

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI**

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI DISEMBER 2017

DEJ3143 : INSTRUMENTATION

TARIKH : 11 APRIL 2018

MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.

Bahagian A: Objektif (10 soalan)

Bahagian B: Struktur (4 soalan)

Bahagian C: Esei (2 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A: 10 MARKS
BAHAGIAN A: 10 MARKAH

INSTRUCTION:

This section consists of **TEN (10)** objective questions. Mark your answers in the OMR form provided.

ARAHAN :

*Bahagian ini mengandungi **SEPULUH (10)** soalan objektif. Tandakan jawapan anda di dalam borang OMR yang disediakan.*

CLO1
C1

1. Choose an example of an active transducer.
Pilih satu contoh bagi transduser aktif.

- A. strain gauge
Tolok Terikan
- B. Resistance Temperature Detector (RTD)
pengganding suhu rintangan (RTD)
- C. thermistors
termistor
- D. piezoelectric
piezoelektrik

CLO1
C2

2. "A device used to measure the strain of an object. It consists of an insulating flexible backing which supports a metallic foil pattern."

Which is the best answer for the statement above?

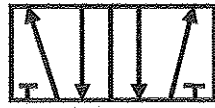
"Satu alat yang digunakan untuk mengukur tekanan objek. Ia terdiri daripada sokongan penebat fleksibel yang menyokong corak foil logam."

Pilih jawapan yang terbaik bagi kenyataan di atas?

- A. humidity sensor
pegasan kelembapan
- B. piezoelectric
piezoelektrik
- C. strain gauge
tolok terikan
- D. photocell
fotosel

CLO1
C2

3. The directional control valve show on figure below indicate
Injap kawalan berarah yang ditunjukkan di bawah menunjukkan

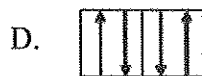


- A. 3/2 way valve
injap 3/2 hala
- B. 4/3 way valve
injap 4/3 hala
- C. 5/2 way valve
injap 5/2 hala
- D. 5/3 way valve
injap 5/3 hala

CLO2
C3

4. "A 3/2 way valve has a pressure port 1(P), outlet port 2(A) and exhaust port 3(R)."
"Sebuah injap 3/2 hala mempunyai satu liang tekanan 1(P), satu liang keluaran 2(A) dan satu liang ekzos 3(R)."

Which of the following figure illustrates the statement above?
Yang mana satu rajah berikut menggambarkan kenyataan di atas?

CLO1
C2

5. Choose the advantage of hydraulic.
Pilih kelebihan hidraulik.

- A. Sensitivity to dirt
kepekaan terhadap kotoran
- B. Can easily cause burns and irritations
boleh menyebabkan kelecuman dan kegatalan
- C. Precise positioning
kedudukan jitu
- D. Temperature dependence
kebergantungan suhu

CLO2
C3

6. A hydraulic system can be divided into three main segments. Arrange the correct answer in sequence.

Satu sistem hidraulik boleh dibahagikan kepada tiga segmen utama. Susunkan jawapan yang betul mengikut turutan.

- A. Actuator, Valve, Pump
Penggerak, Injap, Pam
- B. Pump, Sensor, Actuator
Pam, penderia, Penggerak
- C. Actuator, Sensor, Valve
Penggerak, Penderia, Injap
- D. Valve, Actuator, Transmitter
Injap, Penggerak, Pemancar

CLO1
C1

7. Choose the standard analog signal in industry.

Pilih standard isyarat analog di industri.

- A. 40-200mA
- B. 4-20mA
- C. 4-20A
- D. 0.4-2A

CLO1
C2

8. Choose the most suitable valve which can fulfill the industry requirement as below:

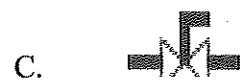
Pilih injap yang paling sesuai untuk memenuhi keperluan industri seperti di bawah:

- can be operated fully open or fully closed
boleh beroperasi dalam terbuka penuh atau tertutup penuh
- used for isolation clear water
digunakan untuk pengasingan air
- have low pressure drops
kejatuhan tekanan adalah rendah
- open and close quickly
buka dan tutup dengan cepat
- easily actuated
mudah dikendalikan

- A. Ball valve
Injap bebola
- B. Butterfly valve
Injap rama-rama
- C. Globe valve
Injap glob
- D. Angle valve
Injap sudut

CLO1
C1

9. Identify the P&ID symbol for pneumatic gate valve.

Kenalpasti simbol P&ID yang betul bagi injap pintu pneumatik.

CLO1
C2

10.

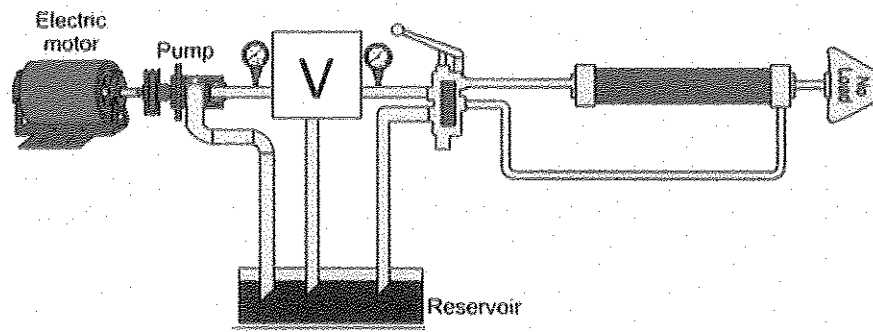


Diagram A10/ Rajah A10: Process Diagram of hydraulic system

By referring to the V box in above diagram, match the suitable valve by its symbol that can perform the operation as in the process diagram.

Merujuk kepada kotak V dalam rajah di atas, pilih injap berdasarkan simbol yang boleh menjalankan operasi seperti dalam gambarajah blok tersebut.

A.

B.

C.

D.

SECTION B : 60 MARKS

BAHAGIAN B : 60 MARKAH

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) List **THREE (3)** types of light transducer.

Senaraikan TIGA (3) jenis transduser cahaya.

[3 marks]

[3 markah]

CLO1
C2

- b) Explain the seeback effect in Thermocouple sensors by referring to diagram B1(b) below.

Terangkan kesan seeback dalam pengesanan pengganding suhu dengan merujuk kepada gambarajah B1(b) di bawah.

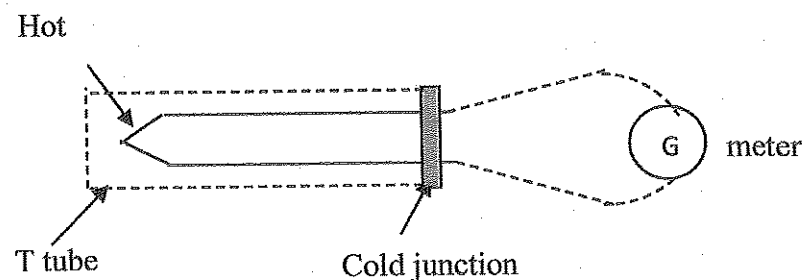


Diagram B1 (b) / Gambarajah B1 (b)

[5 marks]

[5 markah]

CLO2
C3

- c) Illustrate and explain how the photodiode operates.

Gambarkan dan terangkan bagaimana fotodiod beroperasi.

[7 marks]

[7 markah]

QUESTION 2

SOALAN 2

CLO1
C1

- a) List THREE (3) application of pneumatic in industry.
Senaraikan TIGA (3) aplikasi pneumatik dalam industry.

[3 marks]

[3 markah]

CLO1
C2

- b) Distinguish between the advantages and disadvantages of pneumatic system.
Kenal pasti kebaikan dan kelemahan sistem pneumatic

[5 marks]

[5 markah]

CLO2
C3

- c) The Diagram B2 illustrates a valve in operating condition. Show the symbol of valve operand, and briefly explain the operation.

Rajah B2 menggambarkan sebuah injap dalam keadaan kendaliannya. Lukiskan simbol bagi kendalian injap dan terangkan secara ringkas kendalian injap tersebut..

[7 marks]

[7 markah]

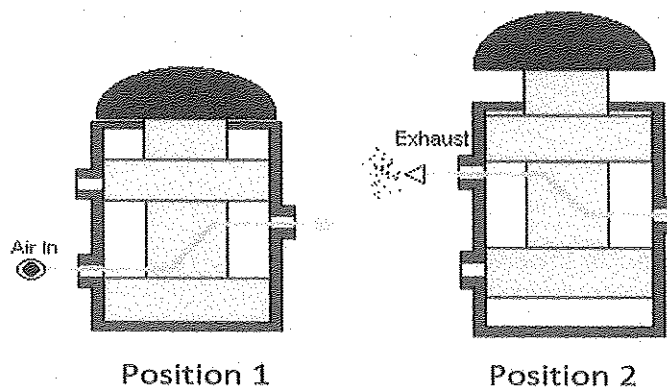


Diagram B2/ Rajah B2

QUESTION 3

SOALAN 3

CLO1
C1

- a) State **THREE (3)** applications of hydraulic system in industry.

Nyatakan TIGA (3) aplikasi sistem hidraulik di industri.

[3 marks]

[3 markah]

CLO1
C2

- b) Sketch symbols of pump, motor, tank, filter and relief valve.

Lakarkan simbol pam, motor, tangki, penapis dan injap pelega.

[5 marks]

[5 markah]

CLO2
C3

- c) Explain Pascal's Law with aid of diagram and state the formula.

Terangkan hukum pascal's dengan berbantuan rajah dan nyatakan formulanya.

[7 marks]

[7 markah]

QUESTION 4

SOALAN 4

CLO1
C1

- a) Give **THREE (3)** applications of electrical transmitter.

Berikan TIGA (3) aplikasi pemancar elektrik.

[3 marks]

[3 markah]

CLO1
C2

- b) Differentiate Process Flow Diagram (PFD) and Piping & Instrumentation Diagram (P&ID).

Bezakan Process Flow Diagram (PFD) and Piping & Instrumentation Diagram (P&ID).

[5 marks]

[5 markah]

CLO2
C3

- d) Illustrate the symbol of butterfly valve and explain the operation.

Gambarkan simbol injap kupu-kupu dan terangkan operasi.

[7 marks]

[7 markah]

SECTION C : 30 MARKS**BAHAGIAN C : 30 MARKAH****INSTRUCTION:**

This section consists of **TWO (2)** essay questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan esei. Jawab SEMUA soalan.

CLO2
C3

QUESTION 1**SOALAN 1**

With an appropriate diagram, explain how a 4/2-way valve is used to control a double-acting pneumatic cylinder in both conditions: **EXTEND** and **RETRACT**.

Dengan gambarajah yang sesuai, terangkan bagaimana injap 4/2 hala digunakan untuk mengawal silinder pneumatik dua tindakan dalam kedua-dua keadaan: MELANJUTKAN dan MENARIK.

[15 marks]

[15 markah]

CLO2
C3

QUESTION 2

SOALAN 2

Based on the Diagram C2, sketch the circuit and explain the function of each component (a,b,c,d,and e) of the hydraulic system.

Berdasarkan Rajah C2, lakarkan litar dan terangkan fungsi setiap komponen (a, b, c, d dan e) untuk system hidraulik.

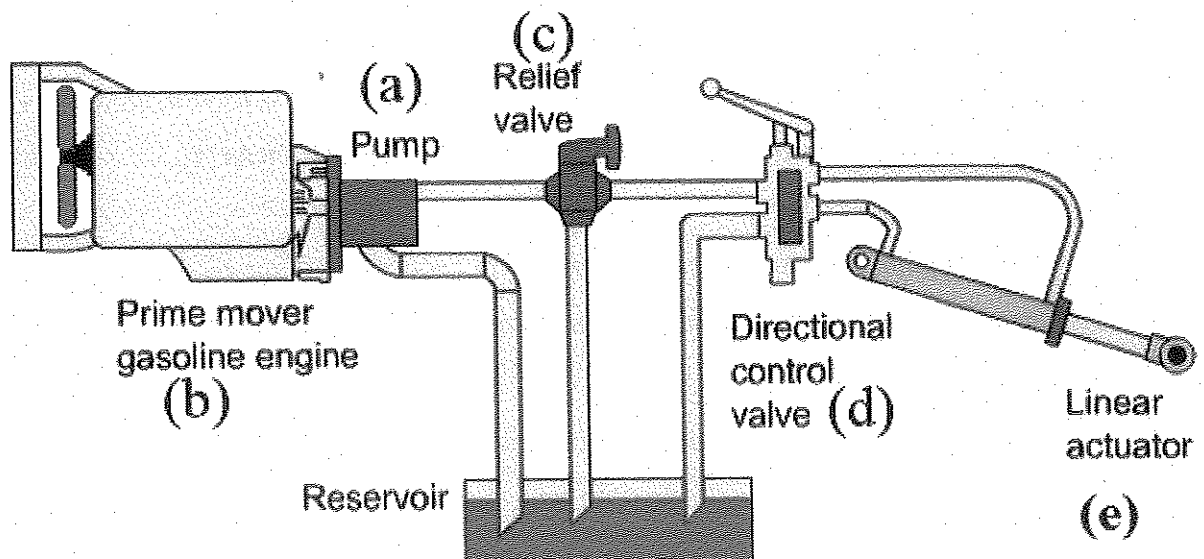


Diagram C2/ Rajah C2: Process

[15 marks]

[15 markah]

SOALAN TAMAT