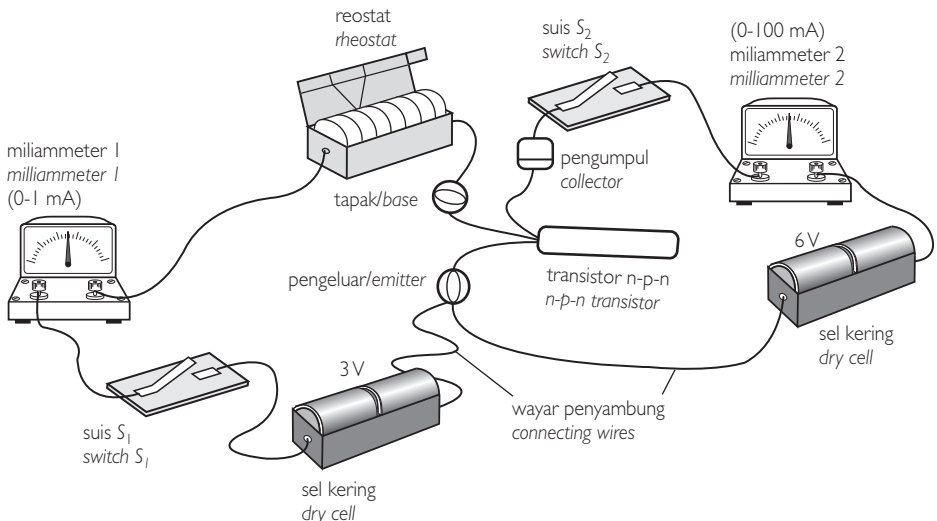


EKSPERIMEN KENDIRI

7

TRANSISTOR SEBAGAI AMPLIFIER ARUS

Buku Teks: BAB 4 m.s. 217 – 219

<p>Tujuan <i>Aim</i></p>	<p>Untuk mengkaji hubungan antara arus tapak, I_B, dengan arus pengumpul, I_C. <i>To investigate the relationship between the base current, I_B, and collector current, I_C.</i></p>
<p>Pernyataan masalah <i>Problem statement</i></p>	<p>Bagaimanakah <u> arus tapak </u> mempengaruhi <u> arus pengumpul </u>? <i>How does the <u> base current </u> affect the <u> collector current </u> ?</i></p>
<p>Hipotesis <i>Hypothesis</i></p>	<p>Arus pengumpul bertambah apabila arus tapak bertambah. <i>The collector current increases when the base current increases.</i></p>
<p>Pemboleh ubah <i>Variables</i></p>	<p>(a) Dimanipulasikan: Arus tapak, I_B <i>Manipulated : The base current, I_B</i> (b) Bergerak balas : Arus pengumpul, I_C <i>Responding : The collector current, I_C</i> (c) Dimalarkan : <u> Jenis transistor </u> <i>Constant : <u> The type of transistor </u></i></p>
<p>Bahan dan radas <i>Material and apparatus</i></p>	<p>Transistor n-p-n, dua suis, 6 sel kering, reostat, miliammeter (0 – 1 mA), miliammeter (0 – 100 mA) dan wayar penyambung <i>n-p-n transistor, two switches, 6 dry cells, rheostat, milliammeter (0 – 1 mA), milliammeter (0 – 100 mA) and connecting wires</i></p>
<p>Prosedur <i>Procedure</i></p>	 <ol style="list-style-type: none"> Susunkan radas-radas seperti yang ditunjukkan dalam rajah. <i>Set up the apparatus as shown in the diagram.</i> Tutup suis S_1 dan selaraskan reostat supaya miliammeter 1 menunjukkan bacaan sifar. <i>Close switch S_1 and adjust the rheostat so that milliammeter 1 shows a zero reading.</i> Tutup suis S_2 dan catat bacaan miliammeter 2. <i>Close switch S_2 and record the reading of milliammeter 2.</i> Ulang eksperimen dengan bacaan miliammeter 1 menjadi 0.2 mA, 0.4 mA, 0.6 mA, 0.8 mA dan 1.0 mA. <i>Repeat the experiment with milliammeter 1 readings of 0.2 mA, 0.4 mA, 0.6 mA, 0.8 mA and 1.0 mA.</i> Catat bacaan-bacaan yang sepadan daripada miliammeter 2. <i>Record the corresponding readings from milliammeter 2.</i> Jadualkan nilai-nilai I_B dan I_C. <i>Tabulate the values of I_B and I_C.</i> Plotkan graf I_C melawan I_B. <i>Plot a graph of I_C against I_B.</i>

Pemerhatian
Observation

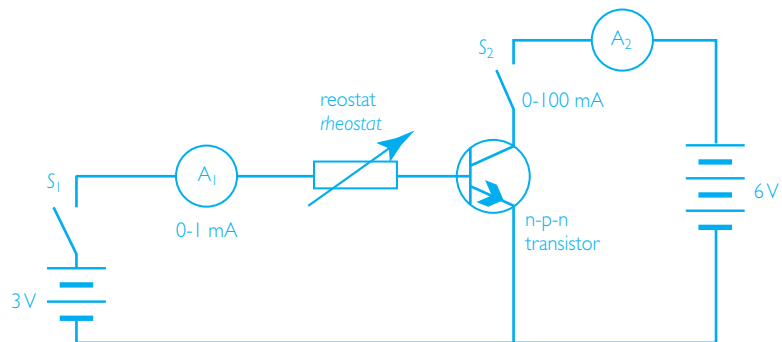
I_B/mA	0	0.2	0.4	0.6	0.8	1.0
I_C/mA	0	20	40	60	80	100

Graf I_C melawan I_B
A graph of I_C against I_B



Perbincangan
Discussion

- 1 Lukis suatu rajah litar bagi litar transistor itu.
Draw a circuit diagram of the transistor circuit.



- 2 Berapakah bacaan miliammeter apabila
What are the milliammeter readings when

(a) S_1 ditutup dan S_2 dibuka?
 S_1 is closed and S_2 is opened?

I_B = sebarang bacaan di antara 0 – 1 mA, I_C = 0 mA.

I_B = any reading between 0 – 1 mA, I_C = 0 mA.

(b) S_1 dibuka dan S_2 ditutup?
 S_1 is opened and S_2 is closed?

I_B = 0 mA, I_C = 0 mA

<p>Perbincangan <i>Discussion</i></p>	<p>3 Apakah yang dapat anda deduksikan tentang I_B dan I_C daripada bacaan yang diperoleh di 2? <i>What can you deduce about I_B and I_C from the readings obtained in 2?</i></p> <p>Arus pengumpul, I_C, ditentukan oleh arus tapak, I_B. Walau bagaimanapun, arus tapak, I_B, <u>tidak ditentukan</u> oleh arus pengumpul, I_C. <i>The collector current, I_C, is determined by the base current, I_B. However, the base current, I_B, is <u>not determined</u> by the collector current, I_C.</i></p> <p>4 Daripada graf, hitung amplifikasi arus bagi transistor itu. <i>From the graph, calculate the current amplification of the transistor.</i></p> <p>Amplifikasi arus/Current amplification = $\frac{I_C}{I_B}$</p> <p>= kecerunan graf/gradient of the graph</p> <p>= $\frac{100}{1.0}$</p> <p>= 100</p>
<p>Kesimpulan <i>Conclusion</i></p>	<p>I_C berkadar <u>langsung</u> dengan I_B. <i>I_C is <u>directly</u> proportional to I_B.</i></p>

EKSPERIMEN KENDIRI

8

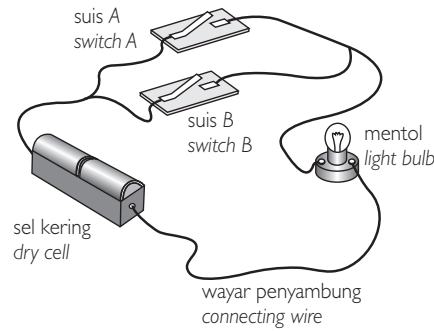
GET LOGIK

<p>Tujuan <i>Aim</i></p>	<p>Untuk mengkaji tindakan get-get logik yang berikut: <i>To study the action of the following logic gates:</i> (a) DAN/AND (b) ATAU/OR (c) TAK/NOT (d) TAKDAN/NAND (e) TAKATAU/NOR</p>												
<p>Pernyataan masalah <i>Problem statement</i></p>	<p>Bagaimanakah get-get logik seperti get DAN, get ATAU, get TAK, get TAKDAN dan get TAKATAU berfungsi? <i>How does the logic gates such as gate AND, gate OR, gate NOT, gate NAND and gate NOR are function?</i></p>												
<p>Hipotesis <i>Hypothesis</i></p>	<p>Tindakan get logik boleh dihuraikan dalam bentuk jadual kebenaran dan ungkapan algebra Boole. <i>The action of logic gates can be described by truth table and Boolean algebra expression.</i></p>												
<p>Pemboleh ubah <i>Variables</i></p>	<p>(a) Dimanipulasikan : Susunan radas <i>Manipulated : Apparatus set up</i> (b) Bergerak balas : <u>Output</u> <i>Responding : Output</i> (c) Dimalarkan : Input <i>Constant : Input</i></p>												
<p>Bahan dan radas <i>Material and apparatus</i></p>	<p>Dua sel kering, dua suis, satu mentol, satu perintang dan wayar penyambung <i>Two dry cells, two switches, one light bulb, one resistor and connecting wires</i></p>												
<p>Prosedur <i>Procedure</i></p>	<p>1 Pasangkan radas-radas seperti yang ditunjukkan dalam Rajah (a). <i>Set up the apparatus as shown in Diagram (a).</i></p> <div data-bbox="715 1188 1150 1510" data-label="Diagram"> <p>The diagram shows a series circuit. On the left is a 'sel kering dry cell'. Two wires connect it to two switches labeled 'A' and 'B', collectively labeled 'suis switch'. From switch B, a wire goes to a 'mentol light bulb'. A final wire connects the light bulb back to the dry cell. The wires are labeled 'wayar penyambung connecting wire'.</p> </div> <p>Rajah (a)/Diagram (a)</p> <p>2 Input dan output diwakili oleh 0 atau 1. Jadual yang berikut menunjukkan bagaimana tindakan setiap input dan output diwakili. <i>The input and output are represented by either 0 or 1. The table below shows how each input and output is represented.</i></p> <table border="1" data-bbox="497 1721 1417 1936"> <thead> <tr> <th colspan="2">Input</th> <th colspan="2">Output</th> </tr> <tr> <th>0</th> <th>1</th> <th>0</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>Suis dibuka <i>The switch is opened</i></td> <td>Suis ditutup <i>The switch is closed</i></td> <td>Mentol tidak menyala <i>The light bulb does not glow</i></td> <td>Mentol menyala <i>The light bulb glows</i></td> </tr> </tbody> </table> <p>3 Jalankan aktiviti-aktiviti mengikut input yang dinyatakan dalam jadual yang berikut. Perhatikan perubahan pada mentol itu dan catatkan pemerhatian anda dalam jadual. <i>Carry out the activity according to the input stated in the table. Observe the changes on the light bulb and record your observations in a table.</i></p>	Input		Output		0	1	0	1	Suis dibuka <i>The switch is opened</i>	Suis ditutup <i>The switch is closed</i>	Mentol tidak menyala <i>The light bulb does not glow</i>	Mentol menyala <i>The light bulb glows</i>
Input		Output											
0	1	0	1										
Suis dibuka <i>The switch is opened</i>	Suis ditutup <i>The switch is closed</i>	Mentol tidak menyala <i>The light bulb does not glow</i>	Mentol menyala <i>The light bulb glows</i>										

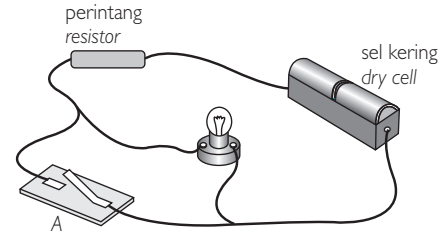
Prosedur
Procedure

4 Ulang aktiviti-aktiviti dengan memasangkan radas-radas seperti yang ditunjukkan dalam Rajah (b), (c), (d) dan (e) dan catatkan pemerhatian anda dalam jadual-jadual yang berikut.

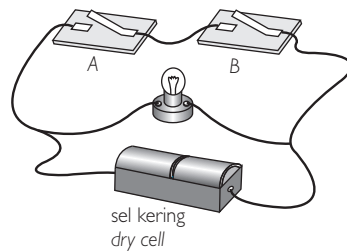
Repeat the activity by setting up the apparatus as shown in Diagrams (b), (c), (d) and (e) and record your observations in the following tables.



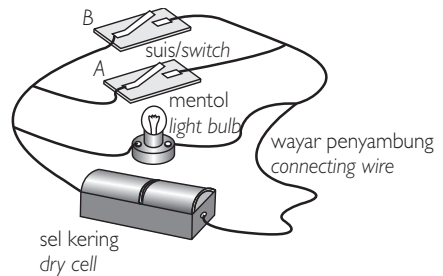
Rajah (b)/Diagram (b)



Rajah (c)/Diagram (c)



Rajah (d)/Diagram (d)



Rajah (e)/Diagram (e)

Pemerhatian
Observation

Rajah (a)/Diagram (a)

Input		Output
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

Rajah (b)/Diagram (b)

Input		Output
A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

Rajah (c)/Diagram (c)

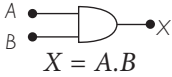

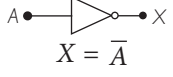
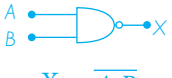

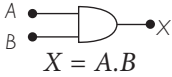

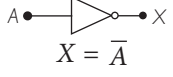
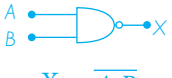

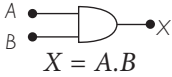

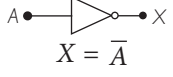
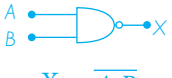

Input	Output
A	X
0	1
1	0

Rajah (d)/Diagram (d)

Input		Output
A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

Rajah (e)/Diagram (e)

Input		Output
A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

<p>Perbincangan Discussion</p>	<p>1 Namakan get-get logik yang diwakili oleh setiap rajah itu. Name the logic gates represented by each diagram. Rajah (a)/Diagram (a): Get DAN/AND gate Rajah (b)/Diagram (b): <u>Get ATAU/OR gate</u> Rajah (c)/Diagram (c): Get TAK/NOT gate Rajah (d)/Diagram (d): <u>Get TAKDAN/NAND gate</u> Rajah (e)/Diagram (e): <u>Get TAKATAU/NOR gate</u></p> <p>2 Lukis simbol dan nyatakan persamaan Boole bagi setiap get logik yang diwakili oleh: Draw the symbols and state the Boolean equations for the logic gates represented by:</p> <table border="1" data-bbox="496 546 1422 1022"> <tr> <td data-bbox="496 546 810 784"> <p>Rajah (a)/Diagram (a) Get DAN/AND gate</p>  <p>$X = A.B$</p> </td> <td data-bbox="810 546 1126 784"> <p>Rajah (b)/Diagram (b) Get ATAU/OR gate</p>  <p>$X = A + B$</p> </td> <td data-bbox="1126 546 1422 1022"> <p>Rajah (c)/Diagram (c) Get TAK/NOT gate</p>  <p>$X = \bar{A}$</p> </td> </tr> <tr> <td data-bbox="496 784 810 1022"> <p>Rajah (d)/Diagram (d) Get TAKDAN/NAND gate</p>  <p>$X = \overline{A.B}$</p> </td> <td data-bbox="810 784 1126 1022"> <p>Rajah (e)/Diagram (e) Get TAKATAU/NOR gate</p>  <p>$X = \overline{A + B}$</p> </td> <td></td> </tr> </table>	<p>Rajah (a)/Diagram (a) Get DAN/AND gate</p>  <p>$X = A.B$</p>	<p>Rajah (b)/Diagram (b) Get ATAU/OR gate</p>  <p>$X = A + B$</p>	<p>Rajah (c)/Diagram (c) Get TAK/NOT gate</p>  <p>$X = \bar{A}$</p>	<p>Rajah (d)/Diagram (d) Get TAKDAN/NAND gate</p>  <p>$X = \overline{A.B}$</p>	<p>Rajah (e)/Diagram (e) Get TAKATAU/NOR gate</p>  <p>$X = \overline{A + B}$</p>	
<p>Rajah (a)/Diagram (a) Get DAN/AND gate</p>  <p>$X = A.B$</p>	<p>Rajah (b)/Diagram (b) Get ATAU/OR gate</p>  <p>$X = A + B$</p>	<p>Rajah (c)/Diagram (c) Get TAK/NOT gate</p>  <p>$X = \bar{A}$</p>					
<p>Rajah (d)/Diagram (d) Get TAKDAN/NAND gate</p>  <p>$X = \overline{A.B}$</p>	<p>Rajah (e)/Diagram (e) Get TAKATAU/NOR gate</p>  <p>$X = \overline{A + B}$</p>						
<p>Kesimpulan Conclusion</p>	<p>Setiap tindakan get logik boleh dihuraikan dalam bentuk <u>jadual kebenaran</u> dan <u>ungkapan algebra Boole</u>. Each action of logic gates can be described by <u>truth table</u> and <u>Boolean algebra expression</u>.</p>						