



MARKING SCHEME

School:.....*SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING*

Programme:.... *CERTIFICATE IN ELECTRICAL SERVICEMAN'S COURSE*

Unit code:..... *EEE211*

Unit Title:.....*APPLIED ELECTRICITY 1*

Date:.....*03/07/2014*

Examiner:.....*MR Roneel R Maharaj*

SOLUTION SHEET EEE211

SECTION A

MULTIPLE CHOICE (20 Marks)

- | | |
|-------|--------|
| 1. C | 1 Mark |
| 2. B | 1 Mark |
| 3. B | 1 Mark |
| 4. D | 1 Mark |
| 5. D | 1 Mark |
| 6. B | 1 Mark |
| 7. B | 1 Mark |
| 8. C | 1 Mark |
| 9. B | 1 Mark |
| 10. B | 1 Mark |
| 11. C | 1 Mark |
| 12. A | 1 Mark |
| 13. A | 1 Mark |
| 14. C | 1 Mark |
| 15. A | 1 Mark |
| 16. D | 1 Mark |
| 17. B | 1 Mark |
| 18. C | 1 Mark |
| 19. B | 1 Mark |
| 20. A | 1 Mark |

Total 20 Marks

SECTION B (Part A)

MATCHING

(10 marks)

1. E
2. I
3. C
4. D
5. H
6. B
7. F
8. G
9. A
10. J

[1 mark each]

(Part B)

TRUE/ FALSE

(10 marks)

1. F
2. T
3. F
4. T
5. T
6. F
7. T
8. F
9. T
10. T

[1 mark each]

SECTION C**ANSWERS AND CALCULATIONS****(30 MARKS)**

1. $5 * 60 \text{ watts} = 300 \text{ watts} - 0.3\text{kW} * 8\text{hr} = 2.4\text{kWhr}$ (1 mark)
 $1 * 150 \text{ watts} = 150 \text{ watts} - 0.15\text{kW} * 2\text{hr} = 0.3\text{kWhr}$ (1 mark)
 $3 * 40 \text{ watts} = 120 \text{ watts} - 0.12\text{kW} * 8\text{hr} = 0.96\text{kWhr}$ (1 mark)

Total kWhr per day = **3.66kWhr** (1 mark)

Total units used for 5 days = 5 days * 3.66kWhr
= **18.3 units** (2 marks)

Total Cost = 18.3 units * 15 cents = **\$2.75** (1 mark)

2.

1. $\text{Area} = \pi r^2$
 $= \pi * (0.0025)^2$
 $= \mathbf{1.96 \times 10^{-05} \text{ m}^2}$ (2 marks)

2. $R = \rho L/A$
 $= (1.72 \times 10^{-8}) (1.6) / 1.96 \times 10^{-05}$
 $= \mathbf{1.4 \times 10^{-03} \Omega}$ (1 mark)

3. $V = IR$
 $12 = I (1.4 \times 10^{-03})$
 $I = \mathbf{8561.75 \text{ Amps}}$ (1 mark)

3. A. $1/C_T = 1/C_1 + 1/C_2 + 1/C_3$
 $= \mathbf{3F}$ (1mark)

B. $Q_T = C_T * V_T$
 $= 3 * 12$
 $= \mathbf{36 \text{ coulombs}}$ (1 mark)

C. In series: charge same, voltage different.

$$\begin{array}{lll} V_1 = Q_T/C_1 & V_2 = Q_T/C_2 & V_3 = Q_T/C_3 \\ = \mathbf{3.6 \text{ Volts}} & = \mathbf{1.2 \text{ volts}} & = \mathbf{7.2 \text{ volts}} \end{array}$$
 (2 marks)

4.

- Length of the conductor moving in the magnetic field 9 the longer the conductor the higher the induced EMF (2 marks)
- Speed of movement between the conductor and the magnetic field. (the faster the relative velocity/movement, the higher the induced EMF (2 marks)
- Strength of the magnetic field. (Stronger the field the higher the induced EMF) (2 marks)
- Angle at which the conductor passes through the magnetic field. (2 marks)

5.

- Output voltage
- Internal Resistance
- Capacity or ampere-hour rating of a battery

(3 marks)

6.

- The lead- acid cell
- Sealed lead – acid cell
- Gel Battery
- Gates Battery

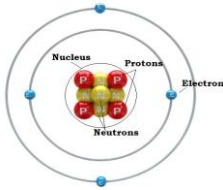
(4 marks)

SECTION D

ANSWERS AND CALCULATIONS

(30 MARKS)

1.



2. a) Average Value = $0.637 \times 30\text{A}$ - Half cycle

$$= \underline{\underline{19.11 \text{ A}}}$$

For full cycle = 0

(1 mark)

b) Peak Value = **30 A**

(1 mark)

c) RMS Value = $0.707 \times 30 \text{ A}$

$$= \underline{\underline{21.21 \text{ A}}}$$

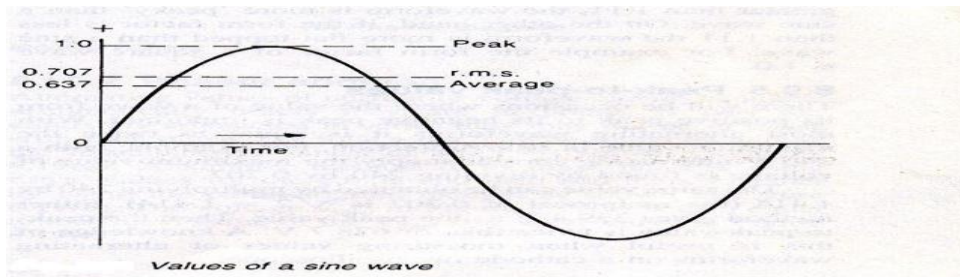
(1 mark)

d) Peak to Peak Value = 30×2

$$= \underline{\underline{60 \text{ A}}}$$

(1 mark)

e)



(2 marks)

3.

- Area of the plates
- Distance between the plates
- Types of dielectric between the plates

(3 marks)

4.

a) $1\text{K}\Omega \pm 5\%$

(1 Mark)

b) $75\Omega \pm 20\%$

(1 Mark)

c) $27\text{K}\Omega \pm 10\%$

(1 Mark)

d) $0.4\text{M}\Omega \pm 5\%$

(1 Mark)

5. Ohms Law: states that in any circuit the current is directly proportional to the voltage and inversely proportional to the circuit resistance.

(2 marks)

$$I = V/R$$

6.

a. Total resistance = $6.5\text{k}\Omega$

(2 mark)

b. Total current = 3.692×10^{-3} Amps

(1 mark)

c. $V_1 = 18.46$ Volts $V_2 = 5.54$ Volts

$V_3 = 24$ volts

(3 marks)

d. Total Power = 88.32×10^{-03} Watts

(1 mark)

7.

- a. The turns ratio 3:1
- b. Secondary Voltage = 60Volts
- c. Type of transformer = Step down

(2 mark)

(2 marks)

(1 mark)

THE END