring forces are **10%** and **15%** of the calculated force respectively; give your answer in Newton (N).

(10 marks)

- (b) A hydraulic jack has a compression piston diameter of **450mm** and pump piston diameter of **50mm** as shown in figure 3 below. If the load on the compression piston is **1800 N**, and need to be raised by **18mm**, calculate the force (in N) and stroke needed for the pump piston (in mm).

(10 marks)

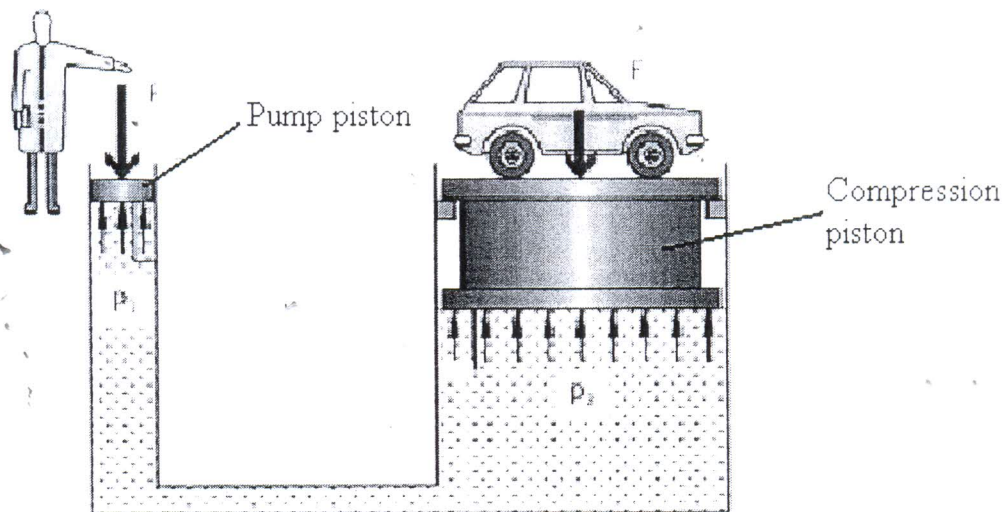
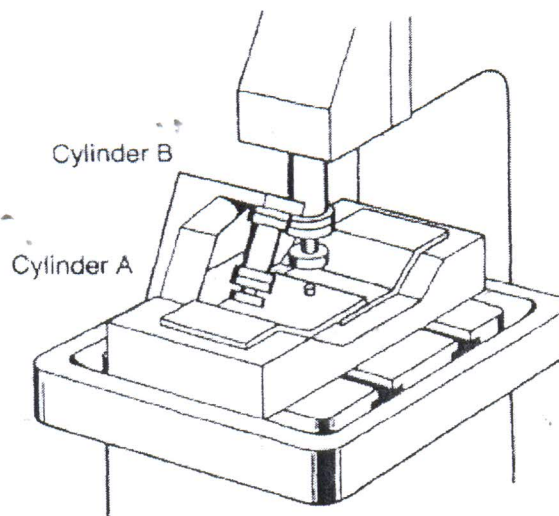


Figure 3

**Question 3**

Two clips are to be riveted together on a semi-automatic press as shown in figure 4 below. Components and rivet are positioned by hand and then removed by hand on completion of the riveting operation. The working cycle starts with holding and clamping of the components by cylinder A, follow by riveting by cylinder B. Once the cylinder B retracts to its initial position, the cylinder A then retracts to its initial position. The continuous cycle will start by actuating a 'Start' pushbutton, and stops by actuating 'Stop' pushbutton. It should stop at the end of sequence.

**Figure 4**

- (a) Draw the stroke step diagram for the cylinders.

(5 marks)

- (b) Design an electro-pneumatic circuit for the system.

(15 marks)

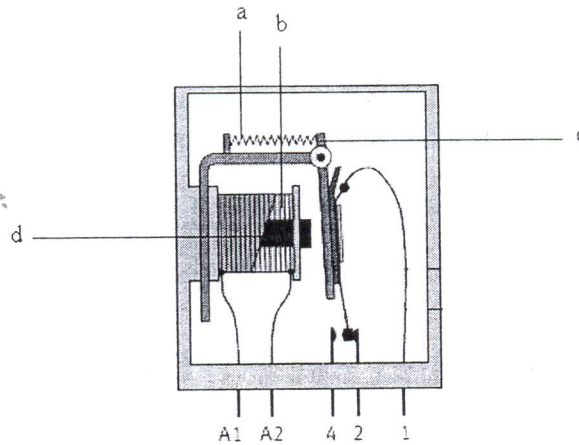
**SECTION B (Total: 40 marks)**

**INSTRUCTION: Answer TWO (2) questions ONLY.**

**Please use the answer booklet provided.**

**Question 4**

- (a) State the criteria need to be considering before choosing either to use pneumatic or hydraulic system. (2 marks)
- (b) State the different between mobile and stationary hydraulic. (2 marks)
- (c) State two applications of mobile hydraulic and stationary hydraulic. (4 marks)
- (d) Explain briefly, why the viscosity of the oil is very important in hydraulic system. (4 marks)
- (e) State two tasks of reservoir or tank in hydraulic system. (2 marks)
- (f) State two usages of pressure relief valve in hydraulics system. (2 marks)
- (g) Name the pneumatic relay parts in figure 5 below. (4 marks)



**Figure 5**

**Question 5**

A hydraulic system is used in a production line with circuit diagram shown in Figure 6.

Answer the following questions based on the circuit diagram;

- (a) Name the components 1, 2, 3 and 7 (4 marks)
  
- (b) State the function of component 4 in the system. (2 marks)
  
- (c) Name and state the function of component 5 in the system. (4 marks)
  
- (d) Name and state the function of component 6 in the system. (4 marks)
  
- (e) State one functions of component 8 other than works as storage for pressure medium. (2 marks)

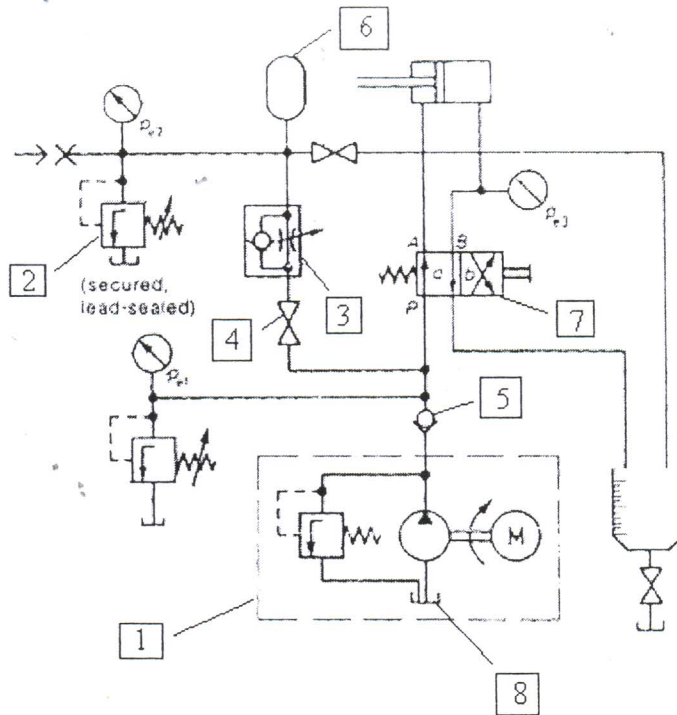


Figure 6

(g) Explain the air flow in roller (limit switch) below (Figure 9):

(4 marks)

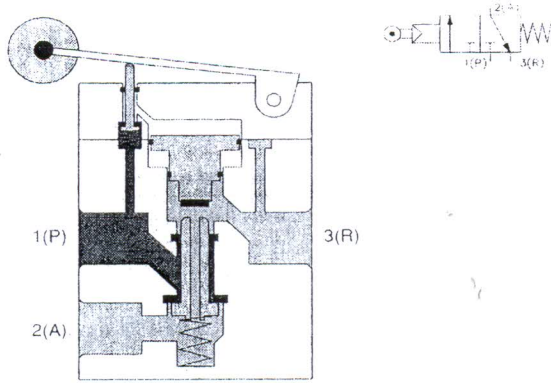


Figure 9

END OF QUESTION