



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

**NATIONAL CERTIFICATE
AUGUST EXAMINATION
ELECTRICAL TRADE THEORY N1**

28 July 2016

This marking guideline consists of 6 pages.

QUESTION 1

- 1.1 True
- 1.2 True
- 1.3 True
- 1.4 False
- 1.5 True
- 1.6 True
- 1.7 False
- 1.8 False
- 1.9 True
- 1.10 False
- 1.11 False
- 1.12 True
- 1.13 True
- 1.14 True
- 1.15 True
- 1.16 False
- 1.17 True
- 1.18 True
- 1.19 True
- 1.20 False

(20 x 1) **[20]****QUESTION 2**

- 2.1
- It cuts down on the time spent looking for goods, articles and tools
 - Space is saved
 - Injuries are avoided
 - Fire hazards are reduced

(4)

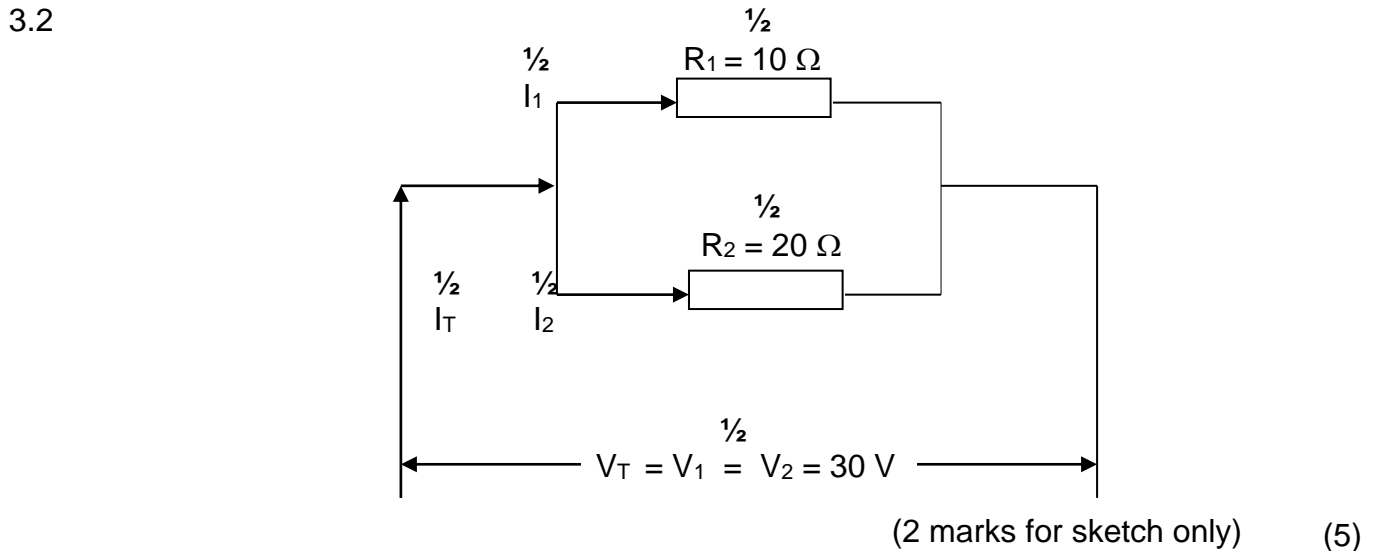
- 2.2
- Electrical faults
 - Open flames
 - Friction
 - Chemical reactions
 - Lightning
 - Matches
 - Cigarettes
 - Static electricity
 - Heated surfaces
 - Uncontrollable spontaneous ignition, et cetera.

(Any 5 x 1)

(5)
[9]

QUESTION 3

- 3.1 $I \equiv$ Current flow measured in ampere (A)
 $V \equiv$ Voltage drop/ potential difference measured in Volt (V)
 $R \equiv$ Resistance measured in Ohm (Ω) (6)



3.3 3.3.1
$$R_T = \frac{R_1 R_2}{R_1 + R_2}$$

$$= \frac{10 \times 20}{10 + 20}$$

$$= 20 \div 3$$

$$= 6,667 \Omega$$
 (3)

3.3.2
$$I_T = V_T \div R_T$$

$$= 30 \div 6,667$$

$$= 4,5 \text{ A}$$
 (2)

3.3.3
$$I_1 = V_T \div R_1$$

$$= 30 \div 10$$

$$= 3 \text{ A}$$

$$I_2 = V_T \div R_2$$

$$= 30 \div 20$$

$$= 1,5 \text{ A}$$
 (4)

3.3.4
$$Q_T = I_T^2 R_T \times t$$

$$= 4,52 \times 6,667 \times (2 \times 60 \times 60)$$

$$= 972 \text{ 000 J}$$

$$= 972 \text{ kJ}$$
 (4)

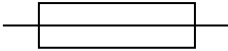

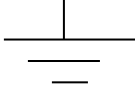

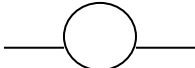
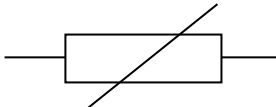
[24]

QUESTION 4

- 4.1 Hold the fingers of the right hand around the conductor. Point the thumb in the direction of the current flow. The direction of the flux will be indicated by the direction of the forefingers. (6)
- 4.2 4.2.1 Turns ratio = $(N_1 \div N_2)$
= $250 \div 50$
= 5:1 (2)
- 4.2.2 $(V_1 \div V_2) = (N_1 \div N_2)$
 $V_2 = V_1 (N_2 \div N_1)$
= $220 (50 \div 250)$
= 44 V (3)
- 4.2.3 $(N_1 \div N_2) = (I_2 \div I_1)$
 $I_2 = I_1 (N_1 \div N_2)$
= $10(250 \div 50)$
= 50 A (3)
- [14]**

QUESTION 5

- 5.1
- Shall be clamped at least every 1m
 - May not be threaded
 - Must be joined by means of couplers
 - Provide for expansion and contraction due to temperature
 - May not be used where they are likely to be damaged, unless protected
 - May not be used where their maximum temperature is likely to be exceeded (Any 4 x 1) (4)

	Item	Wiring Symbol	
5.2			
5.2.1	Fuse		
5.2.2	Battery		
5.2.3	Earth connection		
5.2.4	Bell		
5.2.5	Voltmeter		
5.2.6	Variable resistor		(6)

5.3 A circuit breaker is a mechanical switching device that can operate as a manual switch. Its purpose is to automatically disconnect an appliance or circuit from the supply in the event of an abnormal condition such as an overcurrent. (4)
[14]

QUESTION 6

- 6.1
- Copper
 - Aluminium
- (2)
- 6.2
- High dielectric strength (allows no current flow)
 - Durable
 - Flexible
 - Mechanically strong
 - Should not absorb moisture
- (Any 3 x 1) (3)
- 6.3 No, Carbon is used in heavy current machines in the manufacture of resistors. (2)
- 6.4 To bend metal conduit without the conductors walls collapsing (2)
[9]

QUESTION 7

- 7.1
- Fairly accurate
 - Almost uniform scale
 - Well shielded from stray magnetic fields
- (Any 2 x 1) (2)
- 7.2
- Insulation resistance test between conductors and earth
 - Insulation resistance test between conductors
 - Earth and bonding continuity test
 - Continuity test of conductors
 - Polarity test
 - Earth-leakage protection test
- (Any 3 x 1) (3)
- 7.3
- Violet \equiv 7
 - Grey \equiv 8
 - Red \equiv $\times 10^2$
 - Gold \equiv $\pm 5\%$ tolerance
- R = 7 800 Ω \pm 5% tolerance
= 7,8 k Ω
- (5)
[10]
- TOTAL 100**