

Nyaraya Cluster Examination

**Kenya Certificate of Secondary Education**

# **2023 Form Four Evaluation Programme**

**447/1 POWER MECHANICS Paper 1**

**JULY/AUGUST 2023**

**447/1**

**POWER MECHANICS**

**Paper 1 (THEORY)**

**July/August**

**TIME -21/2**

**NAME …………………………………………… Index Number …………………**

**Candidate’s signature …………………… Date ……………………………**

**Instructions to candidates**

1. Write your name and index number on the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Candidates should have the following for this examination:

* Drawing instruments
* Scientific calculator
* Drawing paper size A4

1. This paper contain two sections **A** and **B**
2. Answer all questions in section **A** in the spaces provided.
3. Answer **question 11** on A4 paper and any other **three** questions from section **B** in the spaces provided.
4. All dimensions are in millimetres unless otherwise stated.

**For examiner’s use only**

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| --- | --- | --- | --- |
| **Section** | **question** | **Maximum**  **score** | **Candidates score** |
| **A** | **1-10** | **40** |  |
| **B** | **11** | **15** |  |
|  |  | **15** |  |
|  |  | **15** |  |
|  |  | **15** |  |

**SECTION A (40 marks)**

Answer all questions

1. (a) Define a business plan. (2mks)

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(b) List down four factors that must be considered before setting up a ‘’jua kali’’ garage. (2mks)

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1. (a) An engine with a good compression starts but does not run. Name any four engine systems that could be faulty. (2mks)

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(b) State two advantages of independent front suspension over rigid beam suspension

(2mks)

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1. (a) State two reasons for having a first aid box in a vehicle. (2mks)

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(b) Use sketches to differentiate between slotted hexagonal nut and a castellated nut

(2mks)

1. (a) State three functional characteristics of a road wheel. (3mks)

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(b) State two advantages of riveting over soldering. (1mk)

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1. (a) Name four main electrical circuits in a motor vehicle. (2mks)

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(b) State two types of bearing loads and for each state an area of application in motor vehicle. (2mks)

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6. State the function of each of the following components: (4mks)

(i). Ball joint …………………………………………………………………………………………….............................................................................................................................

(ii). Damper …………………………………………………………………………………………………………………………………………………………………………………………

(iii). Wrist …………………………………………………………………………………………………………………………………………………………………………………………

(iv). Brake drum

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7. (a) State the purpose of each of the following tools: (2mks)

(i). Tachometer ……………………………………………………………………………………………..............................................................................................................................

(ii).Telescopic gauge ……………………………………………………………………………………………..............................................................................................................................

(b) List four cleaning tools used during soldering. (2mks)

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8. (a) Explain the difference between flushing and bleeding as used in braking system

(2mks)

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(b) State four components operated by a multi-cylinder engine cam-shaft. (2mks)

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9. (a) State four causes of vehicle swaying on turn (2mks)

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(b) Explain the meaning of each of the following fabrication process.

(i) Forming (1mk) ………………………………………………………………………………………………………………………………………………………………………………………….

(ii) Finishing (1mk) ……………………………………………………………………………………………..............................................................................................................................

10. (a) State the energy conversion that take place in each of the vehicle components:

Horn (1mk) ……………………………………………………………………………………………..............................................................................................................................

Alternator (1mk) …………………………………………………………………………………………….............................................................................................................................

(b) Sketch the symbols for each of the following electrical devices. (2mks)

1. Lamp

1. Zener diode

1. Capacitor

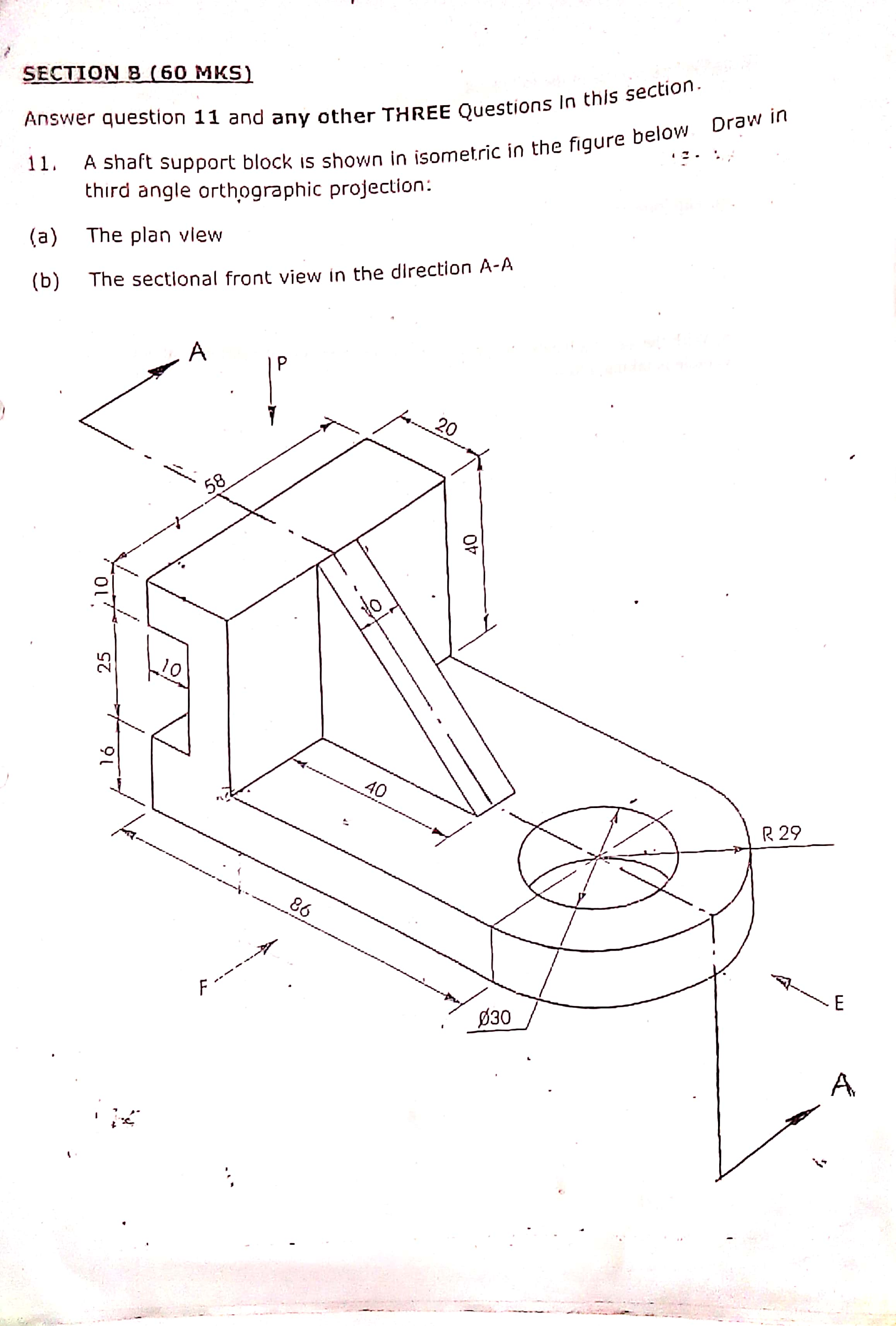
1. Battery

**SECTION B (60 marks)**

***Answer question 11 and any three questions from this section in the spaces provided. Candidates are advised not to spend more than 25 minutes on question 11.***

11. A shaft support block is shown in isometric in the figure below. Draw in third angle orthographic projection:

1. The plan view.
2. The sectional front view in the direction A-A.



12. (a) State four functions of oil in an engine. (4mks) ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

(b) Using labelled sketch, explain the operation of pressure relieve valve. (7mks)

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(c) Describe the splash feed lubrication system as used in single cylinder engines.

(4mks)

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13. (a) State one function of each of the following charging system components.(3mks)

1. Diode …………………………………………………………………………………………………………………………………………………………………………………………
2. Cut-out relay …………………………………………………………………………………………………………………………………………………………………………………………
3. Pole shoes. ………………………………………………………………………………………………………………………………………………………………………………………… (b) List four differences between D.C generator and an alternator. (4mks)

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(c) Describe the operation of an alternator. (8mks)

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14. (a) List four constant velocity universal joints. (2mks)

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(b) Name four gears used in the final drive. (2mks)

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(c) (i) Sketch and label all the parts of a final drive. (5mks)

(ii)Explain the differential principle during cornering. (6mks)

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15. (a) State three causes of each of the following in oxy-acetylene welding. (3mks)

1. Backfire ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………
2. Flash back …………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

(b) Explain four effects of oxy-acetylene flame on steel. (8mks)

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(c) State four advantages of rightward method over leftward welding method. (4mks)

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