



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

**JABATAN KEJURUTERAAN ELEKTRIK**

**PEPERIKSAAN AKHIR  
SESI DISEMBER 2017**

**DEE3043 : ELECTRONIC CIRCUITS**

**TARIKH : 02 APRIL 2018**

**MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)**

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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

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN**

(CLO yang tertera hanya sebagai rujukan)

**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 regulator circuit  
*Senaraikan TIGA (3) jenis litar pengatur.*

[3 marks]

[3 markah]

CLO1  
C2

- (b) A basic Direct Current (DC) power supply consists of five main sections. Draw the diagram block of Direct Current (DC) power supply and explain the function for each diagram block.

*Bekalan kuasa arus terus mempunyai lima bahagian utama. Lukiskan gambarajah blok bekalan kuasa arus terus tersebut dan terangkan setiap fungsi gambarajah blok itu.*

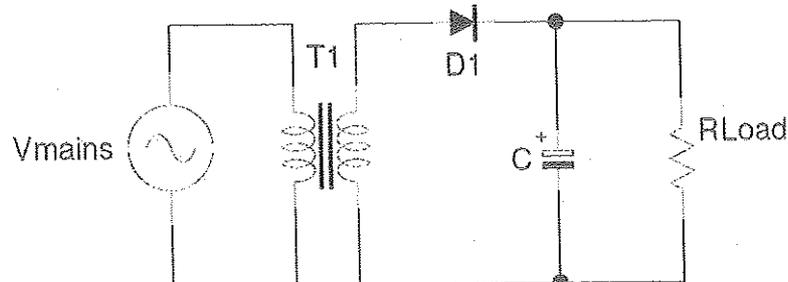
[5 marks]

[5 markah]

CLO2  
C3

- (c) **Figure B1(c)** shows the circuit diagram for a basic Direct Current (DC) power supply. Name and illustrate the operation of the circuit.

*Rajah B1(c) menunjukkan litar diagram untuk litar asas bekalan kuasa arus terus. Nama dan gambarkan operasi litar tersebut.*



**Figure B1(c) / Rajah B1(c)**

[7 marks]

[7 markah]

## QUESTION 2

## SOALAN 2

CLO1  
C1

- (a) List **THREE (3)** types of sinusoidal oscillator circuits.  
*Senaraikan TIGA (3) jenis litar pengayun sinusoidal.*

[3 marks]

[3 markah]

CLO2  
C3

- (b) A Colpitts Oscillator circuit having two capacitors of 10pF and 20pF respectively are connected in parallel with an inductor. Given that the frequency of oscillations of the circuit is 1MHz. Calculate the value of inductor L1.  
*Litar pengayun Colpitts yang mempunyai dua kapasitor bernilai 10pF dan 20pF masing-masing disambung secara selari dengan induktor. Diberi frekuensi ayunan litar ialah 1MHz. Kirakan nilai induktor L1.*

[6 marks]

[6 markah]

CLO2  
C3

- (c) The Hartley oscillator achieves positive feedback by using an inverting amplifier plus the 180° phase shift across a parallel resonant circuit. If the following components are given  $R_{in} = 4.7k\Omega$ ,  $R_F = 10k\Omega$ ,  $C1 = 10\mu F$ ,  $L1 = L2 = 0.1mH$ , Op-amp IC 741. Calculate the oscillator frequency.  
*Pengayun Hartley mencapai suapbalik positif dengan menggunakan penukar penguat ditambah peralihan fasa 180° merentasi litar selari resonan. Sekiranya diberi komponen berikut  $R_{in} = 4.7k\Omega$ ,  $R_F = 10k\Omega$ ,  $C1 = 10\mu F$ ,  $L1 = L2 = 0.1mH$ , penguat kendalian IC 741. Kirakan nilai frekuensi pengayun.*

[6 marks]

[6 markah]

## QUESTION 3

## SOALAN 3

CLO1  
C2

- (a) If the
- $R = 200\Omega$
- and
- $C = 0.47\mu F$
- , calculate the frequency cut-off for low pass filter.

*Jika  $R = 200\Omega$  dan  $C = 0.47\mu F$ , kirakan frekuensi potong untuk penapis laluan rendah.*

[3 marks]

[3 markah]

CLO2  
C3

- (b) Sketch the active low pass and high pass filter circuit.

*Lakar litar penapis aktif lulus rendah dan lulus tinggi.*

[6 marks]

[6 markah]

CLO2  
C3

- (c) Sketch frequency response curve for a high pass and band pass filter.

*Lakar lengkungan sambutan frekuensi bagi penapis lulus tinggi dan lulus jalur.*

[6 marks]

[6 markah]

## QUESTION 4

## SOALAN 4

CLO1  
C1

- (a) Describe the differences between an A/D converter and a D/A converter.

*Terangkan perbezaan antara penukar A/D dan penukar D/A.*

[3 marks]

[3 markah]

CLO1  
C2

- (b) Identify with diagram a 4 bit R-2R digital to analogue converter circuit.

*Kenalpasti dengan gambarajah litar penukar digital kepada analog 4 bit R-2R*

[5 marks]

[5 markah]

CLO2  
C3

- (c) Sketch the schematic diagram for a Digital Ramp Converter (DRC) and briefly explain the operation of the circuit.

*Lakar gambar rajah skematik untuk penukar cerun digital dan terangkan dengan ringkas tentang operasi litar tersebut.*

[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.

## QUESTION 1

## SOALAN 1

CLO2  
C3

Operational amplifier (Op-Amp) is an integrated circuit that contains several levels and a differential amplifier configuration. With the aid of op-amp block diagram and explain briefly each of the stages. Calculate the output voltage of the circuit in Figure C1, if  $R_1=R_2=R_3=2K\Omega$ ,  $R_f = 40K\Omega$ ,  $V_1=0.10V$ ,  $V_2=-0.5V$ , and  $V_3=1.5V$ .

Penguat kendalian (Op Amp) adalah suatu rangkaian terintegrasi yang mempunyai beberapa tahap dan konfigurasi penguat yang berlainan. Dengan bantuan gambarajah blok op-amp terangkan secara ringkas setiap peringkat. Kira voltan keluaran litar dalam Rajah C1, jika  $R_1=R_2=R_3=2K\Omega$ ,  $R_f = 40K\Omega$ ,  $V_1=0.10V$ ,  $V_2=-0.5V$ , dan  $V_3=1.5V$ .

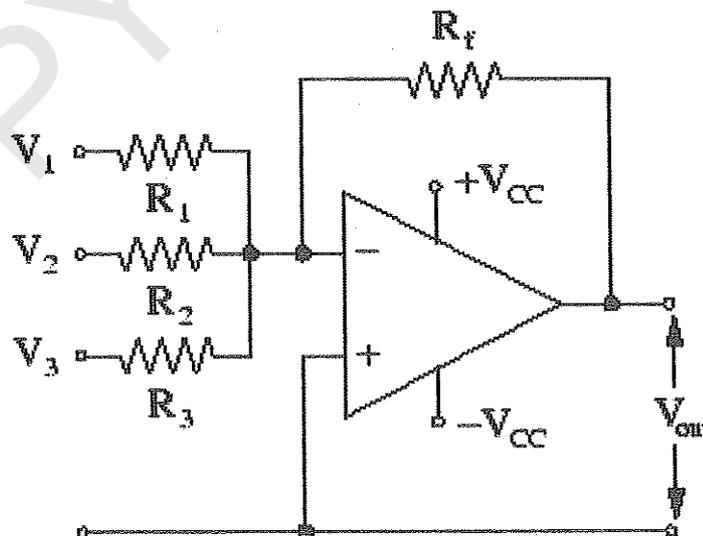


Figure C1/ Rajah C1

[15 marks]

[15 markah]

CLO2  
C3

## QUESTION 2

## SOALAN 2

Sketch a timer circuit with connected in monostable operating modes. Given the component values of astable mode,  $R_a = 2K\Omega$ ,  $R_b = 4K\Omega$  and  $C = 0.1\mu f$ . Calculate the value of period high (TH), period low (TL), period (T), frequency (F), % duty cycle (%D) and sketch output waveform at pin no 2 or 6.

*Lukiskan litar pemasa mod monostabil. Diberi nilai komponen-komponen bagi mod astabil,  $R_a = 2K\Omega$ ,  $R_b = 4K\Omega$  dan  $C = 0.1\mu f$ . Kirakan nilai bagi tempoh tinggi (TH), tempoh rendah (TL), tempoh (T), frekuensi (F), % kitar kerja (%D) dan lakarkan gelombang keluaran pada pin 2 atau 6.*

[15 marks]

[15 markah]

SOALAN TAMAT