

**UNIVERSITI KUALA LUMPUR
MALAYSIAN INSTITUTE OF INDUSTRIAL TECHNOLOGY**

**FINAL EXAMINATION
JANUARY 2016 SEMESTER**

COURSE CODE : JFB 20203
COURSE TITLE : HYDRAULIC & PNEUMATIC CONTROL SYSTEM
PROGRAMME LEVEL : BACHELOR
DATE : 29 MAY 2016
TIME : 9.00 AM – 12.00 PM
DURATION : 3 HOURS

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. This question paper consists of ONE (1) section.**
 - 4. This question paper consists of FIVE (5) questions.**
 - 5. Answer FOUR (4) questions only.**
 - 6. Please write your answers on the answer booklet provided.**
 - 7. Please answer all questions in English only.**
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THERE ARE 5 PAGES OF QUESTIONS EXCLUDING THIS PAGE.

Total: 100 Marks

INSTRUCTION: Answer FOUR (4) Question Only

Please use the answer booklet provided.

Question 1

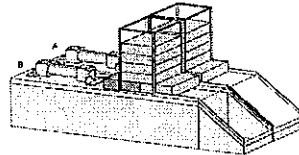


Figure 1: Pneumatic System in Packaging System

Pneumatic system is proposed to be installed in packaging system in production line. Based on Figure 1, two unit of piston are required to design as equation below;

A+ A- B-

B+

(a) List all equipment related in this system.

(8 marks)

(b) Solve the problem using mechanical system in pneumatic application.

(10 marks)

(c) Analyze the circuit in question 1b to improve the system in order to get a continuous cycle.

(4 marks)

(d) Explain the circuit in question c using displacement step diagram.

(3 marks)

Question 2

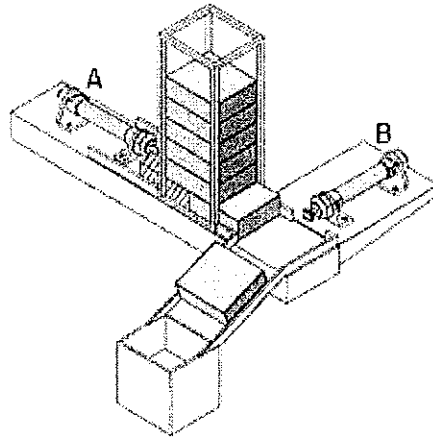


Figure 2: Pneumatic System

Figure 2 shows current system in the production line. As an engineer you are required to improve the design of pneumatic system from two piston to four unit of piston base on algorithm below:

$$A+B+A-B- \rightarrow A+ B+ C+D+D-$$

$$A-B-C-$$

(a) List all equipment related in this system.

(8 marks)

(b) Sketch 1 cycle operation of the system

(10 marks)

(c) The system for one cycle need to be improve from 1 cycle to continuous cycle base on the time issues. Solve the situation given to get continuous cycle to the system.

(7 marks)

Question 3

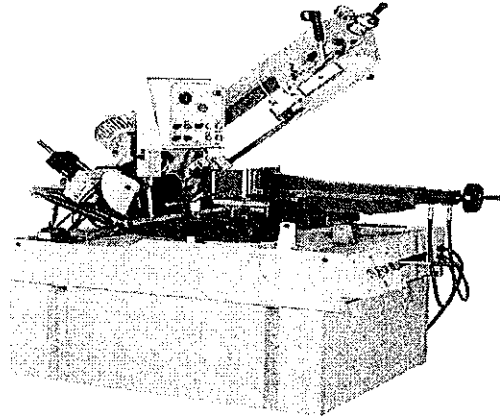


Figure 3: Cutting Machine with Different Pressure

Figure 3 shows the cutting machine (20 bar) and this cutting machine need to be improved on the pressure since the system is operating with two different pressure which are 15bar and 10 bar.

- (a) Recognize the system using mechanical equipment in order to get cutting function in hydraulic system with 20 bar of operation.

(8 marks)

- (b) Sketch the electrical diagram for 20bar operation of cutting machine

(10 marks)

- (c) System need to upgrade with 2 different function. Analyze the situation to improve the system with 15bar and 10 bar of power for hydraulic system.

(7 marks)

Question 4

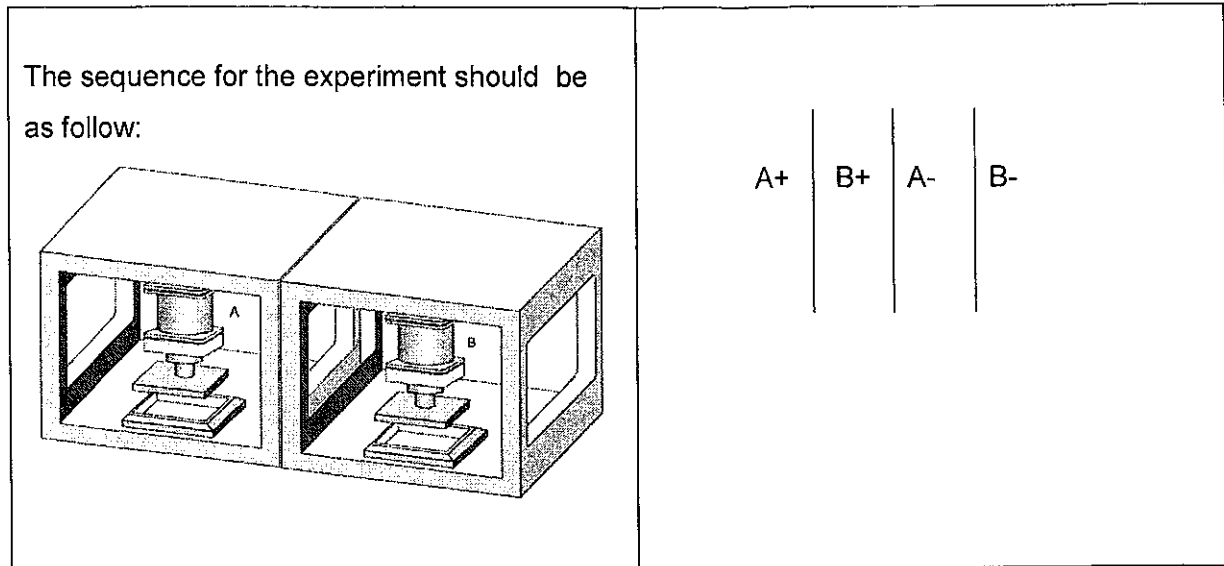


Figure 4: Packaging System

Figure 4 shows the electro pneumatic system in packaging process. Packaging system in factory need to be upgraded from two piston to three unit of piston based on increasing demand of product and reduce the time of production. As engineer you are required to design a new system for your production line.

- (a) List all equipment related to design the system. (8 marks)
- (b) Sketch the system using mechanical design. (5 marks)
- (c) Sketch the electrical system for this system. (5 marks)
- (d) Explain the system using displacement step diagram. (7 marks)

Question 5

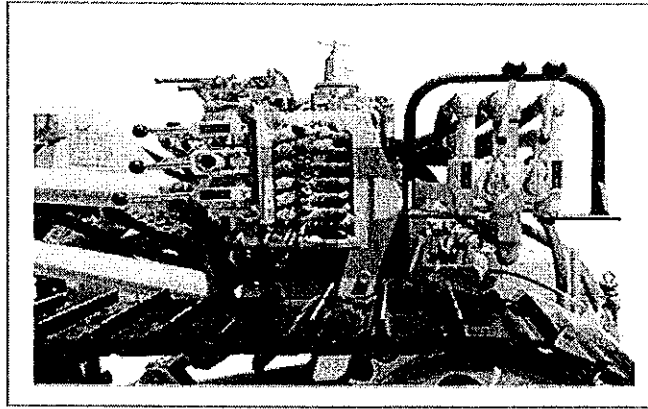


Figure 5: Drilling System in Off Shore Application

Hydraulic system had been used widely in many field such as in manufacturing, automotive or oil and gas industry. In Figure 5 shows drilling system in oil and gas system which is functioning to drill under the sea water to get crude oil. However the system used conventional system. As an engineer you are required to design drilling system by using electro hydraulic system. In this system vendor has been request to operate in two pressure which are 15 bar and 20 bar. The drilling system are need to be designed with 2 time drilling process which the first one is to drill with maximum and the second time with half extend of the drilling. Ensure your circuit are design with safety precaution. As engineer you are required to ;

(a) List out all equipment to use in this system.

(8 marks)

(b) Sketch Hydraulic Control Circuit and control circuit.

(10 marks)

(c) Explain the circuit by using displacement step diagram.

(7 marks)

END OF EXAMINATION PAPER