

**PWO – Water supply, Sanitation
and Hydraulic works**

WORKFORCE DEVELOPMENT AUTHORITY

T112

Thursday, 31/10/2013

8:30 - 11:30 AM



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**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2013;
TECHNICAL AND PROFESSIONAL TRADES**

**EXAM TITLE: Water supply, Sanitation and Hydraulic
works**

OPTION: Public Works (PWO)

DURATION: 3hours

INSTRUCTIONS:

The paper comprises Three (3) sections:

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

Section II: Five (5) questions, **Choose any three (3);** **30marks**

Section III: Two (2) questions, **Choose any one (1);** **15marks**

The use of calculator is allowed.

SECTION I: All the 15 Questions are Compulsory 55marks

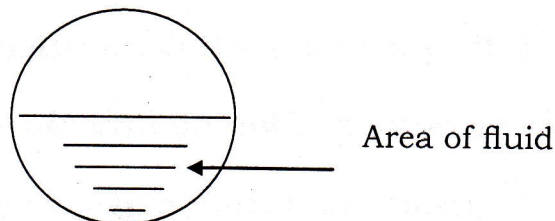
01. What are the 3 main categories of waste water? **3marks**
02. What are the three main characteristics of sewage? **3marks**
03. Name the four (4) zones of septic tank. **4marks**
04. Outline the elements on which depends the day weather flow. **4marks**
05. What are the four (4) different sources of water? **4marks**
06. A rectangular channel contains water and it has 60 cm height and 40cm base. Find the hydraulic radius (HR). **4marks**
07. What are the two (2) systems of sewerage out of building house? **2marks**
08. How is the acidity of water measured? **8marks**
09. Give the three (3) different methods to apply for the distribution of water to consumers. *combined, pumping,* **3marks**
10. Find the area to be drained for a soakaway whose capacity is 2.5m^3 and the rainfall is 50mm/hour. **5marks**
11. Give the symbols used in piping for : **3marks**
 - a) Flow direction
 - b) Water meter
 - c) Exposed pipe
12. Give and explain two (2) systems from which water may be supplied to consumers (peoples). **5marks**
13. What are the three (3) types of storage and distribution reservoirs? **3marks**
14. What is the cement concrete? **2marks**
15. Explain the terms hydraulic and fluid. **2marks**

Section II: Choose and Answer any Three (3) Questions 30marks

16. What are the main objectives of waste water treatment? **10marks**
17. Why is house drainage provided? **10marks**
18. a) Give the manning's formula and explain each element. **8marks**
b) Give the two (2) main factors on which the run-off coefficient depends on. **2marks**
19. List any 7 typical designs of side drains on hill roads. **10marks**
20. The different drainage areas consists of 4 types of surface which are $A_1=2\text{hectares}$, $A_2=3\text{hectares}$, $A_3=4\text{hectares}$ and X (unknown). If the run-off coefficient for A_1 is $C_1 = 0.35$; for A_2 is $C_2 = 0.30$; for A_3 is $C_3 = 0.20$ and $C_4 = 0.80$ for area X, Find the drainage area X considering the weighed value of run-off coefficient $(C_m) = 0.70$. **10marks**

SECTION III: Choose and Answer any One (1) Question

21. List ten (10) advantages of plastic pipes *easily to assemble by resident* **15marks**
22. The quantity of water (Q) flowing in culvert cement is $0.0125\text{m}^3/\text{second}$ and its velocity (V) is $0.60\text{m}/\text{second}$.



If the total area of culvert cement is 0.034m^2 , find the hydraulic mean depth of hydraulic radius (Hy.R) of culvert cement considering the area of fluid. **15marks**