

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO 1
C2

a. Give FOUR (4) benefits of using a Control System.

a. Berikan EMPAT (4) faedah menggunakan Sistem Kawalan.

(6 marks)

(6markah)

CLO 1
C3

b. Sketch P&ID of a temperature Control System in a vessel and explain its operation.

b. Lakarkan rajah P&ID Sistem Kawalan Suhu dalam tangki dan terangkan pengoperasiannya.

(8 marks)

(8 markah)

CLO 1
C4

c. Find the control ratio of a Control System as shown in Figure 1.

c. Dapatkan nisbah kawalan Sistem Kawalan seperti ditunjukkan dalam Rajah 1.

(11 marks)

(11 markah)

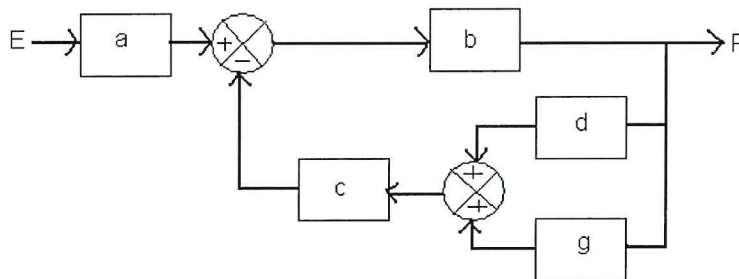


Figure 1/Rajah 1

QUESTION 2
SOALAN 2CLO 1
C2

- a. Explain with the aid of a diagram the steady state error stage in Control System response.
- a. *Terangkan dengan bantuan gambar rajah peringkat ralat keadaan mantap pada sambutan Sistem Kawalan.*

(5 marks)

(5 markah)

CLO 1
C3

- b. Figure 2 shows the response of a system when applied with a unit step. Use the plot to find the values for,

- i. Settling Time (T_s)
- ii. Peak Time (T_p)
- iii. Overshoot Percentage (% OS)

- b. *Rajah 2 menunjukkan sambutan sistem apabila dikenakan isyarat langkah. Gunakan plot tersebut untuk mendapatkan nilai,*

- i. *Masa Endapan (T_s)*
- ii. *Masa Puncak (T_p)*
- iii. *Peratus Lajakan (% OS)*

(6 marks)

(6 markah)

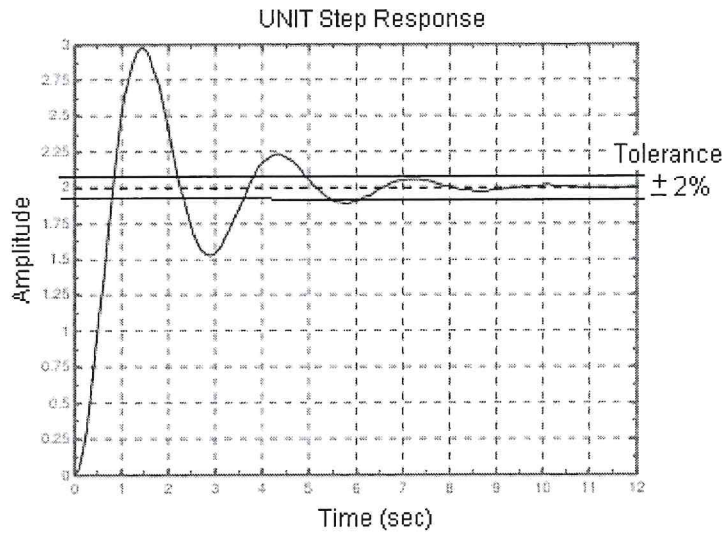


Figure 2/ Rajah 2

CLO 1
C4

- c. Draw the circuit and distinguish the operation of the Comparator Amplifier with Summing Amplifier. Explain their function in control system .
- c. Lukiskan litar dan bezakan cara operasi penguat pembanding dengan penguat jumlah. Jelaskan fungsi mereka dalam sistem kawalan.

(14 marks)

(14 markah)

QUESTION 3
SOALAN 3

CLO 1
C2

- a. Explain why we will not be able to run a control system without the proportional (P) mode ?
- a. Terangkan mengapakah kita tidak boleh menjalankan sistem kawalan tanpa tindakan perkadaran (P) ?

(5 marks)

(5 markah)

- CLO 1
C3
- b. Sketch a circuit and briefly explain of a PID Mode Electronic Controller by using only one operational amplifier and appropriate resistors. Two switches are used as mode type selector.
- b. *Lakarkan dan terangkan secara ringkas satu litar pengawal elektronik tindakan PID dengan hanya menggunakan satu penguat operasi dan perintang-perintang yang sesuai. Dua suis digunakan sebagai pemilih jenis tindakan.*
- (8 marks)
(8 markah)
- CLO 1
C4
- c. Distinguish and briefly explain between PI and PD Pneumatic Controller Modes.
- c. *Bezakan dan terangkan secara ringkas antara pengawal pneumatik tindakan PI dengan PD.*
- (12 marks)
(12 markah)
- QUESTION 4**
SOALAN 4
- CLO 1
C2
- a. Give FIVE (5) basic functions of a computerised process control.
- a. *Berikan LIMA (5) fungsi asas kawalan proses berkomputer.*
- (5 marks)
(5 markah)
- CLO 1
C3
- b. Modify a Multi-loop Control System in P&ID as shown in Figure 3 to a Direct Digital Control method .
- b. *Ubahsuaikan semula sistem kawalan pelbagai-gelung dalam P&ID seperti ditunjukkan dalam rajah 3 kepada kaedah kawalan Digital Terus.*
- (6 marks)
(6 markah)

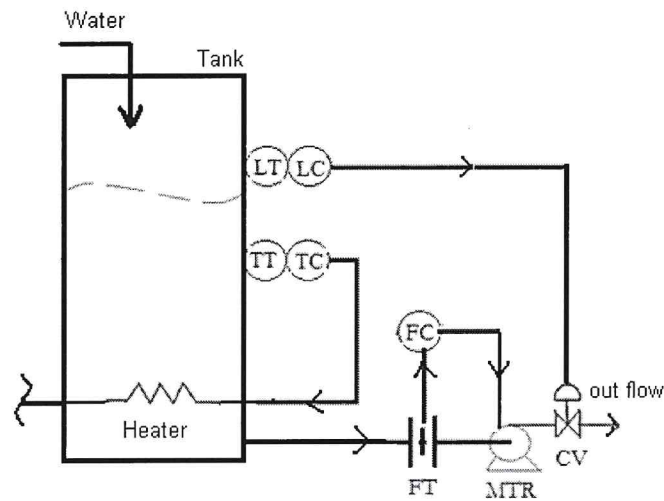


Figure 3/ Rajah 3

CLO 1
C4

- c. Adaptive control is divided into two adjustment rule types, namely, direct and indirect adaptive control. Distinguish between the direct and indirect adaptive control.
- c. *Kawalan tersuai adalah terbahagi kepada dua jenis peraturan pelarasan, iaitu kawalan tersuai langsung dan tidak-langsung. Bezakan antara kawalan tersuai langsung dan tidak langsung..*

(14 marks)

(14 markah)

END OF QUESTIONS

SOALAN TAMAT