

**PWO – Surveying and Cost
Estimation**

T026

Wednesday, 28/11/2018

08:30 – 11:30 AM

WORKFORCE DEVELOPMENT AUTHORITY



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**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2018,
TECHNICAL AND PROFESSIONAL STUDIES**

EXAM TITLE: SURVEYING AND COST ESTIMATION

OPTION: Public Works (PWO)

DURATION: 3 hours

INSTRUCTIONS:

The paper is composed of **the following sections:**

Section I: Twelve (12) compulsory questions. 55 marks

Section II: Attempt any three (3) out of five questions. 30 marks

Section III: Attempt any one (1) out of three questions. 15 marks

Allowed materials:

- Calculator, Ruler and square

Note:

Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration.

Section I. Twelve (12) Compulsory questions

55 marks

01. The first operation to be carried out when surveying starts on new site is a reconnaissance; enumerate six tasks which are done during this phase. (6 marks)
02. Differentiate three types of errors in surveying work. (3 marks)
03. In their method of construction and operation levels are categorized into three types list and explain them clearly. (6 marks)
04. Explain the height of the plane of collimation, HPC, and show how it is calculated. (4 marks)
05. Site surveys are carried out for many reasons, enumerate any six. (6 marks)
06. Detailed estimate is prepared in two stages. Clearly mention and explain them. (4 marks)
07. What are the steps needed for Estimating? (3 marks)
08. Explain four elements of principles of unit measurement in Estimating. (8 marks)
09. From the information provided in the table below, complete the table with the missing information: (5 marks)

S/N	Particulars of Items	Unit of measurement
1.	Lime concrete(L.C) in foundation	m ³
2.	Rock excavation	m ³ /
3	Grouting of cracks, joints	m ²
4	Supply of cement	bag
5	Fixing windows	number
6	Polishing of wood work	pieces
7	Varnishing	liters
8	2.5 cm marble flooring over 7.5 cm L.C including L.C	m ²
9	Skirting	number
10	Cement concrete	m ³

- Angular
 - linear

10. What is the difference between "An estimate" and "Actual Cost"? (4 marks)
11. Explain clearly the term "Levelling" (3 marks)

12. Calculate the area to be quoted of a rectangular plot of land of 195.142m length and 25.337 m width. **(3 marks)**

Section II. Choose and answer any three (3) questions 30 marks

13. Describe the different types of measurement. **(10 marks)**

14. Station 1+271.07 must be marked in the field. If the steel tape to be used is only 43.98 which is under standard condition and the temperature will be 55°C at the time of measurement. How far from the station mark 0+843.31 will the surveyor have to measure to locate the new station? **(10 marks)**

15. After listing a three (3) principal system used by method of volume measurement and defining cross section method, outline six (6) types of cross section commonly used in route survey. **(10 marks)**

16. Prepare an approximate estimate of building project with total plinth area of all building of 526m² and from the following data:

- Plinth area rate 60000 FRW per Sq.m
- Cost of water supply at 7.5% of cost of building.
- Cost of Sanitary and Electrical installations each at 15% of cost of building.
- Cost of architectural features at 3% of building cost.
- Cost of roads and lawns at 8% of building cost.
- Cost of P.S. and contingencies at 10% of building cost.

Determine the total cost of building with the supervision of 15% of the entire project. **(10 marks)**

17. The following width of road embankment is 44m. The side slopes are 2:1. The depths along the centre line road at the intervals of 20m are 2.15, 2.10, 2.01, 1.80, 2.0, 2.04, 2.12, 1.95m. Calculate the Quantity of earth work by:

- a) Trapezoidal rule
- b) Prismoidal rule.

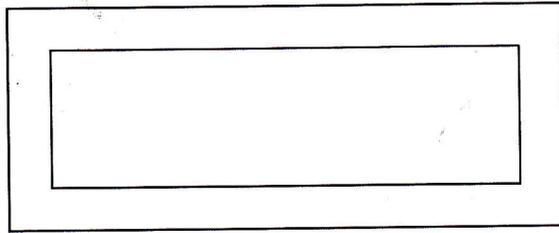
(10 marks)

Section III. Choose and answer any one (1) question

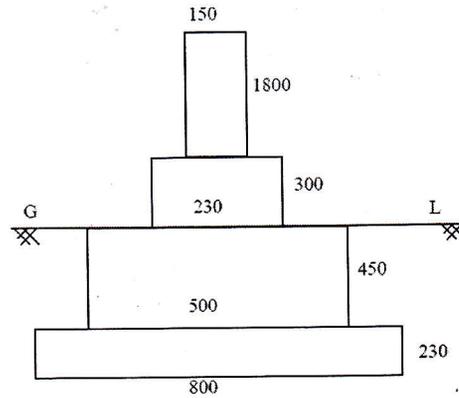
15 marks

18. From the given figure below calculate the details estimate for the Compound Wall for the following considerations:

- 1) Brick pillars of size 230x 230 size are built every 3 meters
- 2) The expansion joints are provided for every 6m length



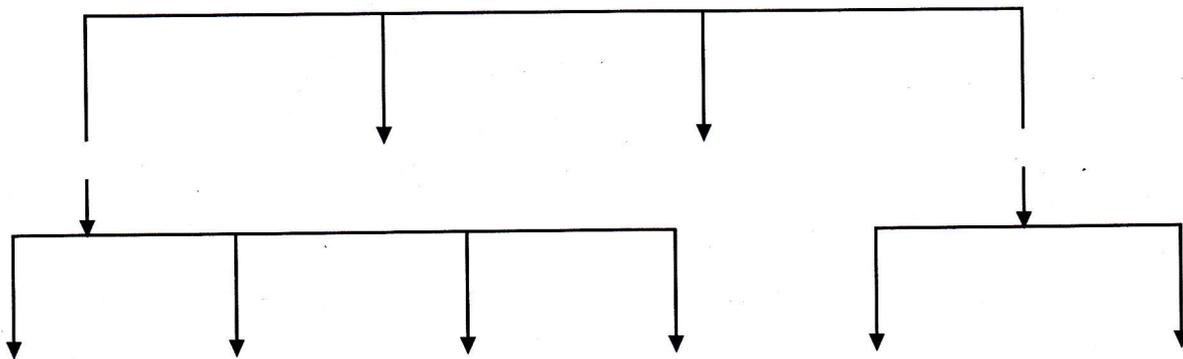
Plot: 15 X 12 (meters)



Cross-section of the compound wall (mm)

(15 marks)

19. Consider the flow diagram below and fill in proper locations following expressions related to cost estimate: Actual cost of land, brochorage if any, cost of labor, cost of land, cost of materials, cost of structure, contingencies at 5%, cost of surveying, legal expenses, cost of verification and execution of deeds.



(15 marks)

20. Show with neat sketches the characteristic features for contour lines of the following:

- (i) A pond
- (ii) A hill
- (iii) A saddle
- (iv) Vertical cliff
- (v) Overhanging cliff.

(15 marks)