

SECTION A : 80 MARKS
BAHAGIAN A : 80 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) Define the terminologies for scale and range

Takrifkan terminologi bagi skala dan julat

[4 marks]
[4 markah]

CLO1
C2

- (b) Explain Gross error, Systematic error and Random error in measurement.

Terangkan ralat Ralat Kasar Ralat Sistemik dan Ralat Rawak dalam pengukuran.

[6 marks]
[6 markah]

CLO1
C3

- (c) The given value for each resistor in figure A1(c), $R_1 = 6.5k\Omega$, $R_2 = 450\Omega$, $R_3 = 12k\Omega$ and total measure value of resistance is $20.5k\Omega$. Calculate the total resistance, Absolute error, Relative error, percentage of error and Percentage of relative accuracy.

Diberi nilai untuk setiap perintang dalam rajah A1(c), ialah $R_1 = 6.5k\Omega$, $R_2 = 450\Omega$, $R_3 = 12k\Omega$ dan jumlah perintang secara pengukuran ialah $20.5k\Omega$. Kirakan Jumlah rintangan, ralat mutlak, ralat relative, peratus ralat dan peratus ketepatan relative.

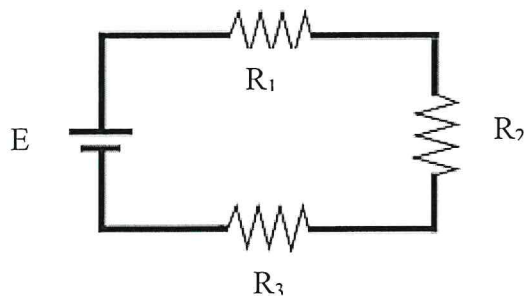


Figure A1(c) / Rajah A1(c)

[10 marks]
[10 markah]

QUESTION 2

SOALAN 2

- CLO1
C1 (a) Oscilloscope is a device that displays the amplitude of electrical signals. List **FOUR (4)** main sections of the front panel of an oscilloscope.

Osiloskop ialah satu alat yang memaparkan amplitud isyarat elektrik. Senaraikan EMPAT (4) seksyen utama muka hadapan osiloskop.

[4 marks]

[4 markah]

- CLO1
C2 (b) Compare **THREE (3)** advantages of each analog and digital oscilloscopes.

Bandingkan TIGA (3) kelebihan analog dan digital osiloskop.

[6 marks]

[6 markah]

- CLO1
C3 (c) Figure A2(c) shows the waveform at the oscilloscope screen. If the oscilloscope setting is set to Volt/div = 0.5V and Time/div = 20 μ s, calculate the voltage peak-to-peak (V_{pp}), voltage peak (V_p), voltage RMS (V_{rms}), periodic time (T) and Frequency (f).

Rajah A2(c) menunjukkan bentuk gelombang yang dihasilkan pada skrin osiloskop. Jika osiloskop disetkan untuk Volt/div = 0.5V dan Time/div = 20 μ s, kirakan, voltan puncak-ke-puncak (V_{pp}), voltan puncak (V_p), voltan RMS (V_{rms}), tempoh Masa (T) dan frekuensi (f).

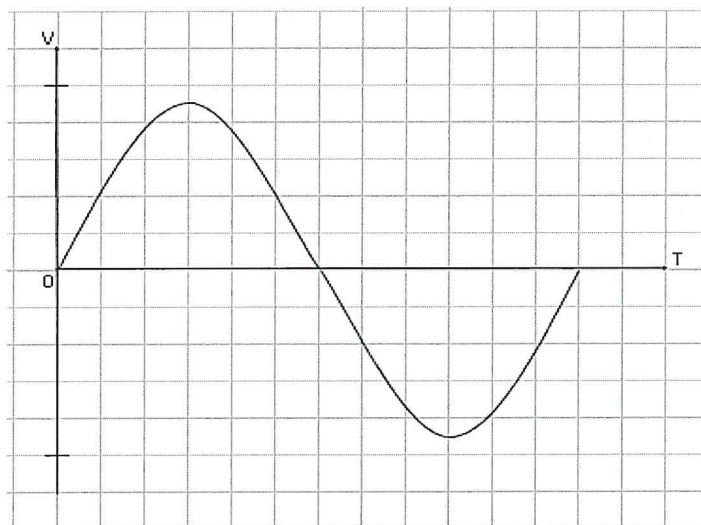


Figure A2(c) / Rajah A2(c)

[10 marks]

[10 markah]

QUESTION 3

SOALAN 3

- CLO1
C1
- (a) Describe **TWO (2)** conditions when the bridge is balanced.
Huraikan DUA (2) keadaan apabila tetimbang berada dalam keadaan seimbang.
- [4 marks]
[4 markah]
- CLO1
C2
- (b) Discuss briefly about Kelvin Bridge. The explanation should include the schematic circuit diagram .
Bincangkan secara ringkas berkenaan Tetimbang Kelvin. Penerangan perlu beserta rajah litar skematik .
- [6 marks]
[6 markah]
- CLO1
C3
- (c) Sketch the schematic diagram of a Wheatstone Bridge and derive the equation for R_X if the bridge is in balanced condition.
Lukis rajah skematik untuk Tetimbang Wheatstone dan dapatkan persamaan untuk R_X jika tetimbang berada dalam keadaan seimbang.
- [10 marks]
[10 markah]

QUESTION 4

SOALAN 4

CLO1
C1

- (a) A power meter is a meter used to measure the amount of electrical power used. Give **TWO (2)** types of power meter and their functions.

*Meter kuasa ialah meter yang digunakan untuk mengukur amaun kuasa elektrik. Berikan **DUA (2)** jenis meter kuasa beserta fungsinya.*

[4 marks]
[4 markah]

CLO1
C2

- (b) Explain the basic principles of an analogue wattmeter with the aid of a suitable diagram.

Terangkan prinsip asas meter watt analog dengan bantuan rajah yang sesuai.

[6 marks]
[6 markah]

CLO1
C3

- (c) Discuss types of the system in the construction of a single- phase induction kilowatt- hour (kWh) meter.

Bincangkan jenis- jenis sistem dalam pembinaan fasa tunggal meter kilowatt- jam.

[10 marks]
[10 markah]

SECTION B : 20 MARKS
BAHAGIAN B : 20 MARKAH

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO1
C3

The total resistance of R_1 , R_2 and R_m for a series type ohmmeter is $25k\Omega$ and the voltage supply is $3V$. Calculate the Full Scale Current Deflection (I_{FSD}) if the unknown resistance, $R_x = 0\Omega$. Find the value of R_x if the ohmmeter is at $\frac{1}{4}$ FSD, $\frac{1}{2}$ FSD and $\frac{3}{4}$ FSD and FSD.

Diberi jumlah rintangan untuk R_1 , R_2 dan R_m untuk meter ohm siri ialah $25k\Omega$ dan bekalan kuasa ialah $3V$. Kira I_{FSD} jika perintang yang tidak diketahui nilainya, $R_x = 0\Omega$. Cari nilai R_x jika meter ohm berada di keadaan $\frac{1}{4}$ FSD, $\frac{1}{2}$ FSD and $\frac{3}{4}$ FSD dan FSD.

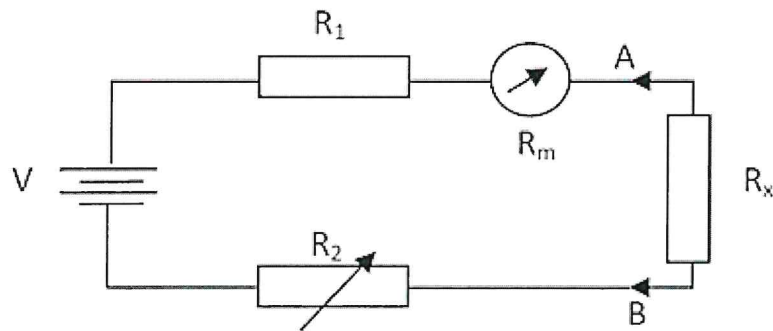


Diagram B1 / Rajah B1

[20 marks]
[20 markah]

SOALAN TAMAT