

EXAMINATION AND EVALUATION DIVISION
DEPARTMENT OF POLYTECHNIC EDUCATION
(MINISTRY OF HIGHER EDUCATION)

MECHANICAL ENGINEERING DEPARTMENT

FINAL EXAMINATION
JUNE 2012 SESSION

JJ512: PNEUMATIC & HYDRAULICS

DATE: 21 November 2012 (Wednesday)

DURATION: 2 HOURS (11.15 AM - 1.15 PM)

This paper consists of **FIVE (5)** pages including the front page.

Essay (6 questions – answer 4 questions)

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**DO NOT OPEN THIS QUESTION PAPER UNTIL INSTRUCTED BY THE CHIEF
INVIGILATOR**

(The CLO stated is for reference only)

ESSAY (100 marks)

INSTRUCTION:

This section consists of **SIX (6)** questions. Answer **FOUR (4)** questions **ONLY**.

QUESTION 1

a) List **FIVE (5)** advantages of the pneumatic system in industry. [CLO1: C1]

- senang disimpan
 - senang disalurkan
 - sistem yang mudah
 - murah
 - tidak mudah bocor
 - kos pengenggaraan yang murah
- (5 marks)

b) Draw the symbol for each pneumatic of the components below: [CLO 1 : C1]

- i. Dual pressure valve.
- ii. 3/2-way, normally open with push button
- iii. Check valve.
- iv. 5/2-way double pilot

(8 marks)

c) Contrast the working principle of single stage reciprocating compressor and two stage reciprocating compressor. [CLO1: C4]




(12marks)

QUESTION 2

(a) List **FIVE (5)** types of cylinder mounting in pneumatic system. [CLO1: C1]

- ram
 - rale dan pinion
 - gear
- (5 marks)

(b) Sketch and explain the function of each of the components below: [CLO1: C2]

- i. Directional Control Valve 
- ii. Flow Control Valve 
- iii. Non Return Valve 

(9 marks)


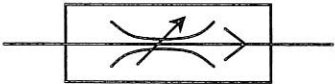

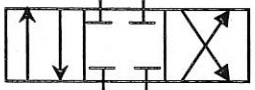

- (c) State the main difference between the single acting cylinder and double acting cylinder. [CLO1 : C3] (4 marks)
- (d) Calculate the size of a double acting cylinder operating at a pressure of 6 bars that would generate a clamping force of 2500 N.
Given, (standard diameter: 8, 10, 12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 200 mm). [CLO1: C4] (7 marks)

QUESTION 3

- (a) Draw the basic circuit of pneumatic system using the: [CLO1 : C3]
- i. OR Functions (4 marks)
 - ii. AND Functions (4 marks)
- (b) Given a sequence Movement :
A+ B+ A- B-
- i. Draw a Time Motion Diagram. [CLO1 : C1] (5 marks)
 - ii. Draw the sequential pneumatic circuit for the movement. [CLO1 : C1] (12 marks)

QUESTION 4

- a) List **THREE (3)** methods of **moving valves** and **THREE (3)** methods of **controlled valve**. [CLO1 : C1] (6 marks)
injap selhala, injap return, injap 2 hula, injap releya, arah, aliran, tekanan
- b) Name the symbols of hydraulic components that are listed below. [CLO1 : C1] (5 marks)

No	ISO symbol	Component
1		
2		
3		Penampung
4		injap kawalan berarah
5		pam

- c) State **TWO (2)** functions of a hydraulic relief valve. [CLO1 : C2] (4 marks)
- membuang tekanan berlebihan
- d) Sketch and explain the Spool type of Directional Control Valve. [CLO1: C4] (10 marks)

QUESTION 5

- a) State **FIVE (5)** main components in basic hydraulics system. [CLO1 : C1]

- injap - silinder - penapis - perumput (5 marks)
 - pam - tangki - motor

- b) Explain **TWO (2)** functions of pressure switch in hydraulics system for close centre circuit. [CLO1 : C2]

(4 marks)

- c) Sketch the hydraulic circuit of open loop system and close loop system.

[CLO1 : C3]



(10 marks)

- d) Explain **THREE (3)** major differences between the open loop system and close loop system. [CLO1 : C4]

(6 marks)

QUESTION 6

- a) List **FOUR (4)** additional components that are used to increase the efficiency of a hydraulic circuit. [CLO 1 : C1]

(4 marks)

- b) There are several problems that have been identified in the hydraulic system which can disrupt the system. Explain **FOUR (4)** problems that occur in the cylinder. [CLO1: C2]

(8 marks)

- c) Draw an electro hydraulic circuit to control double direction hydraulic motor with double solenoid valve. [CLO1 : C4]

(13 marks)