

### 3.6 ELECTRICITY (448)

In the year 2014, Electricity was tested in two papers; paper 1 (448/1) and paper 2 (448/2). Paper 1 was a theory paper which constituted 60% of the final mark while Paper 2 was a practical paper which constituted 40% of the final mark. Both papers followed the usual setting format as those of the previous years.

#### General Candidates Performance

The candidate's performance statistics in the KCSE electricity examination since the year 2009 are as shown in the table below:

*Table 14: Candidates overall performance in the years 2009 to 2014*

Year	Paper	Candidature	Maximum score	Mean score	Standard deviation
2009	1	<b>219</b>	60	35.47	9.65
	2		40	24.08	5.66
	<b>overall</b>		<b>100</b>	<b>59.55</b>	<b>13.75</b>
2010	1	<b>161</b>	60	32.96	9.53
	2		40	28.56	4.33
	<b>overall</b>		<b>100</b>	<b>61.52</b>	<b>12.56</b>
2011	1	<b>183</b>	60	35.21	10.57
	2		40	30.17	3.99
	<b>overall</b>		<b>100</b>	<b>65.37</b>	<b>12.63</b>
2012	1	<b>214</b>	60	35.13	9.09
	2		40	25.47	4.29
	<b>overall</b>		<b>100</b>	<b>60.60</b>	<b>11.83</b>
2013	1	<b>173</b>	60	32.80	9.74
	2		40	27.28	4.19
	<b>overall</b>		<b>100</b>	<b>60.06</b>	<b>12.55</b>
2014	1	<b>190</b>	60	41.31	9.05
	2		40	27.98	3.65
	<b>overall</b>		<b>100</b>	<b>69.30</b>	<b>11.50</b>

From the table it can be observed that:

- (i) The candidature increased slightly from 173 in the year 2013 to 190 in the year 2014.
- (ii) The mean score improved from 60.06 in the year 2013 to 69.30 in the year 2014.
- (iii) However, the standard deviation dropped from 12.55 in the year 2013 to 11.50 in the year 2014.

#### 3.6.1 Electricity Paper 1 (448/1)

The questions which were reported to have been poorly responded to have been analyzed with a view to pointing out candidates' weaknesses and propose suggestions on some remedial measures that need to be taken in order to improve performance in future. The questions for discussions include question 3, 10, 11 a, 13 a, and 15.

### Question 3

With the aid of graphical symbols, describe the difference between a potentiometer and a Rheostat. (5 marks)

#### Weaknesses

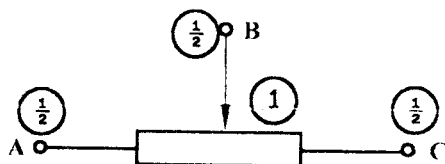
Most candidates confused the terminals while some still used the old resistor symbols.

#### Advice to teachers

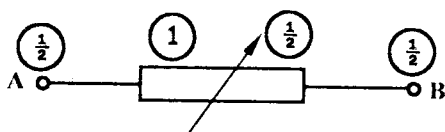
Teachers are advised to give more tutorials in this topic.

#### Expected Responses

(i) Potentiometer.



(ii) Rheostat



### Question 10

Figure 5, shows orthographic views of a block, drawn in first angle projection.

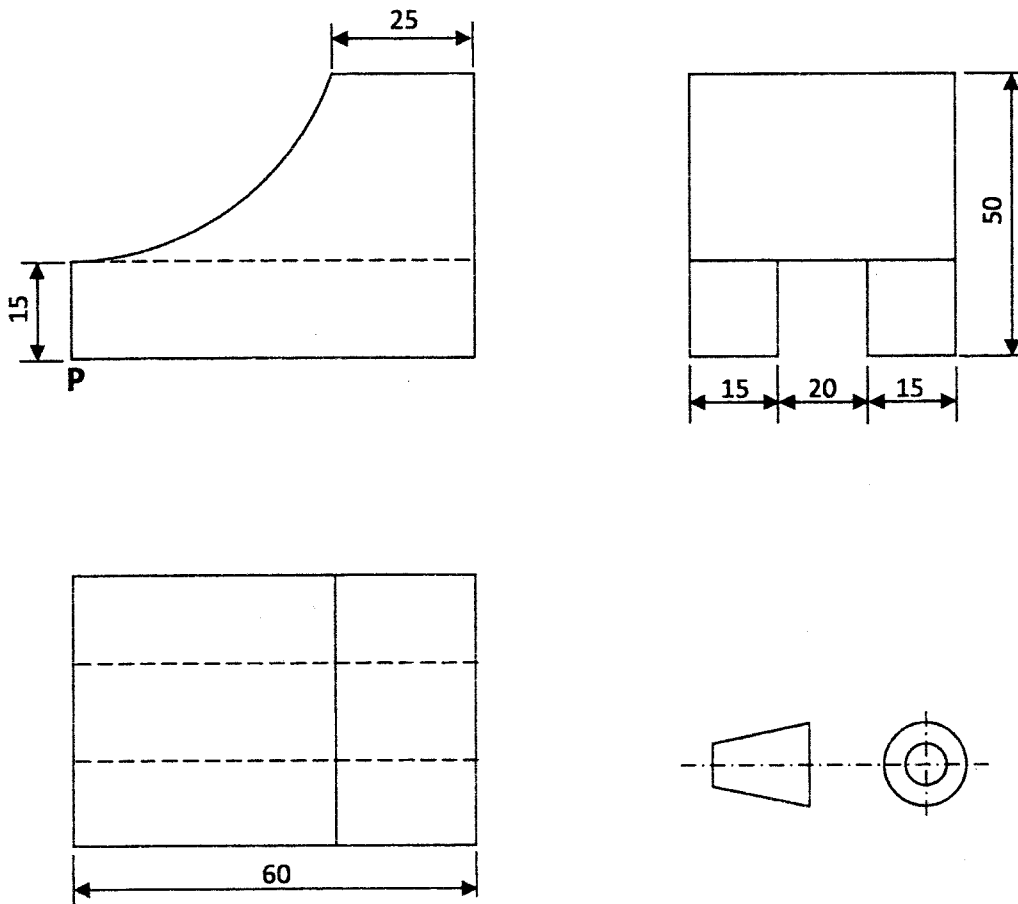


Figure 5

On the isometric grid paper provided, draw the block in isometric projection with P as the lowest point.

(5 marks)

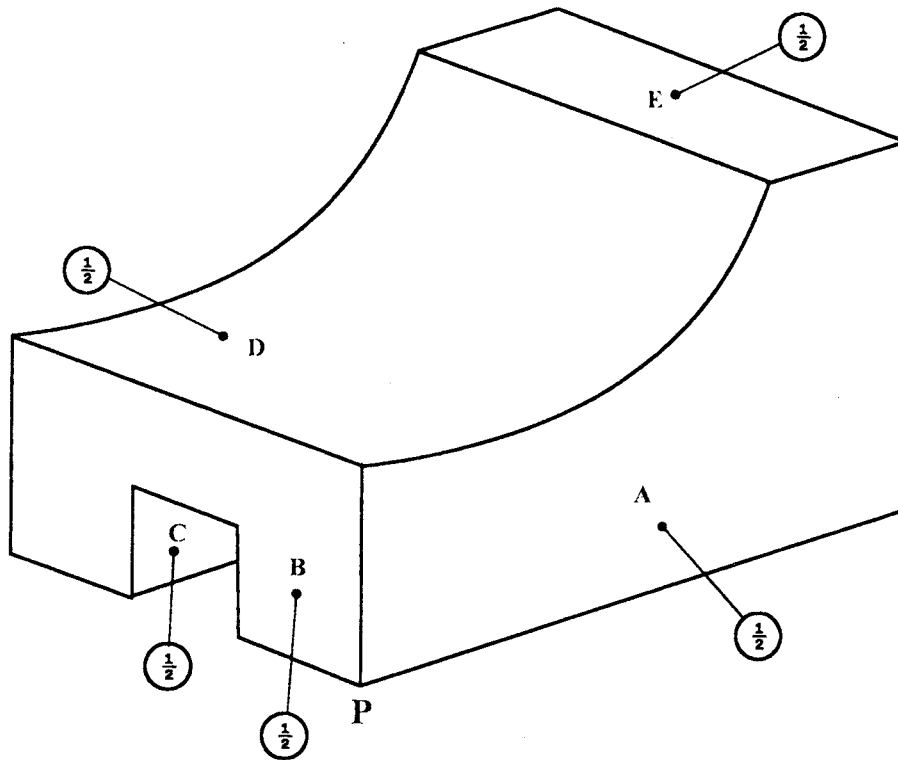
### Weaknesses

Most candidates had problems drawing the figure in isometric while those who tried had problems drawing the circular part and placing P as the lowest point.

### Advice to teachers

Teachers are advised to give more practice in drawing objects both in orthographic and isometric.

## Expected Responses



### Question 11a

With reference to Sinusoidal waveforms, explain each of the following terms: (3 marks)

- (i) Amplitude;
- (ii) Period;
- (iii) Frequency.

### Weaknesses

Most candidates had problems of confusing the terms.

### Advice to teachers

Teachers are advised to improve on tuition holistically with no assumptions.

### Expected Responses

- (i) Amplitude is the maximum value, positive or negative of an alternating quantity.
- (ii) Period is the time taken by an alternating quantity to complete one cycle.
- (iii) Frequency is the number of cycles of an alternating quantity completed in a unit time.

### Question 13 a

Draw a wiring diagram of a final circuit of one lamp controlled from **three** different points. (4 marks)

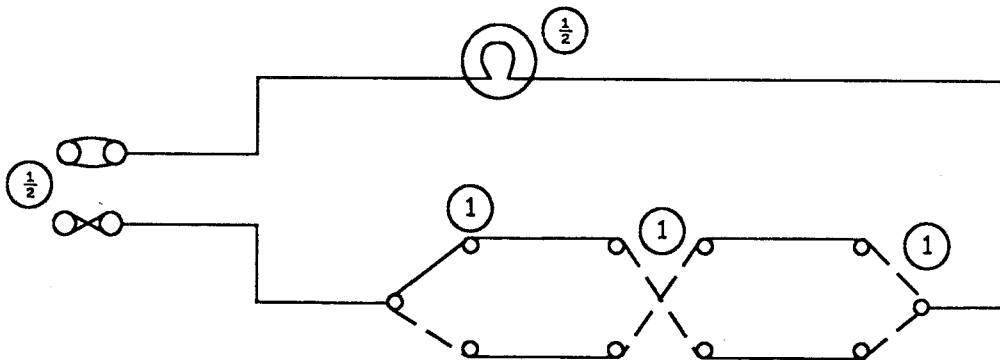
#### Weaknesses

Some candidates were confusing between a wiring diagram and a schematic diagram.

#### Advice to teachers

Teachers are advised to improve on their tuition.

#### Expected Responses



### Question 15a

Draw and label a schematic symbol for each of the following **two** input logic gates. (3 marks)

(i) OR

(ii) NAND

#### Weaknesses

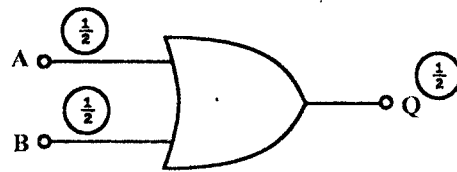
Confusion of symbols was noticed for most candidates.

#### Advice to teachers

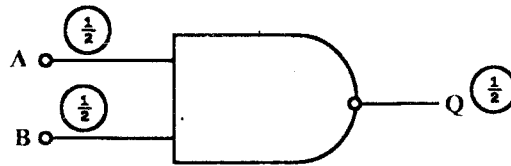
Teachers are advised give students more tutorials in this area because it is the one mostly applied in the digital world.

## Expected Responses

(a) (i) OR gate



(ii) NAND gate



### 3.6.2 Electricity Paper 2 (448/2)

The paper had 5 equally weighted compulsory exercises. It tested competencies in the following areas:

- Circuit connection and manipulation, schematic drawing and calculations.
- Fabricating a candle stand with details given in its development.
- Connecting the electronic circuit provided by KNEC to a DC power supply and taking readings then drawing a graph from which the resistances at maximum power transfer.
- Circuit study by taking measurements of current and voltage then using them to plot a graph then interpreting the graph.
- Domestic installation of a lighting circuit of one lamp to be controlled from one point.

### Weaknesses

- Some candidates had challenges completing the tasks in time.
- Schematic drawings and calculations were a challenge to quite some candidates.
- Plotting the curve in station 3 was challenging to quite a number of candidates
- The use of unfamiliar tools and equipment during examinations should be discouraged.
- Some candidates could not read the measuring instruments in question 4 as expected
- Teachers should teach holistically by ensuring that they cover the whole syllabus and also give more practicals by timing the students.