

**PWO – Construction Technology
and Domestic Electricity**

T026

Tuesday, 04/11/2014

8:30 - 11:30 AM

WORKFORCE DEVELOPMENT AUTHORITY



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**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2014
TECHNICAL AND PROFESSIONAL TRADES**

EXAM TITLE: Construction Technology and Domestic Electricity

OPTION: Public Works (PWO)

DURATION: 3hours

INSTRUCTIONS:

The paper is composed of **three (3) main Sections:**

Section I: Fifteen **(15)** questions, all **Compulsory.** **55marks**

Section II: Five **(5)** questions, **Choose any Three (3).** **30marks**

Section III: Three **(3)** questions, **Choose any One (1).** **15marks**

The use of calculator is admitted

SECTION I. FIFTEEN (15) COMPULSORY QUESTIONS.

01. Give three (3) types of lines used in construction. **3marks**
02. A span of a segmental arch opening for window is 1.65m and the inferior part of window is 1.30m height. If the thickness of a wall is 30cm; find the volume occupied by the window. **5marks**
03. A rectangular parcel to construct has an area of 45.60m^2 . If its width is represented by W equal $1/3$ Length (L); calculate the dimensions of the parcel. **4marks**
04. Calculate the quantity of mass concrete of 480mm thick for lintel over a door of 950mm length and 230mm as the thickness of a wall. **5marks**
05. List any three (3) types of lime used in construction. **3marks**
06. A piece in wood has 148.40g weight. Its dry weight is 108.30g. Calculate the percentage of the moisture content. **4marks**
07. Calculate the quantity of stonework in a semi-circular arch for bridge of 3m span, thickness of the arch is 36cm and the breadth of the wall is 42cm. **5marks**
08. Prepare a preliminary estimate of a building project with a total plastering area of all building of 1306sqm, given that :
- a) Plastering area rate = 2,750Rwf/sqm.
 - b) Extra for special architectural treatment 2.5% of the plastering cost.
 - c) Extra for internal installation 12.7% of the plastering cost.
 - d) Monitoring charges 10% of total amount of the building. **5marks**
09. What is the resistance of a lamp which draws 120mA when connected to a 12.6V battery? **3marks**
10. What is the potential difference (P.d) between two points? Give its symbol, the units and the formula used in calculating the energy change when a charge q moves through the P.d. **4marks**
11. Calculate the power if $E=50\text{V}$ and $R=135$ ohms. **4marks**
12. What will be the energy change if P.d is 1unit and $q=1.6 \times 10^{-19}\text{J/C}$? **3marks**
13. If a P.d of 12 unit maintains a current of 3A through a resistor, what will be the electrical energy W change to heat per second? **3marks**
14. What do you understand by an "alternating current" (AC)? **2marks**
15. What is a kilowatt-hour? **2marks**

1

21C

20

1+

SECTION II. ATTEMPT ANY THREE (3) QUESTIONS.

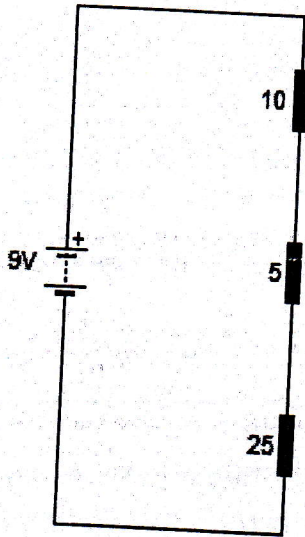
16. List any ten (10) types of bonds used in masonry with bricks. **10marks**
17. i) What are the principal constituents of stones? **6marks**
- ii) What are the qualities from which the choice of stone as building material depends on? **4marks**
18. A high resistance voltmeter reads 1.5V when connected across a dry battery of 1.2V on open circuit of 0.3A through a lamp of resistance R.
- Determine:
- a) The electromotive force (E); **1mark**
- b) The internal resistance of the battery (r); **5marks**
- c) The value of R. **4marks**
19. a) An engineer standing on the general mass of earth touches a phase conductor on a 360V supply. If the resistance of the circuit is 48000Ω which is mainly body resistance; calculate the current flow in this body using OHM's Law. **5marks**
- b) Two resistors $R_1 = 5\Omega$, and $R_2 = 0\Omega$, are given in serie. Determine the total resistance (TR) and the current (I) if the total voltage (V) = 30Ω . **5marks**
20. Discuss the different tests of cement. **10marks**

SECTION III. ATTEMPT ANY ONE (1) QUESTION.

21. A water tank in circle shape is constructed in stones with cement mortar. Its inner diameter is 2.75m and the outer diameter is 3.65m. If the height of water tank is 2.70m; determine:
- a) The volume of stone masonry. **8marks**
- b) The cost of stone masonry for 55 000 Rwf/m³. **2marks**
- c) Outline any five (5) characteristics of good stones. **5marks**
22. i) The standardized measures of a brick is 21cm x 10cm x 7cm which is used to construct an internal wall of a building of 11m length and 3.60m height. If the joint is neglected. Calculate the quantity of bricks/sqm and the quantity/ cum. **9marks**
- ii) What are the factors that should be considered in building cost? **6marks**

23. In the circuit below, calculate the following if resistances are measured in ohms

- a) The total resistance in the circuit
- b) The current flowing in the circuit.
- c) The voltage across every resistor



15marks