

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN MALAYSIA**

JABATAN KEJURUTERAAN MEKANIKAL

**PEPERIKSAAN AKHIR
SESI DISEMBER 2018**

DJJ5123: PNEUMATIC AND HYDRAULIC

**TARIKH : 17 APRIL 2019
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)**

Kertas ini mengandungi **LAPAN (8)** halaman bercetak.
Struktur (4 soalan)
Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN
(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer ALL questions.

ARAHAN :

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

CLO1
C1

- a) Draw the symbols of the pneumatic components below:
Lukiskan simbol bagi komponen-komponen pneumatik berikut :
- Air compressor / *Pemampat Udara*
 - Pressure source / *Punca tekanan*
 - Filter / *Penapis*
 - Filter with water trap / *Penapis dengan pengasing air*
 - Air dryer / *Pengering Udara*

[5 marks]
[5 markah]

CLO1
C2

- b) Sketch Air Service Unit symbol and differentiate the function of Filter, Regulator and Lubricator (FRL) for Air Service Unit.
Lakarkan simbol Unit Khidmat Udara dan bezakan fungsi Penapis, Pengawal Tekanan dan Pelincir bagi Unit Khidmat Udara.

[10 marks]
[10 markah]

CLO1
C3

- c) Draw the cross section diagram and describe the working operation of Two Stages Piston Compressor.
Lukiskan keratan rentas dan terangkan operasi kerja bagi Pemampat Salingan Dua Peringkat

[10 marks]
[10 markah]

QUESTION 2

SOALAN 2

CLO2
C3

a)

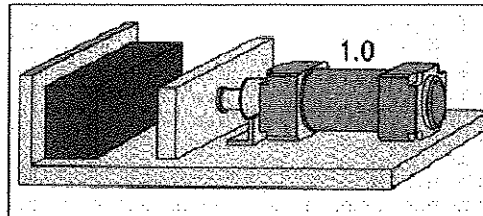


Figure 2(a)

A single acting cylinder of 50mm diameter is to clamp a component when a push button is pressed. As long as the push button is activated, the cylinder is to remain in the clamped position. If the push button is released, the clamp is to retract. Using component below, draw the pneumatic circuit for this problem :

Silinder satu tindakan berdiameter 50mm akan mengunci bahan kerja bila butang tekan di tekan. Selagi mana butang tekan di aktifkan, silinder kekal di posisi mengunci. Bila butang tekan dilepaskan, silinder mengunci kembali ke keadaan asalnya. Dengan menggunakan komponen di bawah, lukiskan litar penumatik untuk masalah ini :

- 1pcs - single acting cylinder normally retract
- 1pcs - 3/2 DVC single pilot
- 1pcs – 3/2 DCV push button

[5 marks]

[5markah]

CLO2
C4

b)

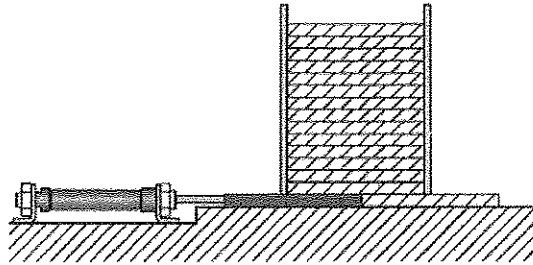


Figure 2(b)

Wooden board are to be pushed by a double acting cylinder from a stacking magazine into an assembly device. Pressing of a push button causes a wooden board to be pushed out of the staking magazine sensor is placed. At the forward end position of the cylinder. Once the forward end position is reached, the slide is moved into the initial position. Using Double Acting Cylinder and 5/2 DCV Double Solenoid, develop diagram:

Kotak kayu akan di tolak oleh silinder dua tindakan dari raknya ke rak pemasangan bila butang tekan di aktifkan. Di penghujung posisi silinder di letakkan penderia. Bila silinder berada di hujung penolakannya, secara sendirinya silinder akan kembali ke keadaan asal. Dengan menggunakan silinder dua tindakan dan injap 5/2 DCV dua solenoid, bina diagram;

i. Pneumatic Circuit

Litar Pneumatik

[5 marks]

[5 markah]

ii. Ladder Diagram Circuit

Litar Gambarajah Tetangga

[5 marks]

[5 markah]

CLO2
C5

c)

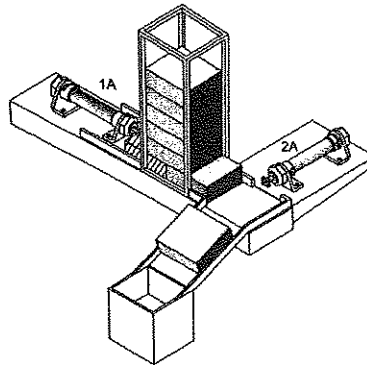


Figure 2 (c)

The two cylinders are used to transfer parts from magazine into a chute. When a push button is pressed, the first cylinder extends, pushing the part from the magazine and positions it in preparation for transfer by second cylinder onto the outfeed chute. Once the part is transferred, the first cylinder retracts, followed by the second. Confirmation of all extended and retracted positions are required. Based on this situation construct:

Dua silinder digunakan untuk memindahkan komponen dari rak ke pelongsor. Bila butang tekan di aktifkan, silinder pertama akan menolak komponen dari raknya ke posisi depan dan sedia di pindahkan oleh silinder ke dua ke pelongsor. Bila komponen selesai di pindahkan silinder pertama akan kembali ke posisi asalnya dan di ikuti silinder kedua. Pengesahan posisi depan dan belakang silinder diperlukan. Berdasarkan situasi ini bina :

- i. Sequence movement Time Motion Diagram

Jujukan pergerakan Gamarajah Gerakan Masa

[2 marks]

[2 markah]

- ii. Pneumatic Circuit Diagram

Gambarajah Litar Pneumatik

[8 marks]

[8 markah]

QUESTION 3

SOALAN 3

CLO1
C1

- (a) State **FIVE (5)** types of control valve in hydraulic system.
*Nyatakan **LIMA (5)** jenis injap kawalan dalam system hidraulik.*

[5 marks]
[5 markah]

CLO1
C2

- (b) Explain briefly the function of hydraulic components listed below.
Terangkan secara ringkas fungsi komponen-komponen hidraulik seperti senarai di bawah,

1. Hydraulic pump / *Pam hidraulik*
2. Accumulator / *Penumpuk*
3. Reservoir / *Tangki*
4. Hydraulic motor / *Motor hidraulik*
5. Pressure relief valve / *Injap pelega tekanan*

[10 marks]
[10 markah]

CLO1
C3

- (c) Pump is the main component in hydraulic system. Draw and label the construction of vane pump.
Pam merupakan komponen terpenting di dalam sistem hidraulik. Lakar serta labelkan binaan bagi pam jenis bilah.

[10 marks]
[10 markah]

QUESTION 4

SOALAN 4

CLO2
C2

- a) Explain the meter-in operation to extend a hydraulic cylinder by constructing a simple hydraulic circuit.

Terangkan operasi "meter-in" untuk pergerakan hadapan silinder hidraulik dengan membina satu litar hidraulik mudah.

[5 marks]

[5 markah]

CLO1
C3

- b) Hydraulic cylinders are compact and relatively simple. Show how to troubleshoot problems in the cylinder due to external leakage, internal leakage, creeping, sluggish operation and loose mounting.

Silinder hidraulik adalah bercirikan binaan yang agak mudah dan padat. Tunjukkan bagaimana untuk menyelesaikan masalah bagi keadaan-keadaan seperti kebocoran luaran, kebocoran dalaman, creeping, sluggish operation dan pemasangan longgar.

[10 marks]

[10 markah]

CLO2
C4

- c) By analysing and selecting hydraulic component listed in the Table 4(c), construct a circuit that can open and close a furnace door. Figure 4 (c) shows the schematic of the door that will be controlled on the furnace.

Dengan membuat analisa dan memilih komponen-komponen hidraulik yang tersenarai di dalam jadual 4(c) di bawah, bina sebuah litar yang dapat membuka dan menutup suatu pintu relau. Rajah 4(c) menunjukkan skematik pintu yang akan dikawal pada relau itu.

No.	Item Label	Quantity	Description
1	0Z1	1	Hydraulic Power Pack
2	0Z2	1	Pressure gauge
3	0V	1	Pressure relief valve
4	1V	1	4/2 way valve, manually operated
5	1A	1	Double Acting Cylinder

Table 4(c): List of Components

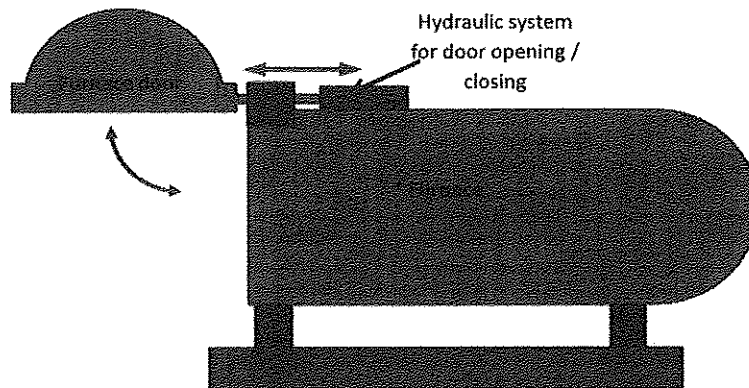


Figure 4(c): Furnace and its door

[10 marks]
[10 markah]

SOALAN TAMAT