

**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.

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SECTION I: All the 15 Questions are Compulsory 55marks

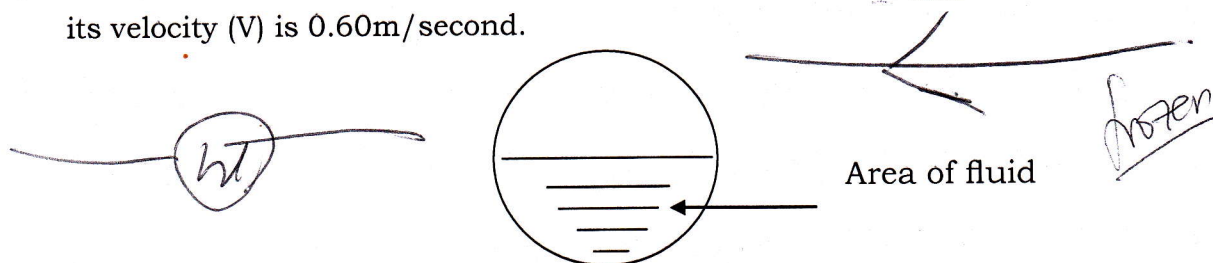
01. What are the 3 main categories of waste water? 3marks
02. What are the three main characteristics of sewage? 3marks
03. Name the four (4) zones of septic tank. 4marks
04. Outline the elements on which depends the day weather flow. 4marks
05. What are the four (4) different sources of water? 4marks
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. 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 — (M) —
 - c) Exposed pipe
12. Give and explain two (2) systems from which water may be supplied to consumers (peoples). *Gravel* 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 $A_1=2$ hectares, $A_2=3$ hectares, $A_3=4$ 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 15marks
22. The quantity of water (Q) flowing in culvert cement is $0.0125m^3$ /second and its velocity (V) is 0.60m/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