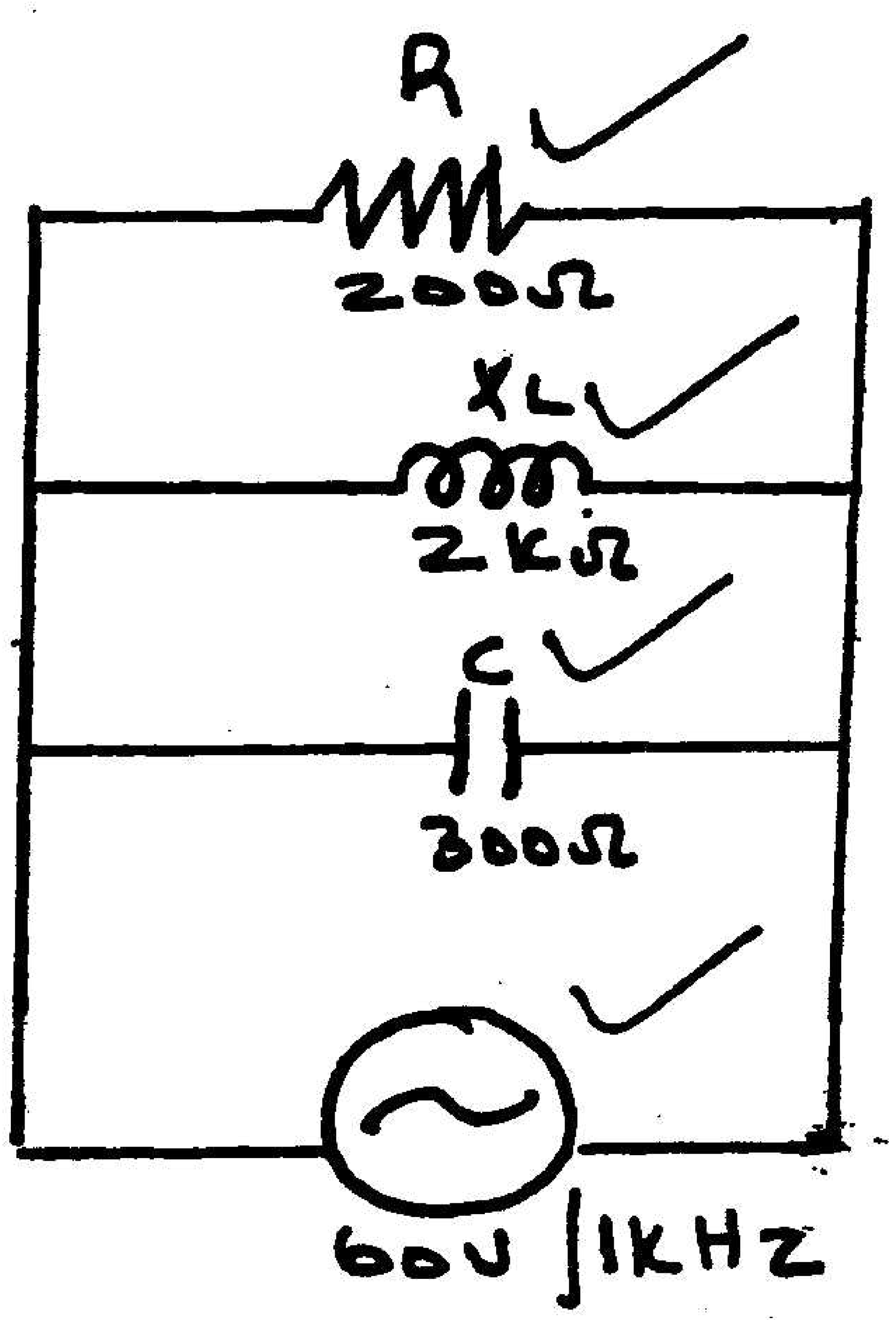
POSSIBLE ANSWERS FOR / MOONTLIKE ANTWOORDE VIR :

ELECTRONICS SG
ELEKTRONIKA SG

704-2/0

VRAAG 1/QUESTION 1

1.1.1



(4)

1.1.2

A $IR = V/R = \frac{60\ V}{200\ \Omega} = 0,3\ A$

$IL = V/XL = \frac{60V}{2\ 000\Omega} = 0,03A$

$IC = \frac{V}{XC} = \frac{60V}{300\Omega} = 0,2A$ (9)

B $IX = IC - IL$

$IX = 0,2A - 0,03A$ (3)

$IX = 0,17A$

C $IT = \sqrt{IR^2 + IX^2}$

$IT = \sqrt{(0,3)^2 + (0,17)^2}$

$IT = \sqrt{0,09 + 0,0289}$ (5)

$IT = \sqrt{0,345A}$

D $COS\varphi = \frac{IR}{IT} = \frac{0,3}{0,345} = 0,869$ or/of (7)

$TAN\varphi = \frac{IX}{IR} = \frac{0,17}{0,3} = 0,566$ or/of

$SIN\varphi = \frac{IX}{} = \frac{0,17}{} = 0,493$

E $\varphi = COS^{-1}\ 0,869 = 29,5°$ (2)

$\varphi = TAN^{-1}\ 0,566 = 29,5°$

$\varphi = SIN^{-1}\ 0,439 = 29,5°$

F $C = \dfrac{1}{2\pi\ F \times XC}$

$C = \dfrac{1}{2\pi \times 1\ 000 \times 300}$

$C = \dfrac{1}{1884955,59}$

C = 0,00000053F (4)

C = 530nF or/of 0,53μF

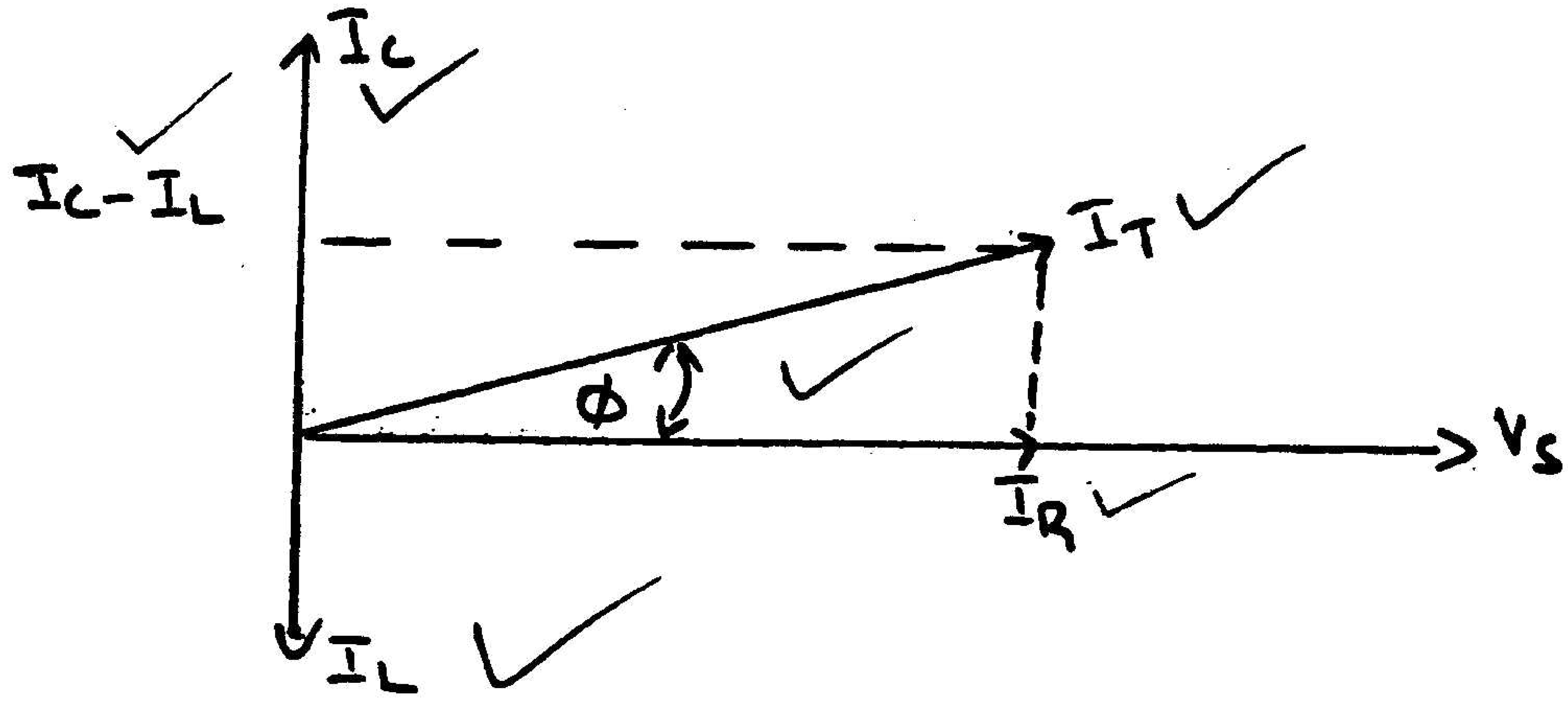
G $L = \dfrac{XL}{2\pi f} = \dfrac{2000}{2\pi \times 1000} = 0,3183H = 318,3\ mH$ (3)

H P = V x I x COSφ

P = 60 x 0,345 x 0,869 (3)

P = 17,988 W

1.1.3



(6)

VRAAG 2/QUESTION 2

2.1.1 VL = 320 COSφ = 0,866 efficiency = 90%

$VP = \dfrac{VL}{\sqrt{3}} = \dfrac{320\ V}{\sqrt{3}} = 184,75\ V$ (3)

2.1.2 IN STAR / STER

IL = Iph = 25A (2)

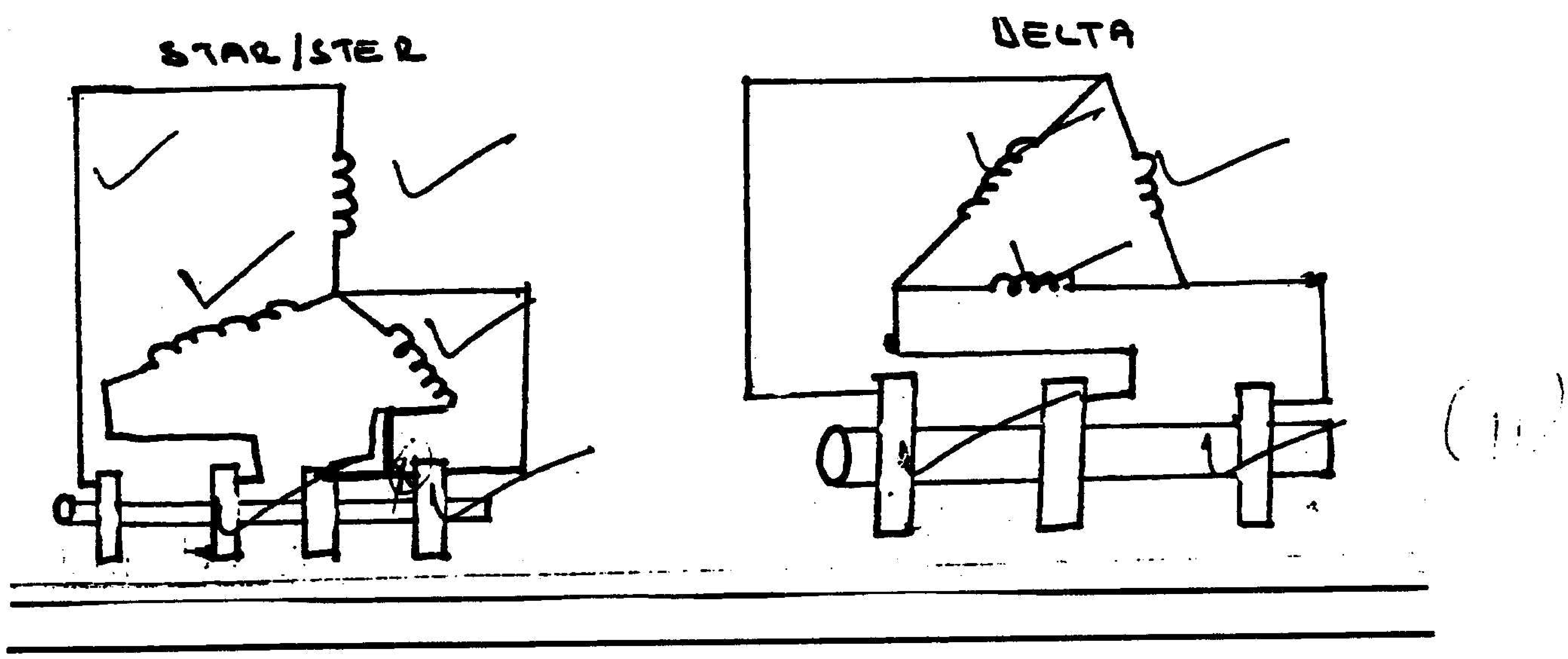
2.1.3 Pin = √3 x VL x IL x COSφ

Pin = √3 x 320 x 25A x 0,866

Pin = 11,999 KW (3)

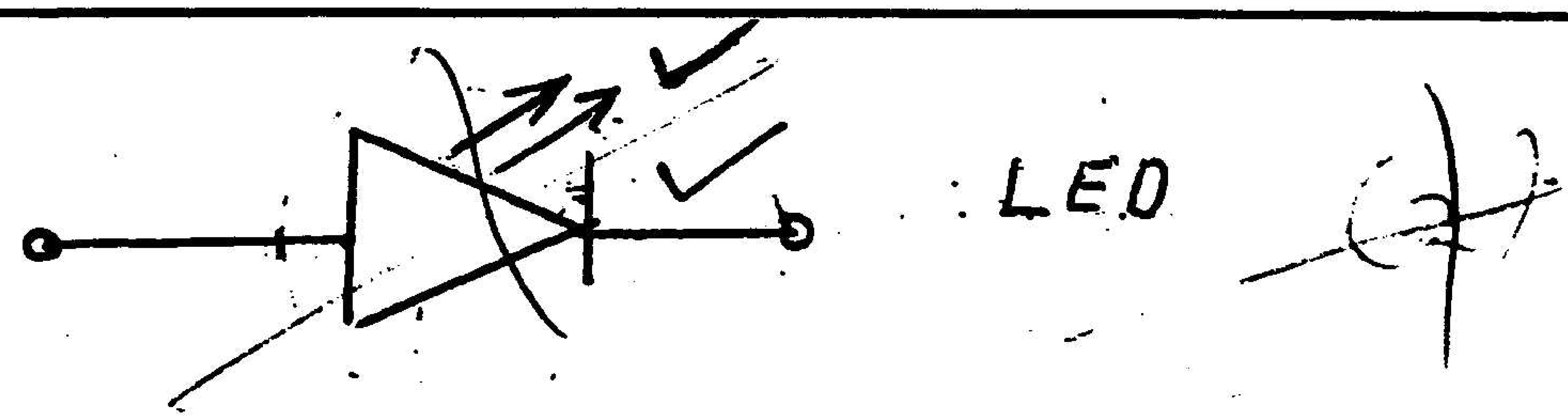
2.2 R Y B (1)

2.3

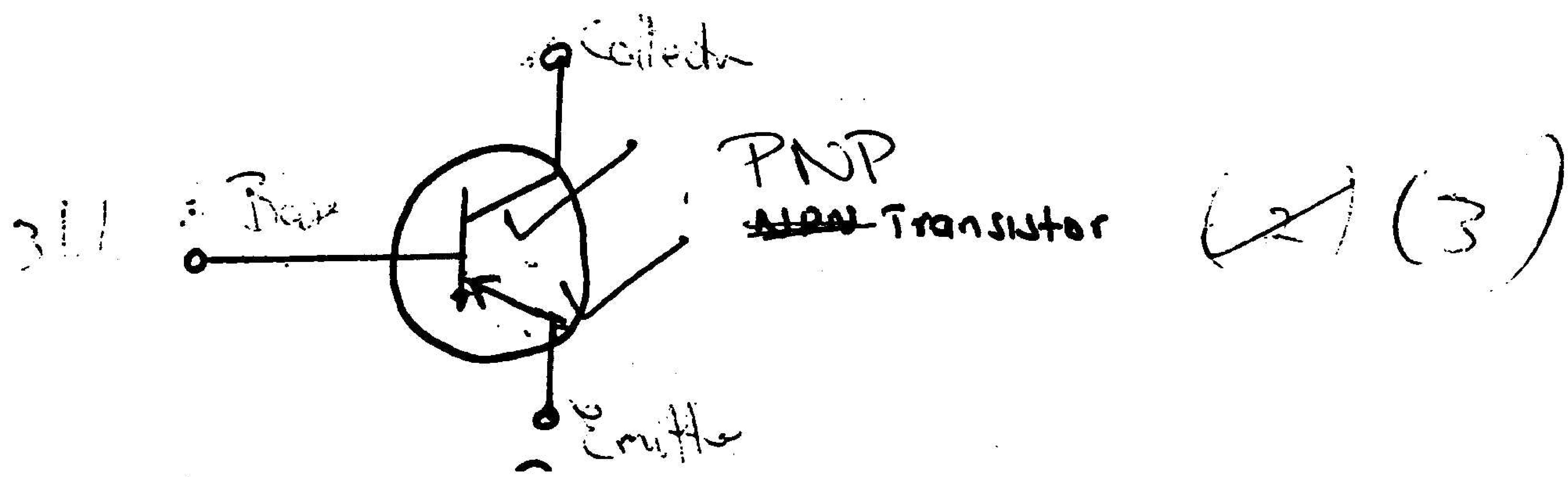


VRAAG 3 / QUESTION 3

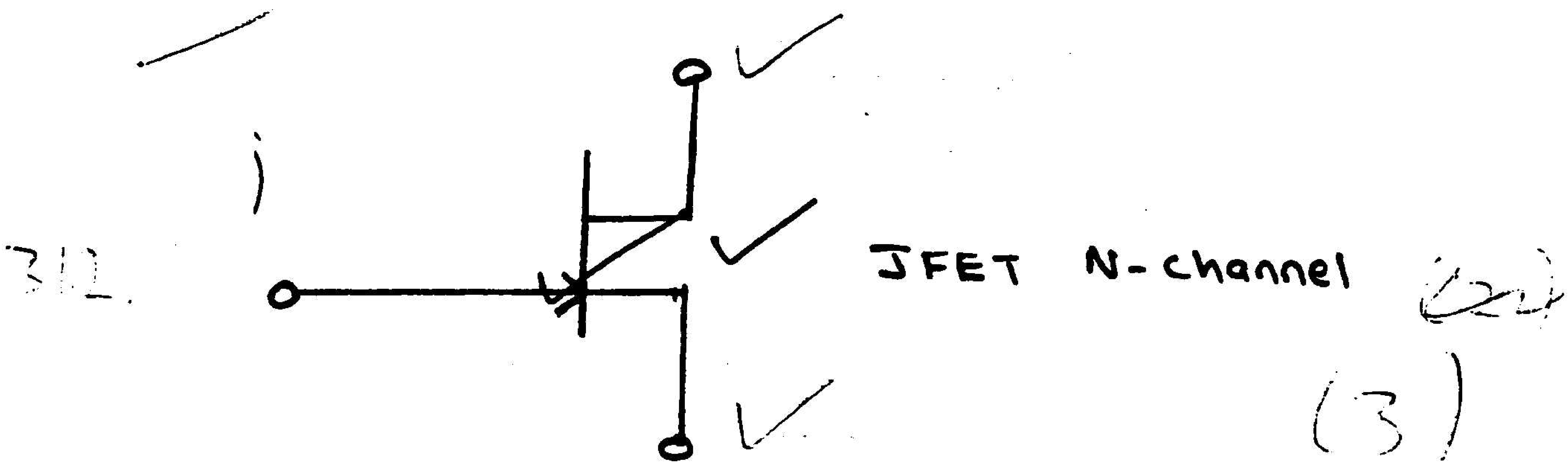
3.1.1



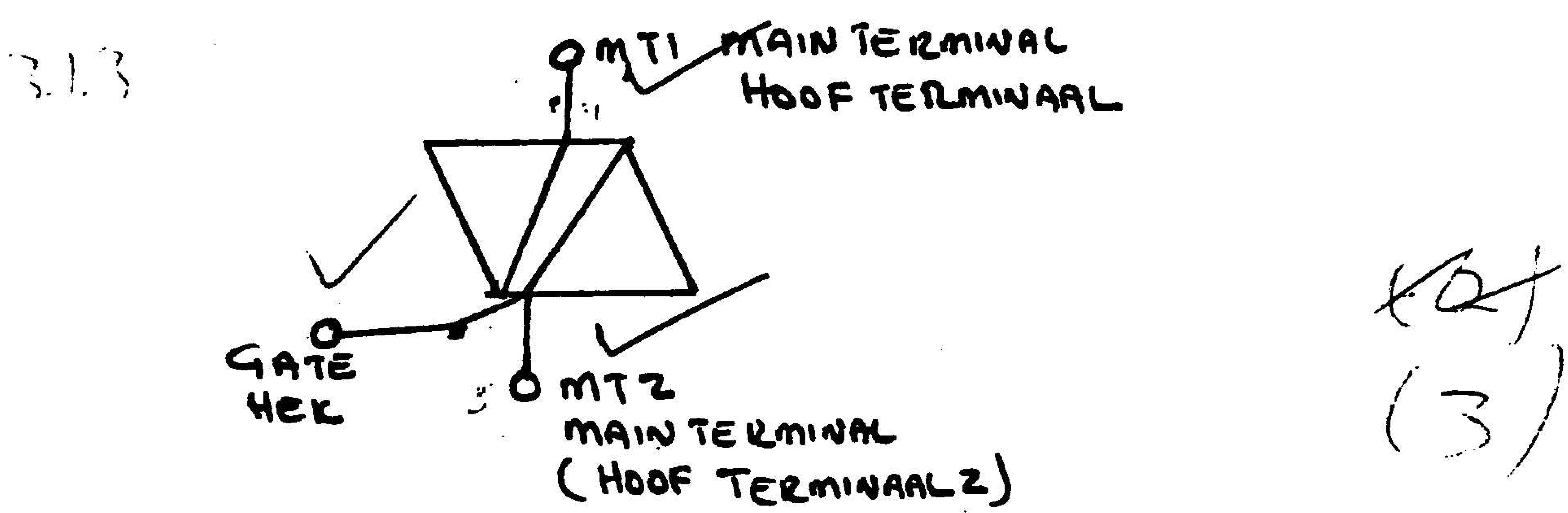
3.1.2



3.1.3

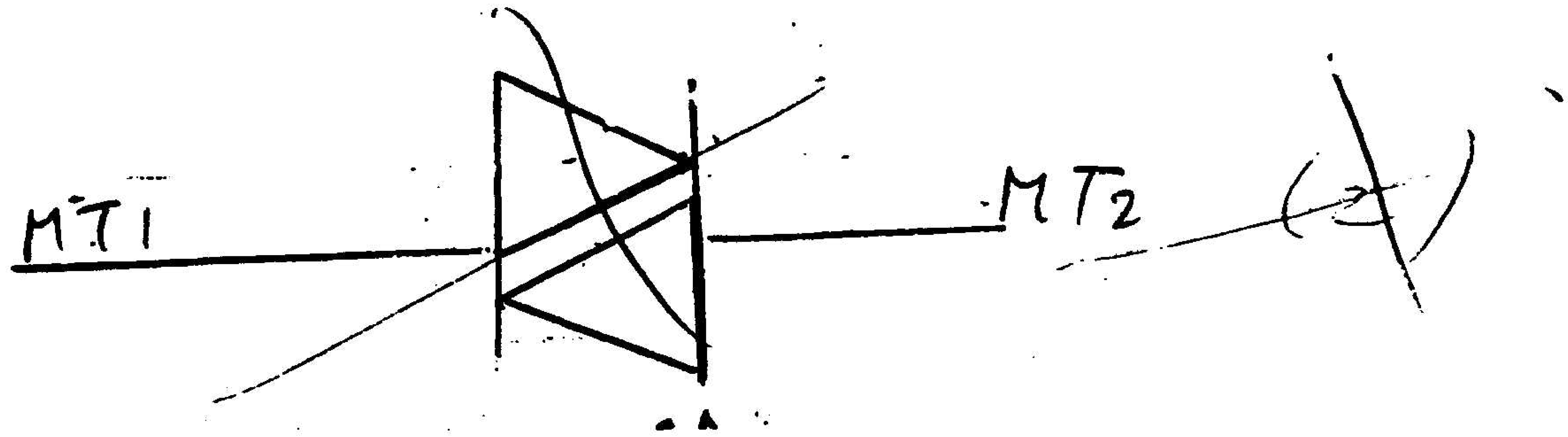


3.~~1~~.4

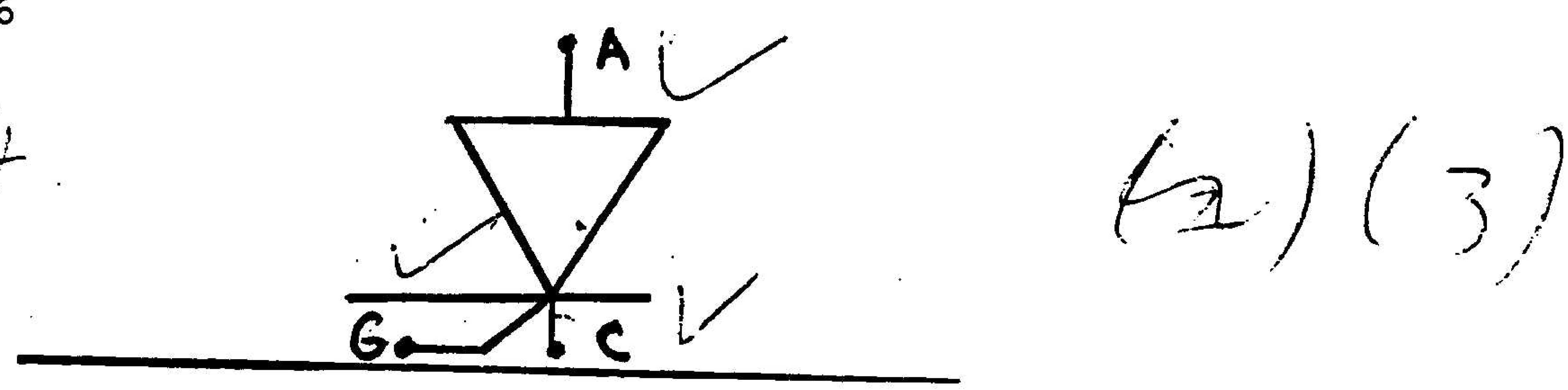


3.1.5

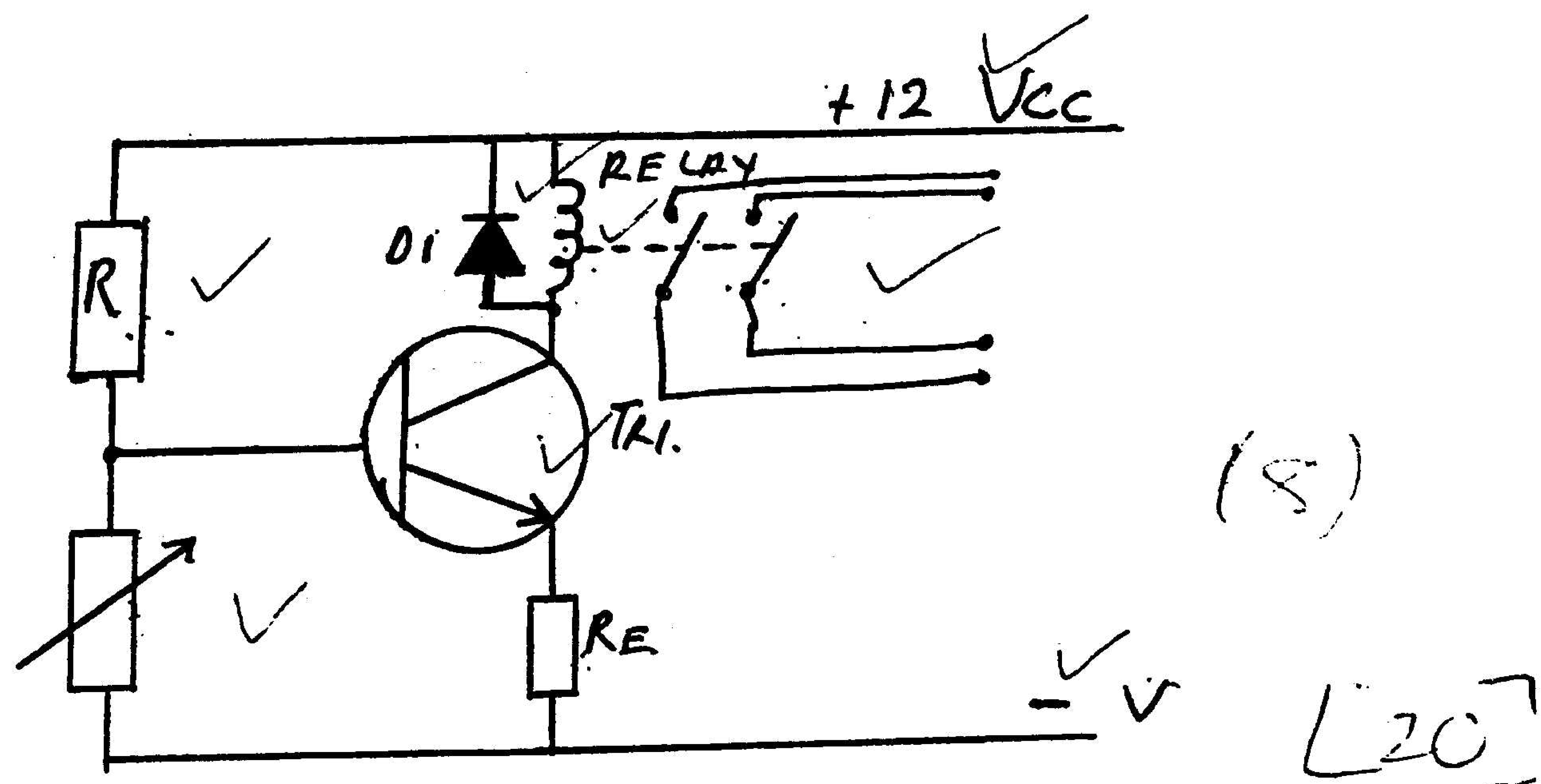
3.1.5



3.1.6



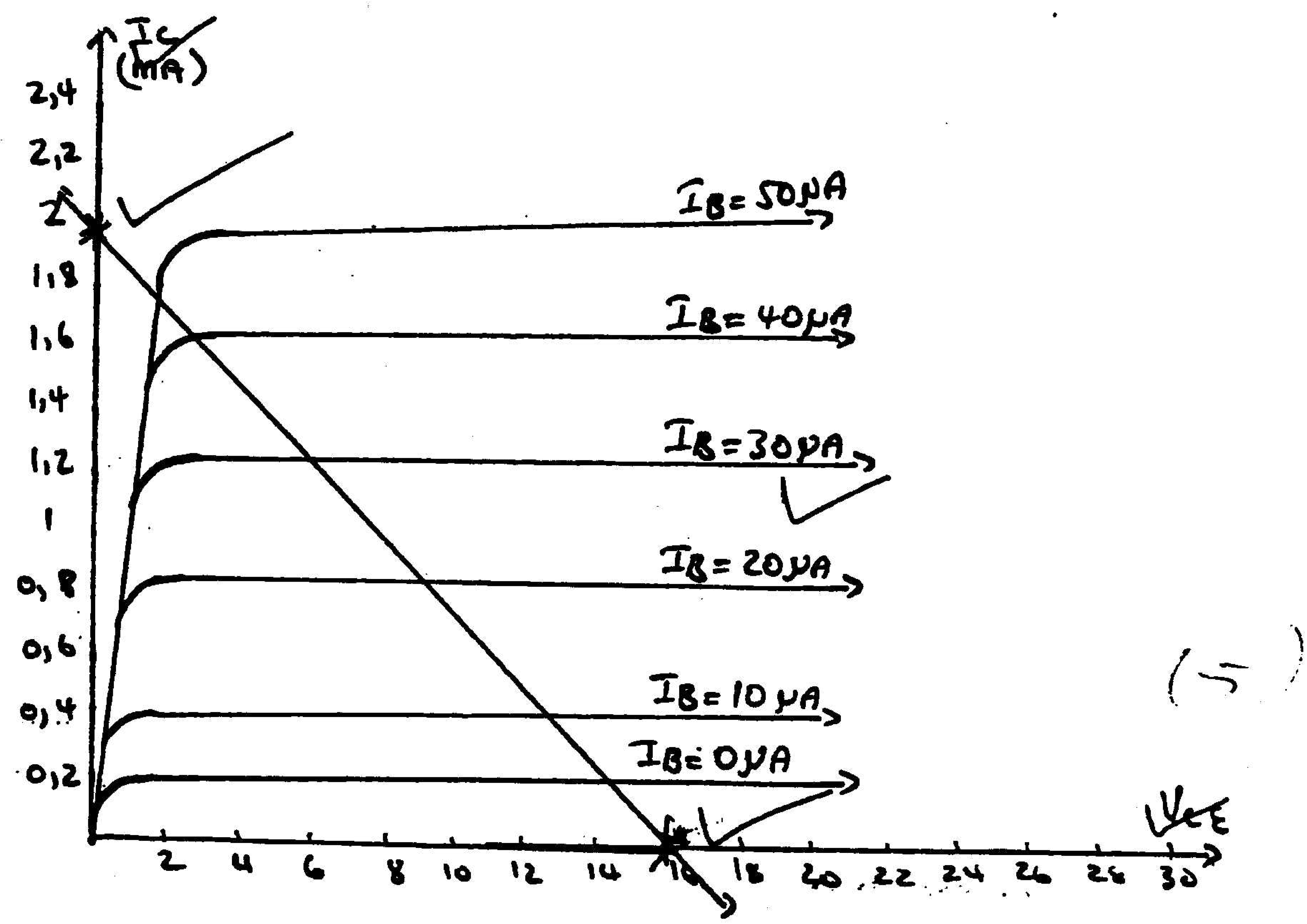
3.2



VRAAG 4 / QUESTION 4

4.1 Kirchoff's law: VCE = VCC = 16 V (2)

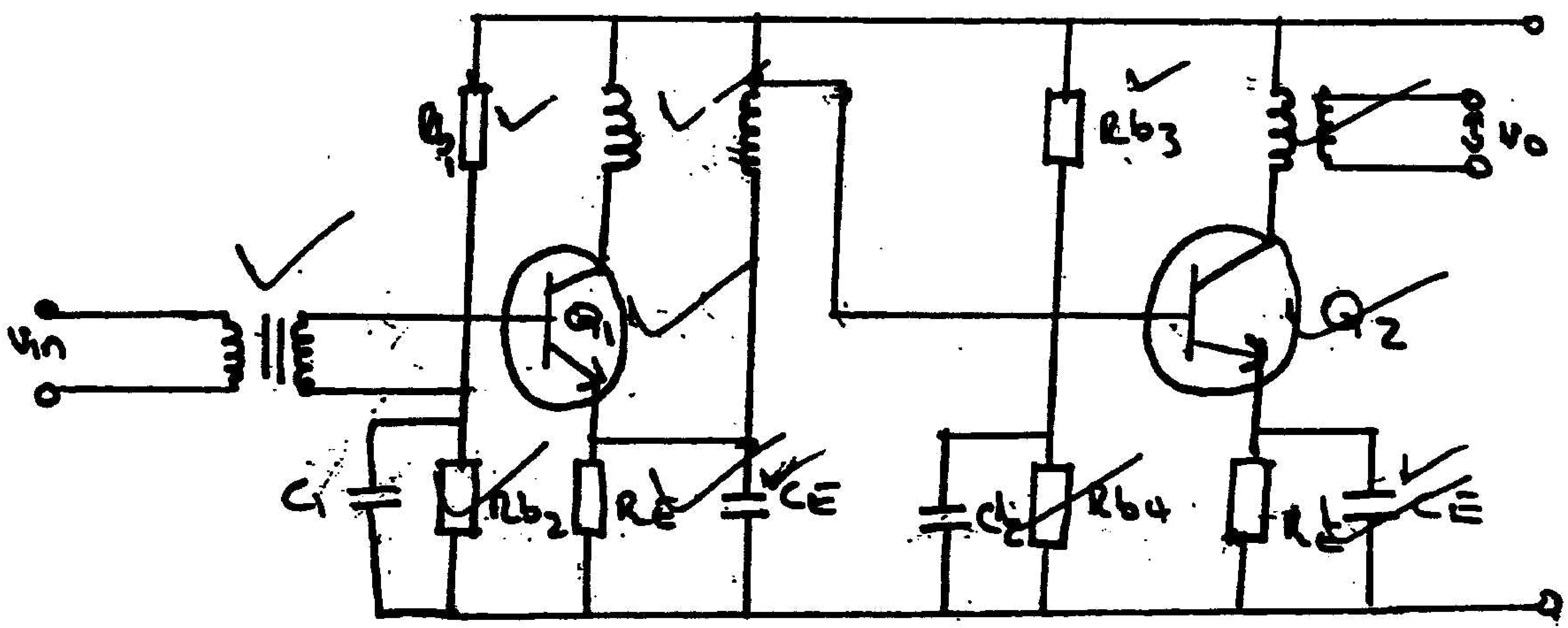
$IC = \frac{VCC}{RC} = \frac{16\ V}{8000} = 0{,}002A = 2\ mA$ (3)



4.2 1) A bulky size of the circuit
2) More expensive
3) Poor frequency response
4) Heavy to carry

Any two (2)

4.3 Transformer coupled amplifier / Transformator koppeling Versterker (20)



- Improved power consumption can be obtained since the transformer is used for impedance matching
- The lower the frequency applied to the transformer, the lower its reactance and the higher the frequency, the higher the reactance
- The amount of the gain can also be controlled by applying certain frequencies to different configurations of the transformer coupled amplifier.

Amplification technique: The output of one amplifier feeds the input of the other amplifier. A transformer is used to interconnect the stages.

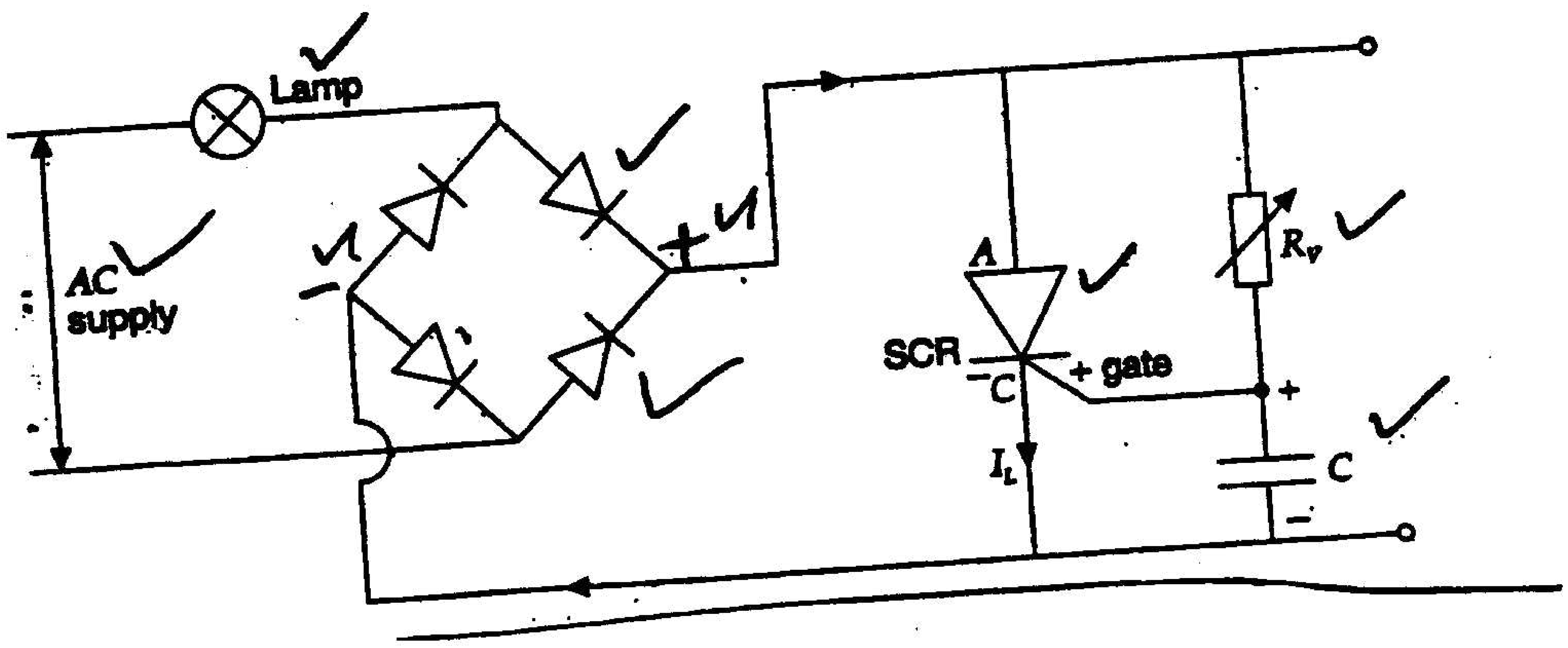
R_1, R_2, R_3 and R_4 provide Q_1 and Q_2 with the required biasing
Re is used for the temperature compensation
CE is used for emitter stabilisation

Verbeterde kragverbruik en meer doeltreffend omdat die transformator gebruik vir impedansie aanpassing.
Dit is wanneer die impedansie van een kring gelyk is aan die impedansie van kring waaraan dit gekoppel word.

R_1, R_2, R_3 en R_4 voorsien Q_1 en Q_2 van die vereiste basis spanning
Re word gebruik as temperatuurkompensasie
CE word gebruik vir emitter stabilisering

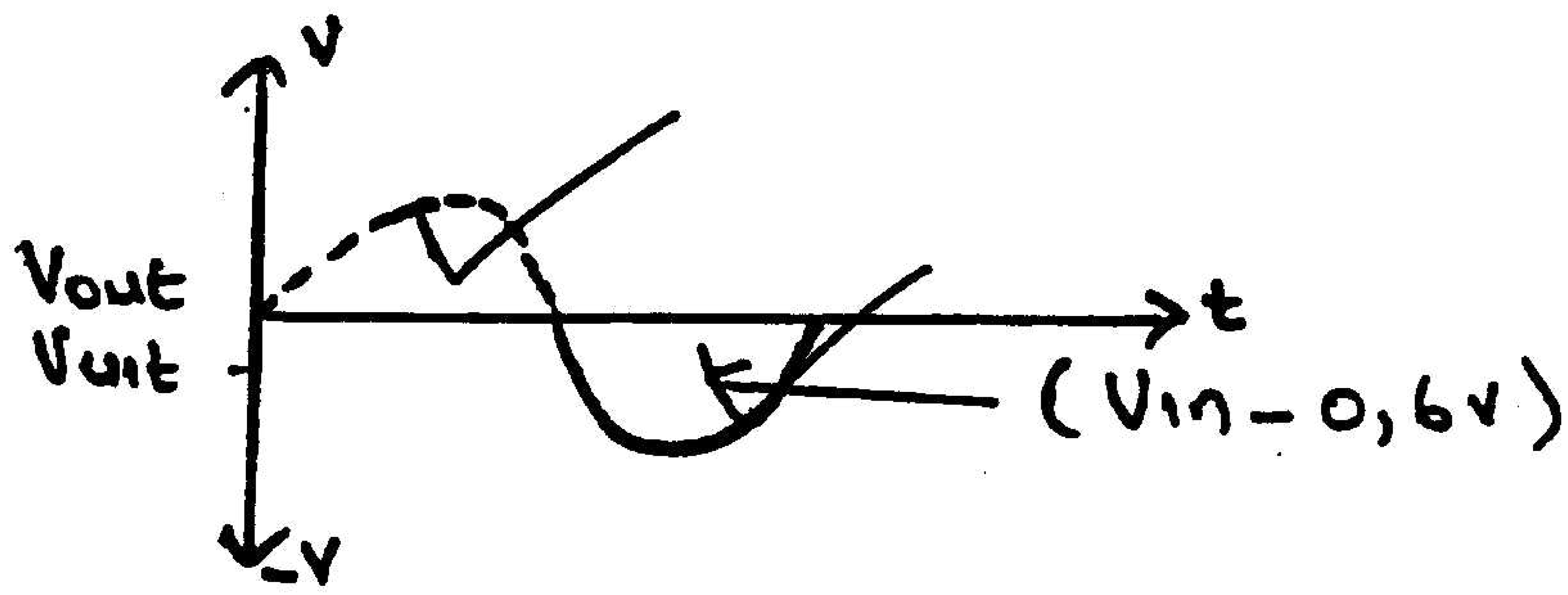
VRAAG 5 / QUESTION 5

5.1

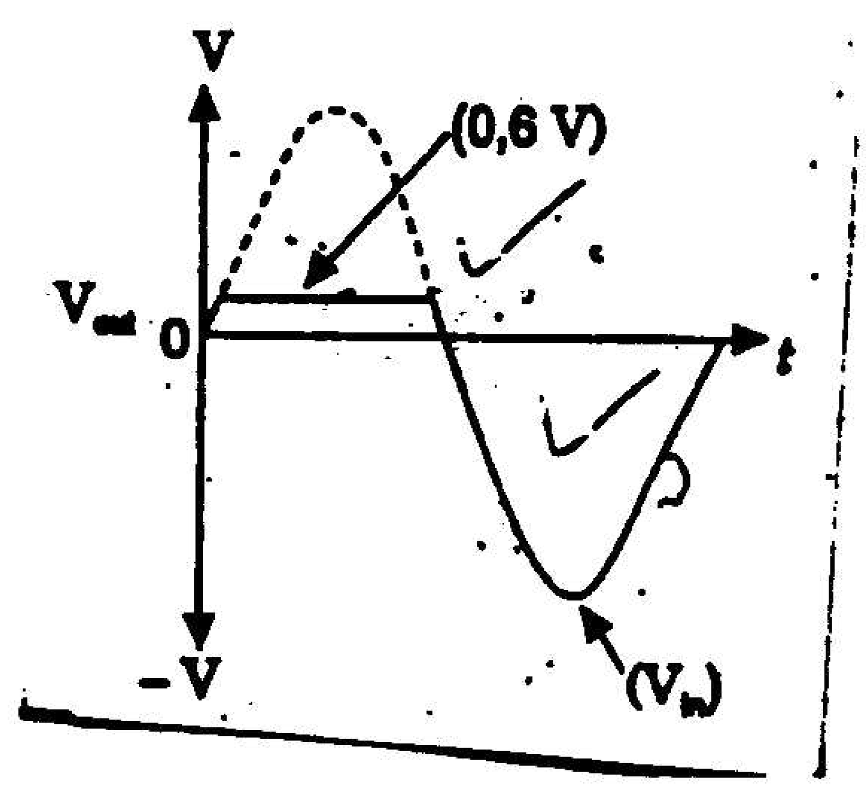


5.2 Measuring voltages / spanning
Calculate of Currents / stroom
Calculate of Frequency / Frekwensie
Phase difference between two signals

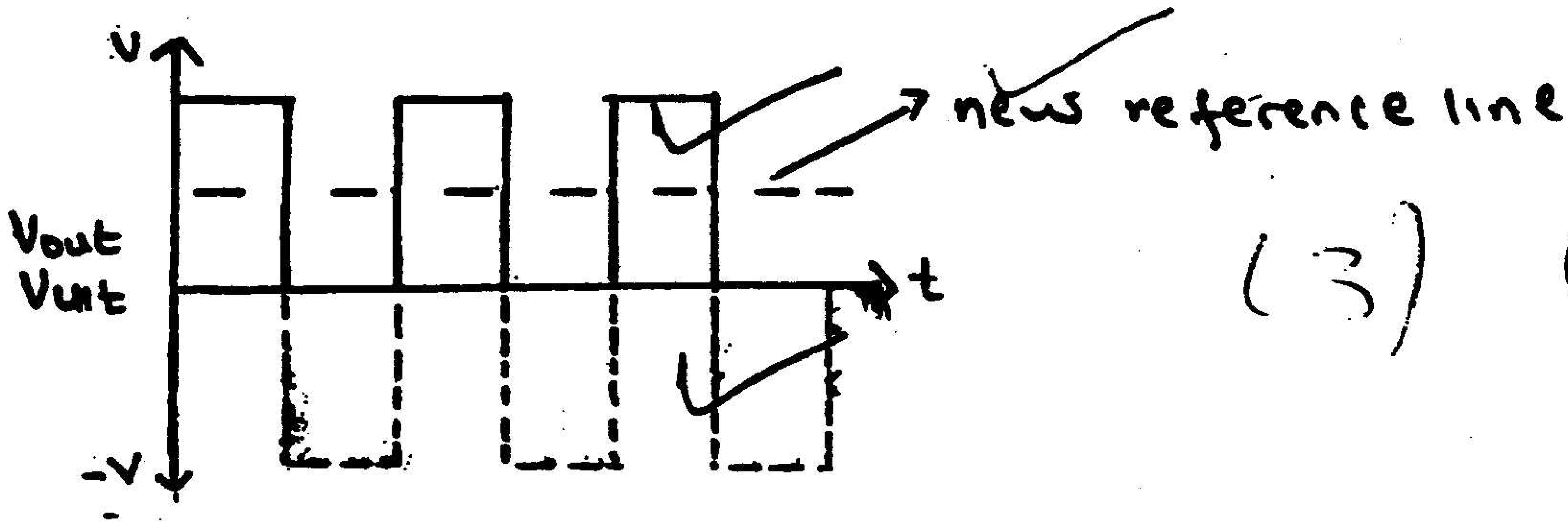
5.3.1



5.3.2

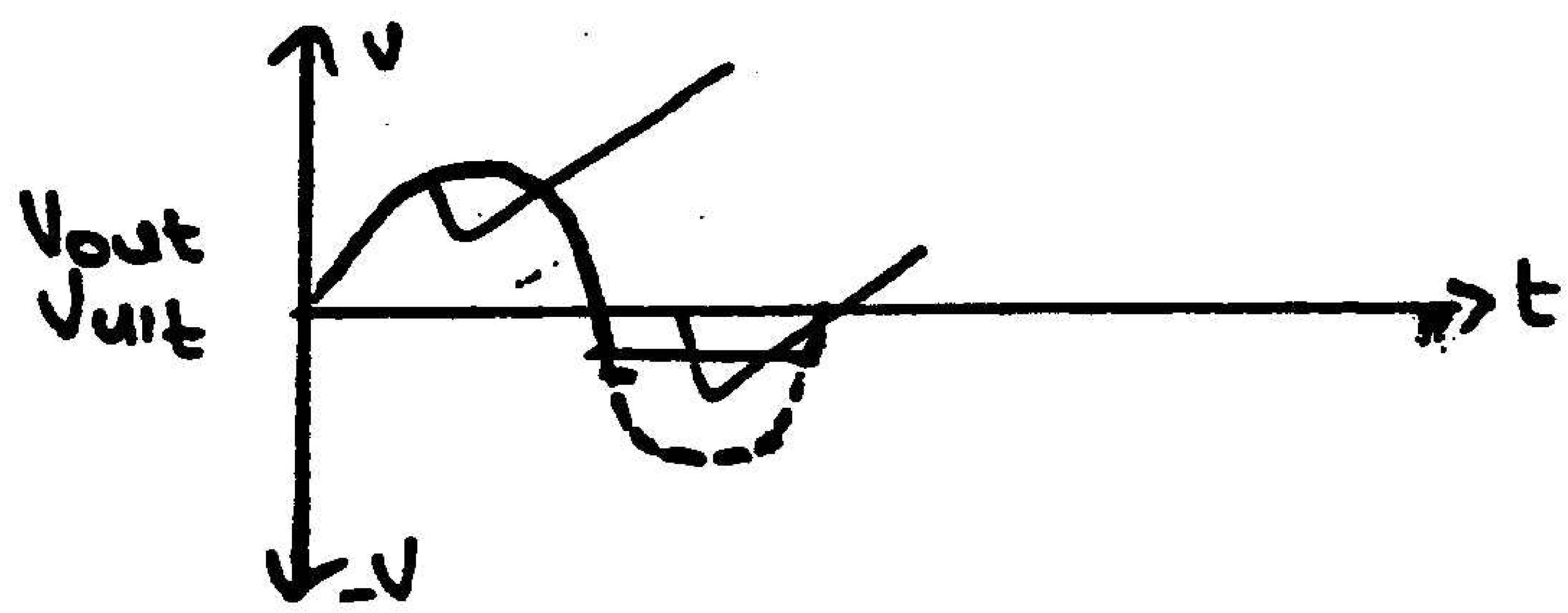


5.3.3



(3)

5.3.4



(2)

[21]

VRAAG 6 / QUESTION 6

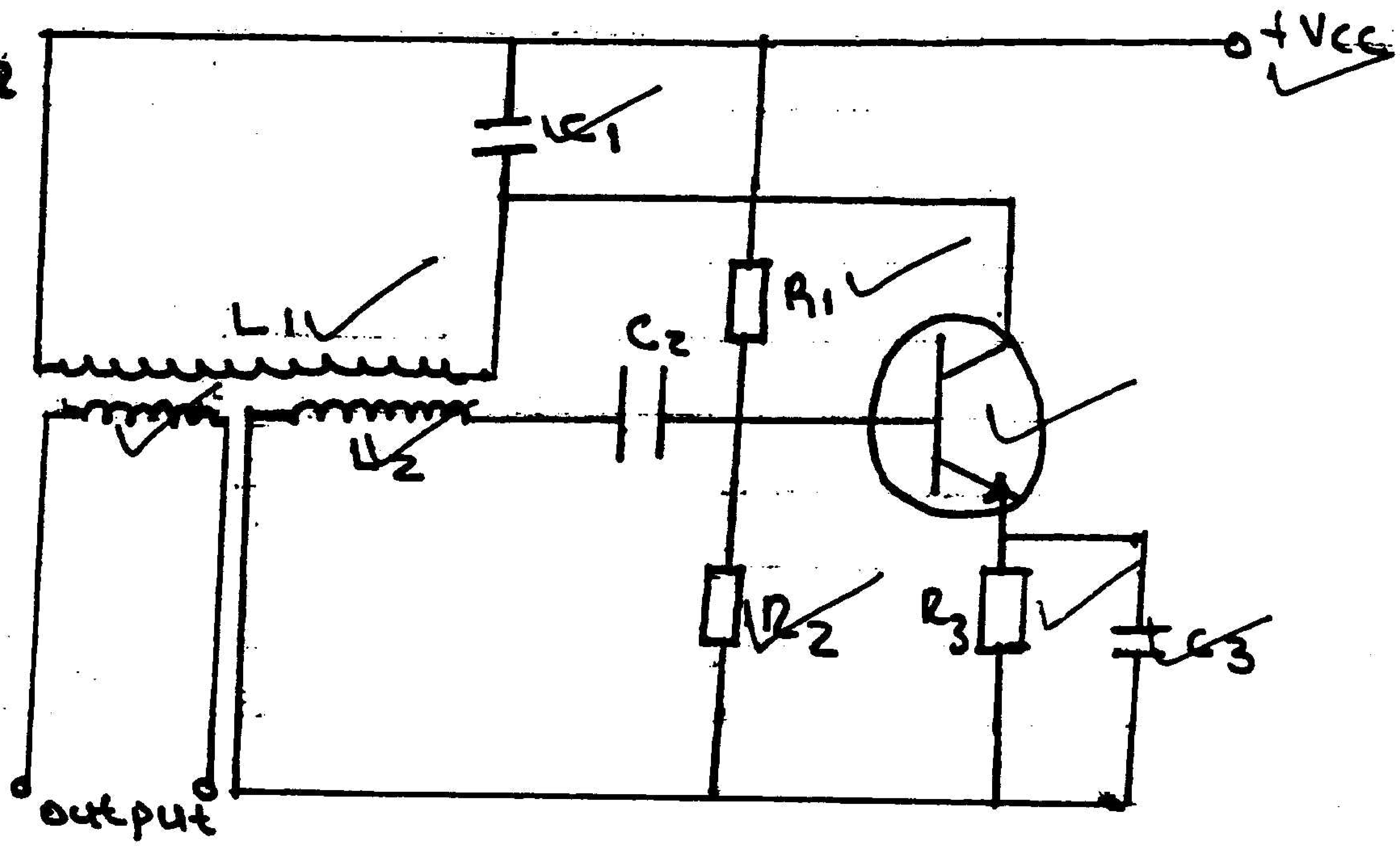
6.1

- Differentiation in component values caused through temperature and fatigue
- A change in impendance of the transistor
- A change in supply voltage
- Transients

Any three (3)

6.2

6.2



When the supply is switched on, the biasing circuit will allow the transistor to switch on and conduct.
The current will thus flow through inductor L 1. As the current flow through L 1, an e m f is induced in L 2. The positive induced e

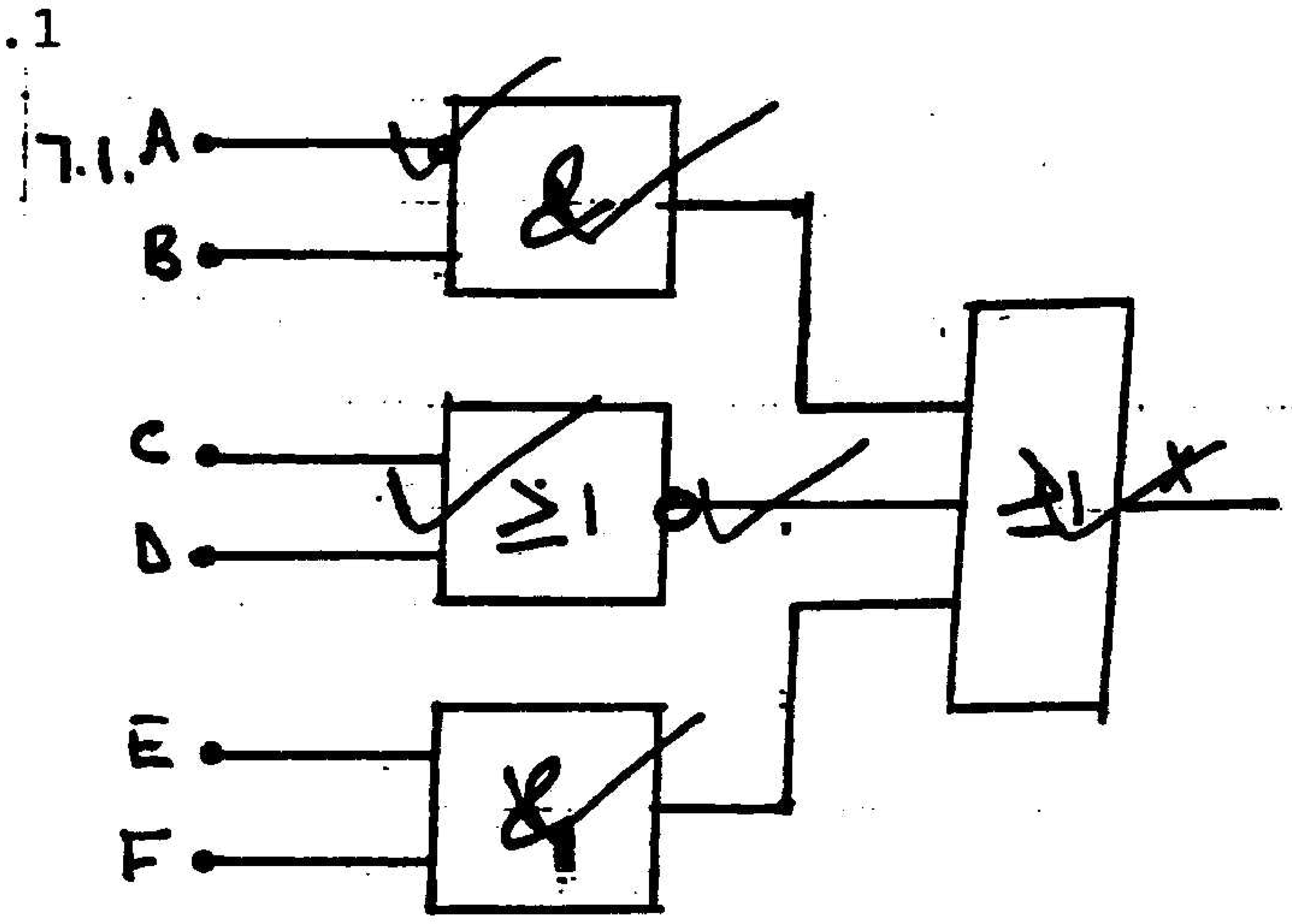
m f in L 2 will switch the transistor more on, resulting in the increase of the current in the inductor L 1 while C 1 charges. More current will be induced in L 2 and the transistor will be driven into saturation state. The charge on the capacitor C 1 is almost that of VCC.

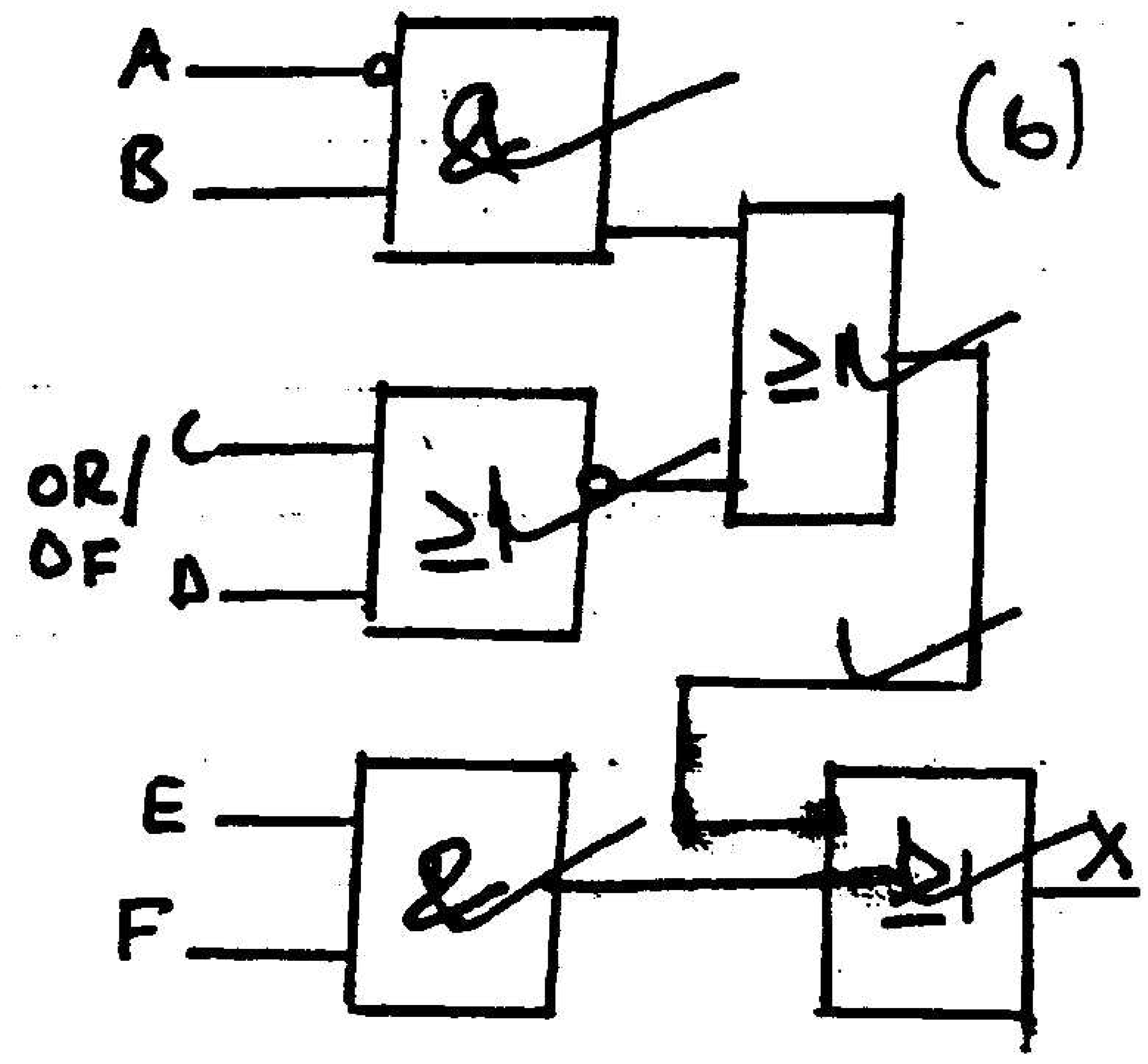
(17)

(20)

VRAAG 7 / QUESTION 7

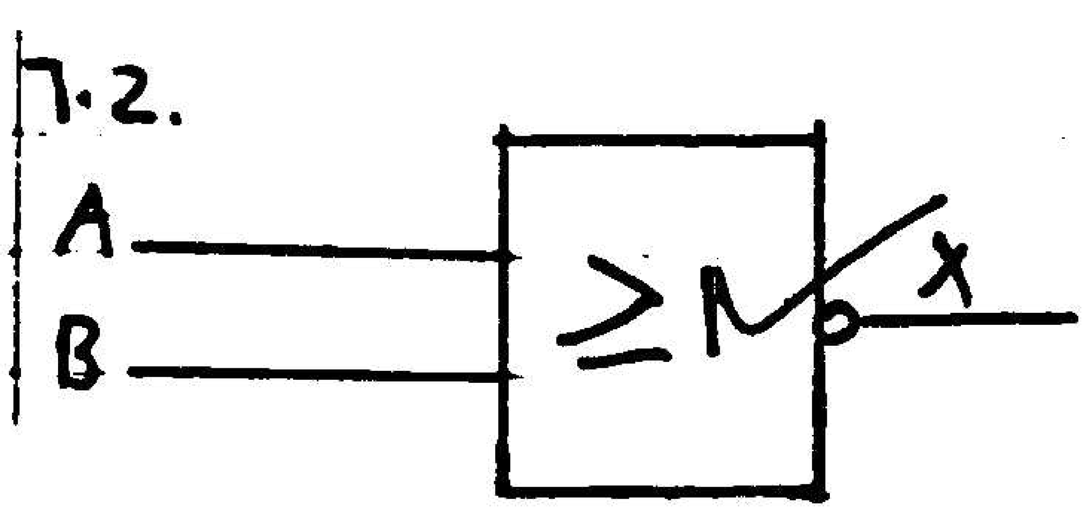
7.1



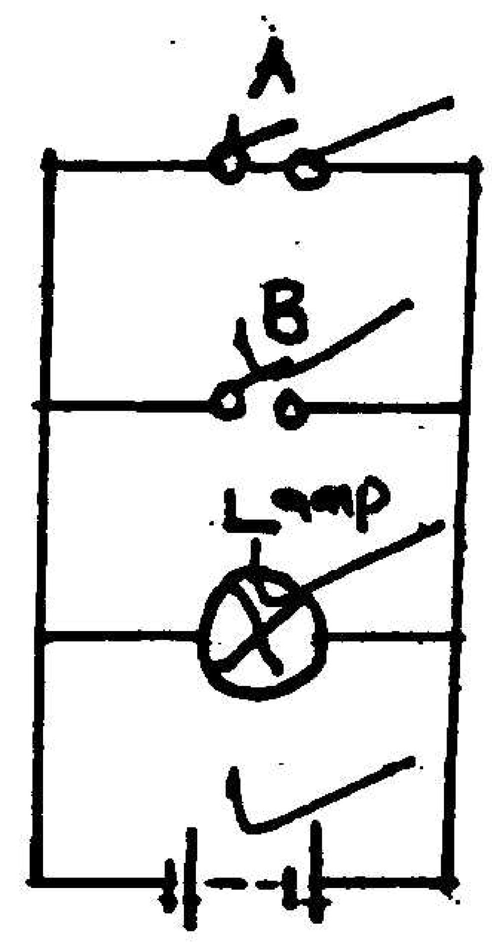


(6)

7.2



A	B	X
0	0	1
1	0	0
0	1	0
1	1	0



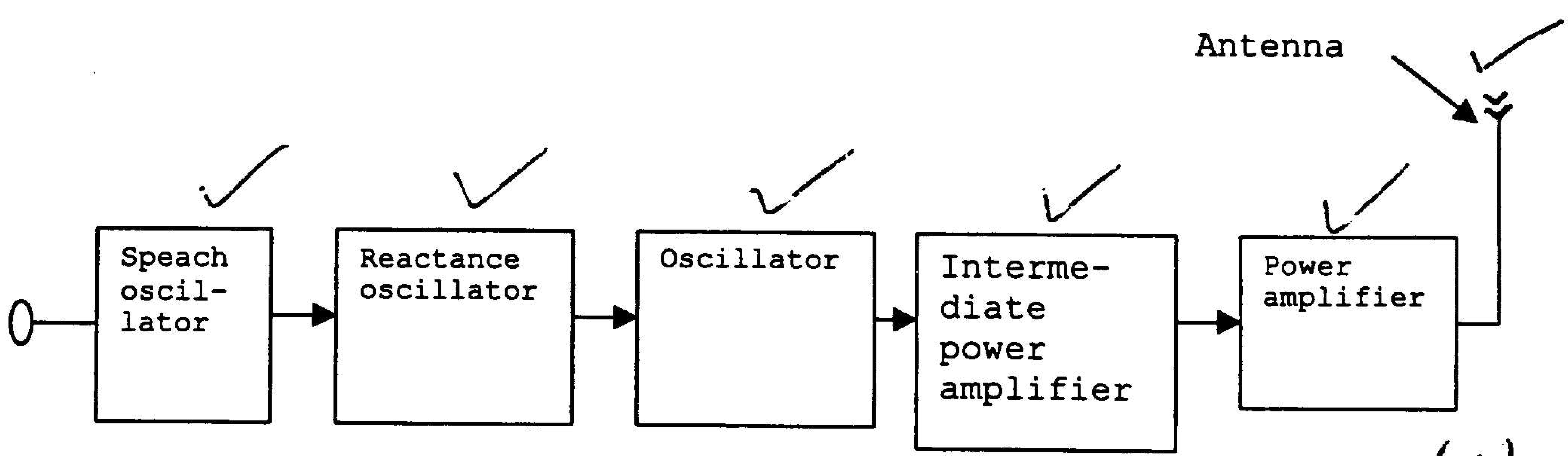
(9)

7.3 (X + Y) (X + Z) = X + YZ

F = X X + XY + XY + YZ
F = X + (XY + XY) + YZ
F = X + XY + YZ
  = X (1 + Y) + YZ
  = X (1) + YZ
  = X + YZ

VRAAG 8 / QUESTION 8

8.1



8.2

1) Make a solid study of the Oscilloscope textbook
2) Body must be earth
3) Prope must be in good condition
4) Use the lowest possible intensity
5) Prevent sharp light
6) Don't exceed maximum input voltage

1) Maak 'n deeglike studie van die ossilloskoophandboek
2) Sorg dat die ossilloskoopomhulsel goed geaard is
3) Isolasie van toetsgeleiers in goeie toestand
4) Gebruik laagste moontlike intensiteit
5) Verhoed sterk lig by ossilloskoop
6) Moet nie maksimum spanninginset oorskry nie

8.3 (1) V peak = Volts/Division x No of dividion
= 5 V/cm x 8 cm

= 40 V ✓

(11) Vrms/Wgk = Vp x 0,707 ✓
= 40 x 0,707 ✓
= 28,28 V ✓ (6) [18]

VRAAG 9 / QUESTION 9

9.1 Foam / Skuim CO_2 ✓ (1)

9.2 Do not wear loose clothes
Do not operate the machine without the teacher's permission
Do not play in the workshop
Do not enter or leave the workshop without the teacher's permission. (4)

(Any acceptable answer)

9.3 1) Having sex with an infected person without using a condom
2) Sharing needles or syringes with an infected person
3) Through blood transfusion
4) From infected mother to unborn child (2) [7]