3.5 POWER MECHANICS (447)

The 2012 KCSE examinations for Power Mechanics consisted of two papers namely Paper 1 (theory) and Paper 2 (Practical). The theory was worth 60% while practical was worth 40% of the final mark. The revised syllabus was tested for the first time but the format and weighting of the two papers was the same as in the previous years.

General Candidates Performance

The candidate's performance statistics in the KCSE Power Mechanics examination since the year 2008 when the syllabus was revised are as shown in the table below.

Table 12: Candidates overall performance in the years 2008 to 2012

Year	Paper	Candidature	Maximum score	Mean score	Standard deviation
2008	1	**57**	60	24.38	9.32
	2		40	25.49	6.88
	overall		**100**	**49.77**	**14.67**
2009	1	**136**	60	28.88	9.27
	2		40	27.05	4.15
	overall		**100**	**56.74**	**12.37**
2010	1	**159**	60	26.49	8.67
	2		40	26.34	5.24
	overall		**100**	**52.66**	**12.81**
2011	1	**136**	60	28.79	9.25
	2		40	27.74	4.10
	overall		**100**	**56.53**	11.69
2012	1	**149**	60	34.51	7.35
	2		40	30.74	3.08
	overall		**100**	**65.26**	**9.07**

From the table it can be observed that:

(i) The mean score improved from 56.53 for the year 2011 to 65.26 for the year 2012.

(ii) The candidature increased from 136 in the year 2011 to 149 in the year 2012.

(iii) The general performance has been increasing since the year 2010.

3.5.1 Power Mechanics Paper 1 (447/1)

The questions which were reported to have been poorly performed have been analyzed with a view to pointing out candidates' weaknesses and proposed suggestions on some remedial measures that would be taken in order to improve performance in future. The questions for discussions include 1 (b), 3(b), 5, 6 and 7.

Question 1 (b)

List four types of common body cuts.

Candidates were expected to list four types of body cuts.

Weaknesses

Most candidates could not identify body cuts.

Advice to Teachers

They should cover the whole syllabus including safety.

Expected Responses

i. Types of body cuts:
ii. Incised
iii. Lacerated or torn
iv. Bruised
v. Stab

Question 3 (b)

Explain the functions of a multimeter and state how it is connected in each case.

Candidates were expected to explain functions of a multimeter and state how they are connected in each case.

Weaknesses

Candidates could not exhaustively identify all the uses of a multimeter and state the connection in each case.

Advice to Teachers

They should explain to the students the applications of a multimeter.

Expected Responses

A multimeter is an electrical instrument consisting of an ammeter, ohmmeter and voltmeter all combined to form one instrument.

(i) When used as an ammeter it is connected in series to measure current flowing in a circuit.
(ii) When used as a voltmeter it is connected in parallel to measure voltage in circuit.
(iii) When used as an ohmmeter it is connected in series to measure the resistance of a circuit.

Question 5 (a)

State two operational differences between an alternator and a generator.

Candidates were expected to state the differences between an alternator and a generator.

Weaknesses

Most candidates could not differentiate between an alternator and a generator.

Advice to Teachers

They should expose students to alternators and generators in terms of operational differences.

Expected response

i. An alternator delivers alternating current while a generator delivers direct current
ii. In the DC generator the armature spins inside a field while in an alternator the field spins inside the starter.

Question 6

(a) Name four parts of an automatic transmission system.

(b) Draw a labeled circuit diagram of the courtesy light circuit.

Candidates were expected to name parts of an automatic transmission system and draw a labeled circuit diagram of the courtesy light circuit.

Weaknesses

Most candidates could not name parts of an automatic transmission system and draw a labeled circuit diagram of the courtesy light circuit.

Advice to Teachers

They should expose students to automatic gearbox construction and drawing various lighting circuits.

Expected response

a) Parts of an automatic transmission system

i. Torque converter
ii. Planetary gearcets
iii. Brake bands
iv. Multiple disc clutches
v. Hydraulic servers and pistons
vi. Numerous valves
vii. Cooling means
viii. Manual control systems

b) Draw a labelled circuit diagram of the courtesy light circuit.

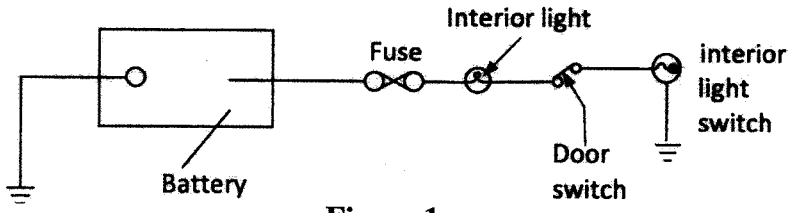

Figure 1

Question 7

State two types of each of the following

(i) Welding rods
(ii) Brazing rods
(iii) Fluxes

Candidates were expected to state two of the above mentioned

Weakness

Candidates were unable to state any type of the above.

Advice to Teachers

They should expose students to types of welding rods, brazing rods and fluxes.

Expected response

(i) Welding rods:
- Steel/ metal filler rods
- Cast iron filler rods
- Aluminium filler rods

(ii) Brazing rods
- Brass filler rods
- Bronze filler rods

(iii) Fluxes
- Borax
- Killed spirits
- Zinc chloride
- Salamonic tallow resin
- Dilute hydrochloric acid
- Olive oil
- Phosphoric acid

3.5.2 Power Mechanics Paper 2 (447/2)

The paper had 10 equally weighted compulsory exercises. It tested competencies in the following areas:

- Drawing the exploded views of a connecting rod assembly and labeling the parts
- Metal fabrication skills on an opener using given materials
- Identification and visual checks for performance of motor vehicle parts
- Naming given parts of a motor vehicle system
- Determining the big end clearance at a torque of 25 KN/m^2 on a single cylinder engine
- Dismantling an oil pump and measuring rotor body clearance and tip clearance and reassembling the pump and testing it.
- Removing the return spring, measuring the tension spring and replacing the return spring on a drum brake
- Connecting a three -lamp lighting circuit such that two lamps are in series while the third lamp is in parallel.
- Identifying parts on a vehicle provided
- Servicing the spark plugs on a multi-cylinder engine

All the exercises were fairly performed by most of the candidates thus the improved mean score.