

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI**

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI II : 2021/2022

DEE30043: ELECTRONIC CIRCUITS

TARIKH : 03 JULAI 2022

MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **ENAM (6)** halaman bercetak.

Bahagian A: Struktur (3 soalan)

Bahagian B: Esei (1 soalan)

Dokumen sokongan yang disertakan : **TIADA**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A: 75 MARKS
BAHAGIAN A: 75 MARKAH

INSTRUCTION:

This section consists of **THREE (3)** subjective questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **TIGA (3)** soalan subjektif. Jawab **SEMUA** soalan.*

QUESTION 1

CLO1
C3

- a) Sketch the schematic diagrams of a power supply that consists of transformer, bridge rectifier, phi (π) filter, Zener diode regulator and fixed resistor voltage divider. Sketch the expected input and output waveform.

Lakarkan unit bekalan kuasa yang mengandungi litar pengubah, penerus tetimbang, penapis phi (π), pengatur diod Zener dan pembahagi voltan perintang tetap. Lakarkan gelombang masukan dan keluaran yang sepatutnya.

[8 marks]

[8 markah]

CLO1
C3

- b) Given the value of inductor, L is 5mH and capacitor $C1$ and $C2$ is 50 μ F in Colpitts Oscillator. Calculate the oscillation frequency, f_o and sketch the circuit diagram for Colpitts oscillator.

Diberi nilai induktor, L adalah 5mH dan Kapasitor $C1$ and $C2$ adalah 50 μ F untuk Pengayun Colpitts. Kirakan frekuensi ayunan, f_o dan lakarkan gambarajah litar pengayun Colpitts.

[8 marks]

[8 markah]

CLO1
C3

- c) A Hartley Oscillator circuit has two inductors of 50mH and 30mH respectively which are connected in parallel with a capacitor 600pF. Calculate the resonant frequency, f_0 and draw the Hartley oscillator circuit by including transistor, inductor, capacitor and resistor.

Litar Pengayun Hartley mempunyai 2 induktor yang bernilai 50 mH dan 30mH, yang disambung selari dengan pemuat 600 pF. Kirakan frekuensi salon, f_0 dan lukiskan litar pengayun Hartley yang mengandungi transistor, pearuh, pemuat dan perintang.

[9 marks]

[9 markah]

QUESTION 2CLO1
C3

- a) Based on Figure A2(a), calculate the time high (TH) and time low (TL), the frequency of the output and the percentage of duty cycle.

Berpandukan Rajah A2(a), kirakan tempoh menaik (TH) dan tempoh menurun, (TL), frekuensi keluaran dan peratus kitar kerja.

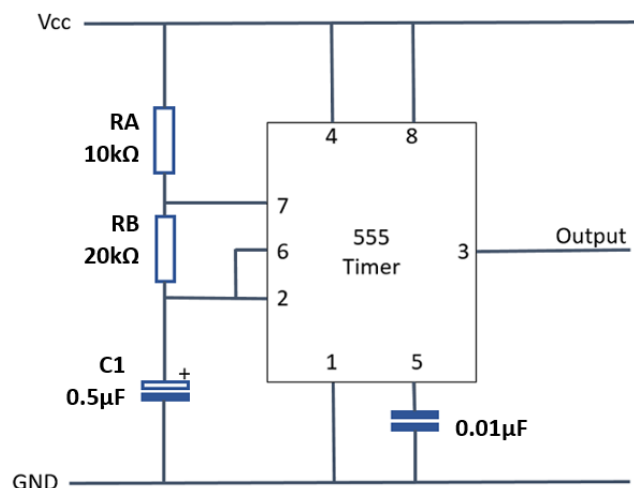


Figure A2(a)/ Rajah A2(a).

[8 marks]

[8 markah]

CLO1
C3

- b) A 555 timer is connected in monostable multivibrator mode. Calculate the duration of output pulse when the value of $R = 30\text{ k}\Omega$ and $C_1 = 15\mu\text{F}$. If a 555 timer is connected as a Schmitt Trigger, draw the schematic diagram.

Pemasa 555 disambung dalam mod monostabil. Kirakan masa denyut keluaran apabila nilai $R = 30\text{ k}\Omega$ and $C_1 = 15\mu\text{F}$. Sekiranya pemasa 555 disambungkan pula sebagai Schmitt Trigger, lukiskan litar skematik berlabel.

[8 marks]

[8 markah]

CLO1
C3

- c) A Low Pass Filter circuit consisting of resistor $3.3\text{ k}\Omega$ in series with a capacitor of 20 nF is connected with 20 v sinusoidal supply. Calculate the output voltage (V_{out}) at a frequency at 100 Hz and 100 kHz .

Litar Penapis Lulus Rendah mengandungi perintang $3.3\text{ k}\Omega$ sesiri dengan kapasitor 20 nF yang bersambung dengan 20 v bekalan ulang-alik. Kirakan voltan keluaran (V_{out}) di frekuensi 100 Hz dan 100 kHz .

[9 marks]

[9 markah]

QUESTION 3CLO1
C3

- a. Given $R = 1.1\text{ k}\Omega$ and $C = 0.66\mu\text{F}$. Calculate the cut off frequency, f_c and draw Passive High Pass Filter circuit.

Diberi $R = 1.1\text{ k}\Omega$ and $C = 0.66\mu\text{F}$. Kirakan frekuensi cut off, f_c dan lukiskan litarkan Penapis Pasif Lulus Tinggi.

[8 marks]

[8 markah]

CLO1
C3

- b. An 8-bit Digital to Analog Converter (DAC) produces an output voltage, $V_{out} = 25\text{mV}$ for a digital input of 00000001. Calculate the full-scale output and resolution percentage for the converter. Draw a 3 bits system of R-2R Ladder Circuit to perform Digital to Analogue conversion.

Sebuah 8-bit DAC menghasilkan voltan output, $V_{out} = 25\text{mV}$ untuk masukan digital 00000001. Kirakan keluaran skala penuh dan peratus resolusi bagi penukar tersebut. Lukiskan gambarajah litar Penukar Digital kepada Analog 3 bit R-2R.

[8 marks]

[8 markah]

CLO1
C3

- c. Calculate V_{out} for digital input 001, 011 and 111 for the circuit shown in Figure A3(c).

Kirakan voltan keluaran bagi masukan digital 001, 011 dan 111 bagi litar yang ditunjukkan dalam rajah A3(c).

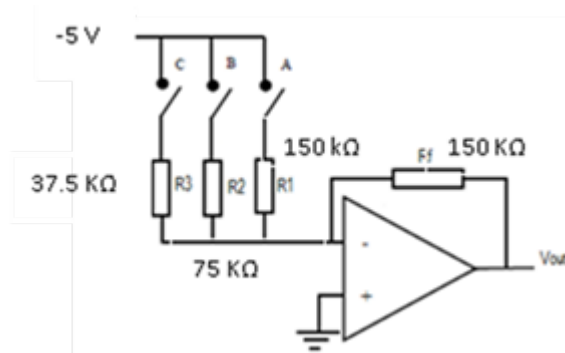


Figure A3(c) / Rajah A3(c)

[9 marks]

[9 markah]

SECTION B: 25 MARKS
BAHAGIAN B: 25 MARKAH

INSTRUCTION:

This section consists of **ONE (1)** essay question. Answer the question.

ARAHAN:

*Bahagian ini mengandungi **SATU (1)** soalan esei. Jawab soalan tersebut.*

CLO1
C3

QUESTION 1

Draw an Inverting Amplifier and derive the equation for calculating the closed-loop gain of an Inverting Amplifier. Calculate the value of gain, A and output voltage, V_o if $R_f = 200\text{k}\Omega$, $R_1 = 2\text{k}\Omega$ and $V_{in} = 2.5\text{mV}$

Lakarkan Penguat Alikan dan terbitkan persamaan bagi gelung tertutup litar Penguat Alikan. Kirakan nilai gandaan, A dan voltan keluaran, V_o jika diberi nilai $R_f = 200\text{k}\Omega$, $R_1 = 2\text{k}\Omega$ dan $V_{in} = 2.5\text{mV}$

[25 marks]

[25 markah]

SOALAN TAMAT