ADVANCED LEVEL NATIONAL EXAMINATIONS, 2016,
TECHNICAL AND PROFESSIONAL STUDIES

EXAM TITLE: Water Supply and Sanitation
OPTION: Public Works (PWO)
DURATION: 3 hours

INSTRUCTIONS:

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

Section I: Seventeen (17) 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

The use of calculator is admitted

Note:
Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration.
Section I. Seventeen (17) Compulsory questions 55marks

01. Give four (4) physical properties of water. 2marks

02. Distinguish hard water and soft water. 4marks

03. Enumerate four (4) conditions to consider during the installation of internal stop valve within a building. 4marks

04. Mention any two (2) most commonly used materials for new underground installations and also used for the replacement of existing mains. 2marks

05. Name four (4) factors that depends the amount of water which can be expected from any given surface. 4marks

06. Calculate the discharge in liters per second through a 25 mm diameter pipe when the total length is 30 m and there is a constant head of 8 m. 3marks

07. Enumerate four (4) necessity of pumping. 4marks

08. What are the processes of hydrologic cycle? 3marks

09. Enumerate three (3) types of examination of water. 3marks

10. List four (4) properties of dangerous waste. 2marks

11. What is a bidet and what are the types of bidet? 3marks

12. Name two functions of manhole. 4marks

13. Name four (4) factors that contribute to pipe corrosion. 4marks

14. Define the term “intake structure” and give any three (3) considerations for selection of site for intake structure. 5marks

15. What pipes are connected to the water storage cistern? 3marks

16. Define the term “water hammer”. 2marks

17. Give three (3) advantages of incinerating the solid wastes. 3marks

WDA/TVET/ PWO – Water Supply and Sanitation – Academic Year 2016
Section II. Choose and answer any three (3) questions. 30marks

18. What are the most common technologies found in municipal water treatment plant? 10marks

19. Briefly, what is the distinction between sittings closed and squatting closed? 10marks

20. In domestic buildings, waste water will be coming from where? (Give the examples to support the answer). 10marks

21. The quantity of water flowing in plastic pipe is 60 liters /second. If the velocity of water (V) is 2m/sec. Find the diameter of the pipe. 10marks

22. What are the advantages and disadvantages of irrigation? 10marks

Section III. Choose and answer any one (1) question. 15marks

23. In the following table, the catchment area and run-off coefficient are given.

<table>
<thead>
<tr>
<th>Name of catchment area</th>
<th>Area of catchment in ha</th>
<th>Run-off coefficient (c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>2</td>
<td>0.60</td>
</tr>
<tr>
<td>A2</td>
<td>?</td>
<td>0.25</td>
</tr>
<tr>
<td>A3</td>
<td>3</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Find the area of catchment A2. 15marks

24. A, B, C are points on a water pipe line AD on sloping ground. The slope distance between the points is measured by using a tape and the corresponding angle of slopes are given below.

<table>
<thead>
<tr>
<th>Water pipe line</th>
<th>Slope distance (m)</th>
<th>Angle of slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>75</td>
<td>5°</td>
</tr>
<tr>
<td>BC</td>
<td>30</td>
<td>15°</td>
</tr>
</tbody>
</table>

Calculate the horizontal distance of the water pipe line AC. 15marks

(Use a sketch to support your answer)
25. a) What are the three (3) methods of filtration of water?
   b) List any four (4) sources of water
   c) What are the two (2) methods used to distribute water to consumers?
   d) An open rectangular channel is 40 cm base and 80 cm height. Find the hydraulic radius \( r \) of the open channel.

15 marks