higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

INDUSTRIAL ELECTRONICS N1

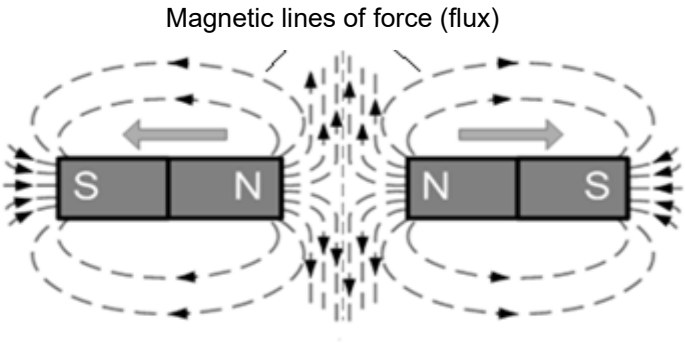
14 April 2021

This marking guideline consists of 7 pages.

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QUESTION 1

1.1



Labels = 2 × 1
Flux lines, correct direction = 2 × 1
Correct pole positioning =2 × 1 (6)

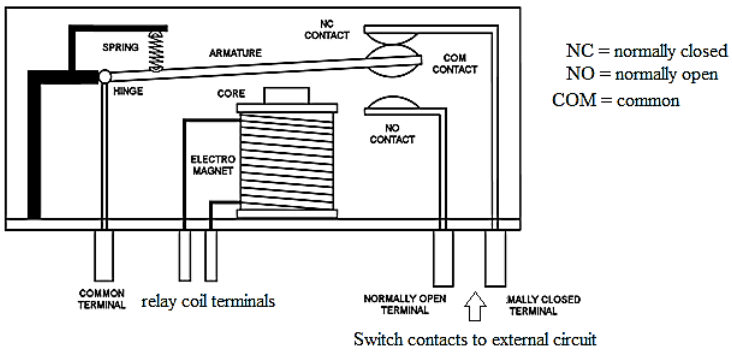
1.2
- Length
- Cross-sectional area
- Type of material
- Temperature (4)

1.3 If permanent magnet is placed near conductor magnetic flux cuts across wire, inducing voltage across it.✓ This causes current to flow through conductor.✓ If permanent magnet is moved in opposite direction, polarity of induced voltage is reversed.✓ This also changes direction of current.✓

OR

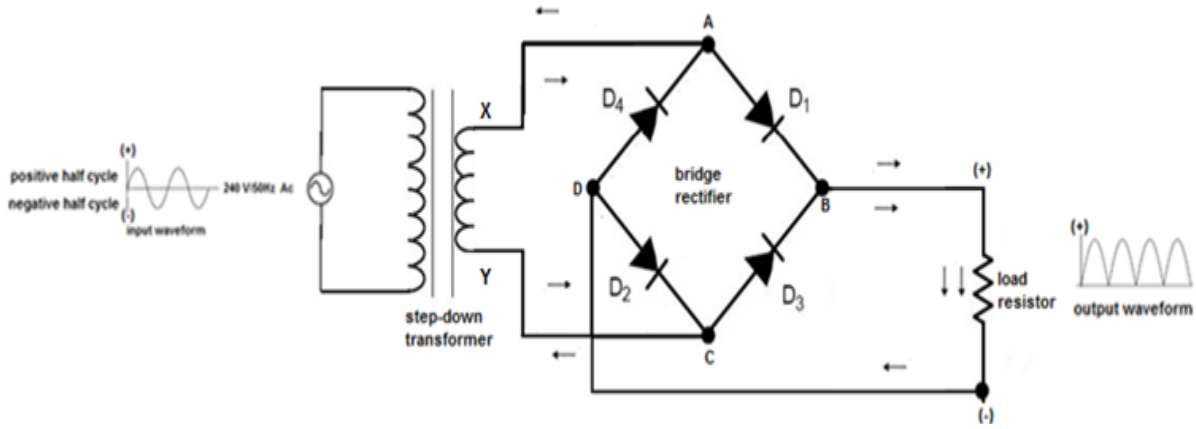
If permanent magnet is inserted into coil of wire then current produced in coil flows in direction indicated by meter. Moving magnet in opposite direction changes direction of current. Magnet or coil must be moving for this to happen. If either is stationary, no current will be induced in coil. (Any relevant explanation) (4)

1.4



(6)

1.5



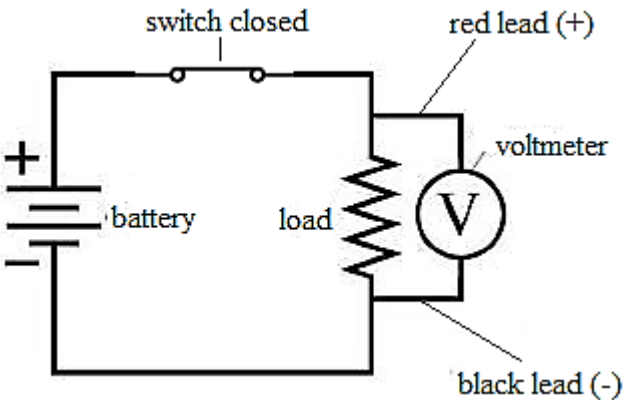
(4 × 1 for correct diagram and 2 × 1 for waveforms) (6)
[26]

QUESTION 2

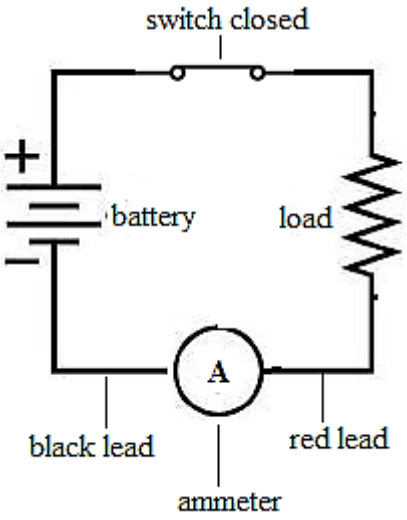
2.1 2.1.1 Atom with positive and negative charges
2.1.2 Process of losing or gaining electrons to atom
2.1.3 Positive ion
2.1.4 Negative ion
2.1.5 Combination of two or more elements

(5 × 2) (10)

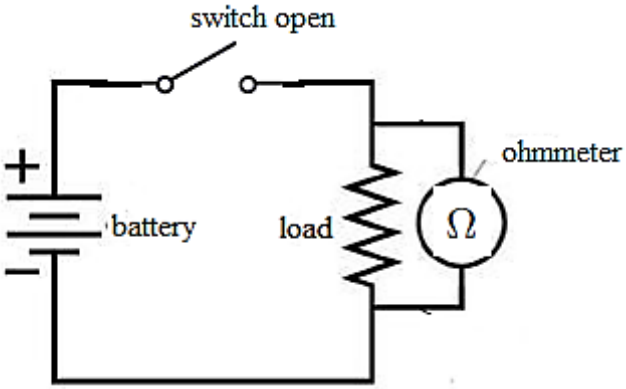
2.2 2.2.1



2.2.2



2.2.3



(3 × 2) (6)

2.3
- Lead-acid
- Nickel-cadmium
- Rechargeable alkaline
- Nickel-metal hydride
- Lithium-ion
- Lithium-polymer

(Any 4 × 1) (4)

2.4 2.4.1

$$\frac{N_P}{N_S} = \frac{V_P}{V_S}$$

$$\frac{10}{1} = \frac{250}{V_S}$$

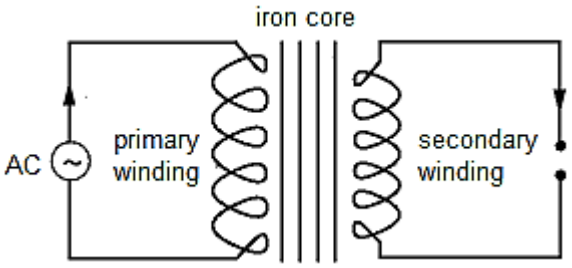
$$V_S = \frac{250}{10} \quad \checkmark$$

$$= 25V \quad \checkmark$$

2.4.2
$$\frac{N_P}{N_S} = \frac{I_S}{I_P}$$
$$\frac{10}{1} = \frac{5}{I_p}$$
$$I_P = \frac{5}{10} \checkmark$$
$$= 0,5A \checkmark$$

(2 × 2) (4)

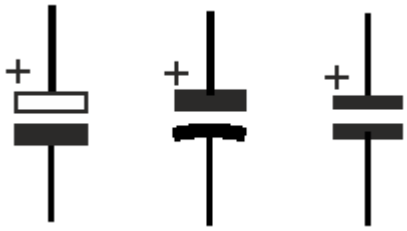
2.5 2.5.1



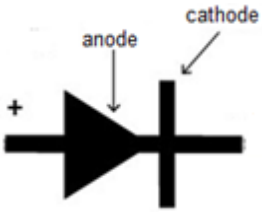
2.5.2



2.5.3



2.5.4



(4 × 1) (4)
[28]

QUESTION 3

3.1
3.1.1 A
3.1.2 D
3.1.3 B
3.1.4 D
3.1.5 B

(5 × 1) (5)

3.2	3.2.1	South to North		(2)
	3.2.2	Switch and amplifier		(2)
	3.2.3	P-type semiconductor material		(1)
	3.2.4	Voltage regulation		(1)
	3.2.5	Dielectric		(1)
3.3	3.3.1	H		
	3.3.2	C		
	3.3.3	I		
	3.3.4	G		
	3.3.5	D		
			(5 × 1)	(5)
3.4	3.4.1	False		
	3.4.2	False		
	3.4.3	False		
	3.4.4	False		
	3.4.5	False		
			(5 × 1)	(5)
3.5	3.5.1	Farad		
	3.5.2	Ampere hour		
	3.5.3	Ohm per ohm degree Celsius		
			(3 × 1)	(3)
				[25]

QUESTION 4

4.1 4.1.1

$$R_T = R_1 + R_2 + R_3 \quad ✓$$
$$= 27 + 54 + 81 \quad ✓$$
$$= 162\Omega \quad ✓$$

(3)

4.1.2

$$I = \frac{V}{R} = \frac{32}{162} = 0{,}198A \quad ✓✓✓$$

(3)

4.1.3 Same as in QUESTION 4.1.2 = 0,198 A or current in series the same. (1)

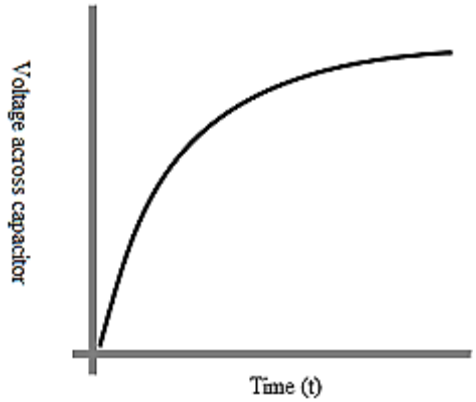
4.1.4
- Red
- Violet
- Black
- Brown

(4)

4.2 The direction of an induced emf is such that the direction of its own magnetic field will oppose the action that caused that magnetic field or change what caused it initially. (3)

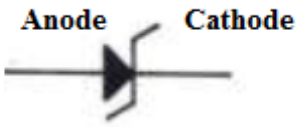
4.3
- Area of plates
- Distance between plates
- Dielectric material (3)

4.4



(1 × 1 for curve and 1 × 1 for any label) (2)

4.5



(1 × 1 for symbol and 2 × ½ for each label) (2)
[21]

TOTAL: 100

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