**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.*
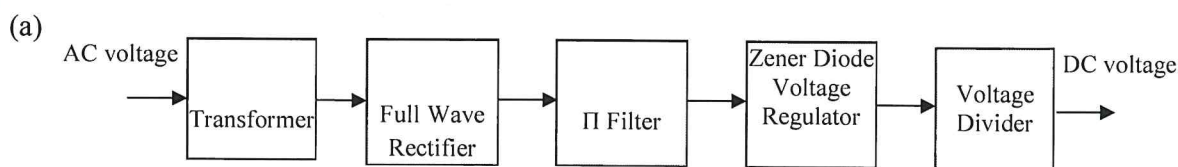
**QUESTION 1**
*SOALAN 1*

CLO1
C3

(a)



Figure A1(a) / *Rajah A1(a)*

Transfer the block diagram in Figure A1(a) into complete DC power supply circuit

*Tukarkan gambarajah blok dalam Rajah A1(a) kepada litar bekalan kuasa arus terus.*

[8 marks]
[8 *markah*]

CLO1
C3

(b)  Sketch the Colpitts Oscillator circuit that having two capacitor 10pF and 20pF respectively are connected in parallel with the inductor and calculate its operating frequency.

*Lakarkan litar Pengayun Colpitts yang mempunyai 2 kapasitor yang bernilai 10pF dan 20pF masing-masing disambung secara selari dengan induktor dan kirakan frekuensi operasi*
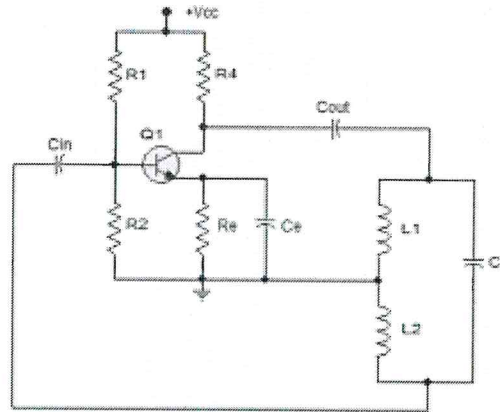
[8 marks]
[8 *markah*]

CLO1
C3

(c)



Figure A1(c) / *Rajah A1(c)*

Compute the value of Capacitor, C1 for the Hartley Oscillator as shown in Figure A1(c) if the oscillation frequency is 5kHz and the inductor value L1=L2=0.1mH.

*Kirakan nilai Capacitor, C1 untuk Hartley Oscillator dalam Rajah A1(c) jika frekuensi ayunan ialah 5kHz dan nilai inductor L1 = L2 = 0.1mH.*

[9 marks]
[*9 markah*]

## QUESTION 2
## *SOALAN 2*

CLO1
C3

(a) The Timer 555 is connected in Astable Multivibrator mode; Calculate the value of Time High (TH), Time Low (TL), frequency (F) and Duty Cycle for the timer. Given RA = 330 Ω, RB = 120 Ω and C = 0.1 μF for electrolytic capacitor and 0.01 μF for ceramic capacitor.

*Pemasa 555 disambung secara Mod Tidak Stabil; Kira nilai Masa Tinggi (TH), Masa Rendah (TL), frekuensi (F) dan Kitaran Tugas untuk Pemasa berkenaan. Diberi RA = 330 Ω, RB = 120 Ω dan C = 0.1 μF untuk kapasitor elektrolitik dan 0.01 μF untuk kapasitor seramik.*

[8 marks]
[*8 markah*]

CLO1
C3

(b)
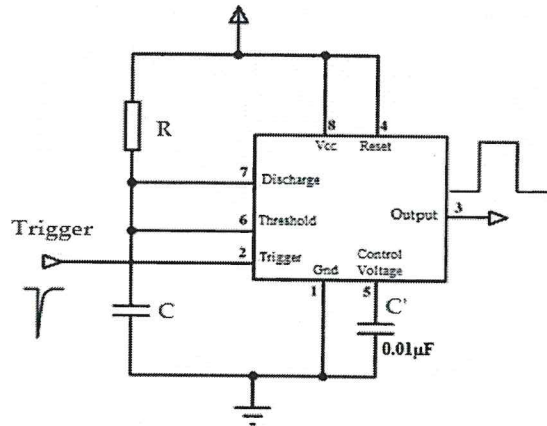


Figure A2(b)/*Rajah A2(b)*

By referring to Figure A2(b), sketch the waveform at pin 2, pin 3 and pin 6. Then, calculate the pulse width if R = 10MΩ and C = 0.1μF

*Dengan merujuk kepada Rajah A2(b), lakarkan bentuk gelombang pada pin 2, pin 3 dan pin 6. Kemudian, hitung lebar nadi jika R = 10MΩ dan C = 0.1μF*

[8 marks]

[*8 markah*]

CLO1
C3

c)  Sketch the circuit diagram of Passive Band Pass Filter consist of C1= 15nF, C2=500pF and R1=R2=10kΩ. Then calculate the higher cut off frequency, lower cut off frequency and bandwidth for the Passive Band Pass Filter.

*Lakarkanl gambarajah litar Penapis Lulus Lebar yang terdiri dari C1 = 15nF, C2 = 500pF dan R1 = R2 = 10kΩ. Kemudian hitung frekuensi potong tinggi, frekuensi potong rendah, dan lebarjalur untuk Penapis Lulus Lebar tersebut*

[9 marks]

[*9 markah*]

## QUESTION 3
## *SOALAN 3*

CLO1
C3

a) With the help of the suitable circuits diagram, show the differentiate of the passive low pass filter and active low pass filter. Then, calculate the cut off frequency, fc and sketch the frequency response curve for a high pass filter that consists of 82pF capacitor connected in series with 240KΩ resistor.

*Dengan bantuan gambarajah yang sesuai, tunjukkan perbezaan antara penapis jenis lulus rendah pasif dan penapis lulus rendah aktif. Kemudian, kirakan frekuensi potong, fc dan lakarkan lengkung sambutan frekuensi bagi penapis lulus tinggi yang terdiri daripada kapasitor 82pF yang disambungkan sesiri dengan perintang 240KΩ.*

[8 marks]

[*8 markah*]

CLO1
C3

b) Sketch a digital to analogue converter circuit up a 4-bit binary with the highest value of the resistor is 220kΩ and $R_F$ = 33kΩ. Calculate the resistors of $R_1$, $R_2$, $R_3$ and $R_4$ if $V_{ref}$ = 5V.

*Lakar dan labelkan litar penukar digital kepada analog 4-bit binari dengan nilai tertinggi perintang ialah 220kΩ dan $R_F$ = 33kΩ. Kira perintang R1, R2, R3 dan R4 jika Vref = 5V.*

[8 marks]

[*8 markah*]

CLO1
C3

c) Draw completely the configuration of DAC if R1 = 18.75kΩ, R2 = 37.5kΩ, R3 =75KΩ dan R4 =150kΩ, reference voltage 5V and reference resistor 20kΩ. Calculate the output voltage for an input 0111.

*Lukis dengan lengkap konfigurasi untuk DAC jika diberi R1 = 18.75kΩ, R2 = 37.5kΩ, R3 =75KΩ dan R4 =150kΩ, voltan rujukan 5V dan perintang rujukan 20kΩ. Kira voltan keluaran untuk input 0111*

[ 9 marks]

[*9 markah*]

## SECTION B: 25 MARKS
## *BAHAGIAN: 25 MARKAH*

**INSTRUCTION:**
This section consists of **ONE (1)** essay questions. Answer **ALL** question.

***ARAHAN:***
*Bahagian ini mengandungi **SATU (1)** soalan esei. Jawab **SEMUA** soalan.*

## QUESTION 1
## *SOALAN 1*

CLO1
C3

If the voltage gain AV of an amplifier is 25, sketch the non-inverting amplifier circuit. Then by using voltage gain formulae, sketch an inverting amplifier system with a required gain of -25.

*Lakarkan sebuah litar penguat bukan terbalik jika nilai AV ialah 25. Kemudian dengan menggunakan formula gandaan voltan, lakarkan sebuah sistem penguat terbalik songsang dengan gandaan voltan sebanyak -25.*

[25 marks]
[25 *markah*]

### SOALAN TAMAT