ADVANCED LEVEL NATIONAL EXAMINATIONS, 2014
TECHNICAL AND PROFESSIONAL TRADES

EXAM TITLE: Water Supply and Sanitation

OPTION: Public Works (PWO)

DURATION: 3hours

INSTRUCTIONS:

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

Section **I**: Twelve **(12)** 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. TWELVE (12) COMPULSORY QUESTIONS.

01. Give and explain briefly three (3) different methods used for distribution of water.

    6marks

02. Define how the acidity of water is measured. **4marks**

03. Find the soakaway capacity (C) if a rainfall intensity (R) is 65mm/hour and the area drained (A) is 7500m². **4marks**

04. Find the capacity (C) in cubic meter unit of a concrete septic tank which serve 1500 persons (P). **4marks**

05. What are the three (3) different methods for filtration of water? **3marks**

06. Find the quantity of water (Q in litres/sec) through a 15mm diameter pipe

    at 6m/sec. **6marks**

07. The discharge of water in a pipeline is 7L. If the velocity of water flowing is

    0.32m/sec., find the internal diameter of this pipeline. **4marks**

08. A longitudinal canal with a trapezoidal cross-section is to be constructed in cut section. The longitudinal slope is 1 in 1750. The soil is clay, with Manning's rugosity coefficient (n) of 0.024. The maximum allowable velocity is 0.7m/sec.

    Find:

    (a) the hydraulic mean depth (R)

    (b) the area (A) to be drained

    (c) the perimeter (P) if the discharge (Q) for the canal is 5cum/sec. **6marks**

09. If the slope of the ditch in ground is 0.007, find the difference in elevation between the lower altitude and the upper one. **3marks**

10. Give and explain any three (3) different sources of water. **6marks**

11. Give three (3) elements that rainwater collection depends. **3marks**

12. Give two (2) principles used in drainage systems of waste water and

    explain them. **6marks**

SECTION II. ATTEMPT ANY THREE (3) QUESTIONS.

13. Describe five (5) advantages and five (5) disadvantages of absent

cement pipes.   **10marks**

14. (a) List six (6) various instruments used for determining the length of the line by chaining method;   **6marks**

(b) Conversion: 453.00grades = ? degrees, Seconds   **4marks**

15. Discuss the advantages and disadvantages of irrigation.   **10marks**

16. A pipe of 200m long slope down at 1 in 100 and tapers from 600mm diameter at the higher end to 300mm diameter at the lower end (figure below), and carries 100litres of water/sec:

(a) Determine the velocity V1 and V2 at the two ends

(b) Determine the height of the higher end above datum (z)

(c) Draw a sketch to make clear the way of your calculations.   **10marks**

17. (a) What are the three (3) types of storage and distribution reservoirs?
(b) Give six (6) advantages an four (4) advantages of concrete pipes used in water treatment.   **10marks**

SECTION III. ATTEMPT ANY ONE (1) QUESTION.

18. (a) Give and explain two (2) systems from which water may be supplied to the consumers

(b) List eleven (11) advantages of plastic pipes.   **15marks**

19. a) The quantity of water (Q) flowing in a canal of rectangular form of 83cm depth and 62cm base is 28.7L/sec. The velocity of flow water (V) is 0.57m/sec.

i. Find the area of fluid in canal.   **3marks**

ii. Find the mean depth of water.   **3marks**

b) The different drainage areas T, X, Y, Z and L have 310m², 561m², 273m², 315m²and 470m² respectively. The respective run-off coefficients CT, CX, CY, CZ and CL are 0.15, 0.16, 0.17, 0.18 and 0.20.

From the above data, calculate the weighted value of run-off coefficient C for all drainage areas.   **9marks**