



UNIVERSITY OF SWAZILAND  
Faculty of Health Sciences  
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH SCIENCES

RE-SIT EXAMINATION PAPER JULY 2018

TITLE OF PAPER : FUNDAMENTALS OF SEWAGE TREATMENT

COURSE CODE : EHS 212

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS :

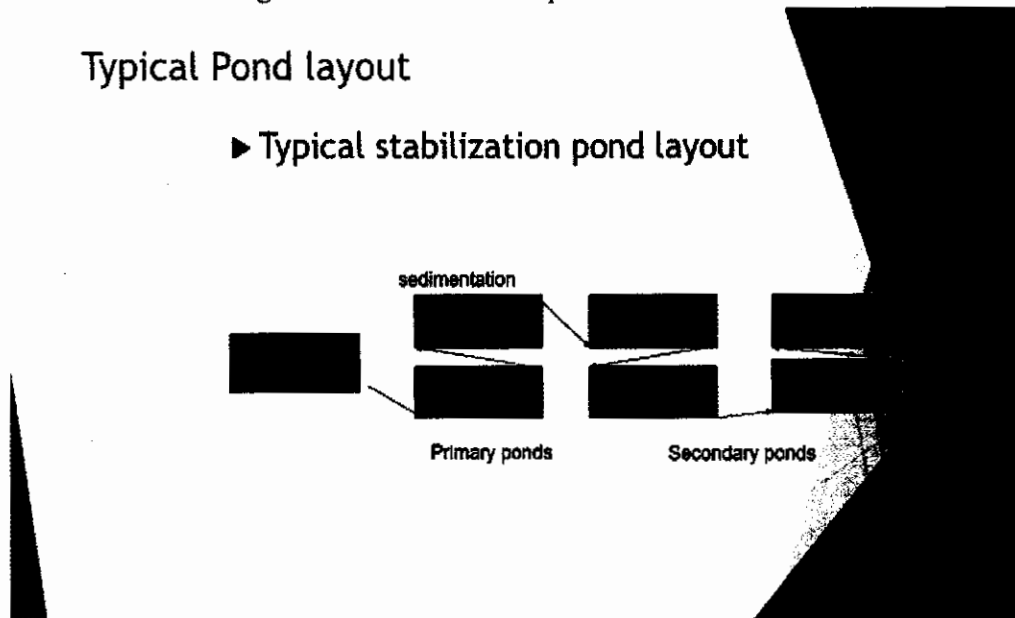
- READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
- ANSWER **ANY FOUR** QUESTIONS
- EACH QUESTION **CARRIES 25** MARKS.
- WRITE NEATLY & CLEARLY
- NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
- BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**QUESTION ONE**

- a) Indicate eight data requirements that make it possible for engineers to design a proper waste water treatment facility [8]
- b) Below is a typical layout for an ordinary maturation ponds. Indicate the by products from each of the stages of treatment at this ponds. [10]

**Typical Pond layout**

► **Typical stabilization pond layout**



- c) Screening involves the use of various screen sizes during primary treatment. Give the three normal screen names and their corresponding sizes [6]
- d) What is the need for pretreatment when carrying out waste water treatment [1]

**QUESTION TWO**

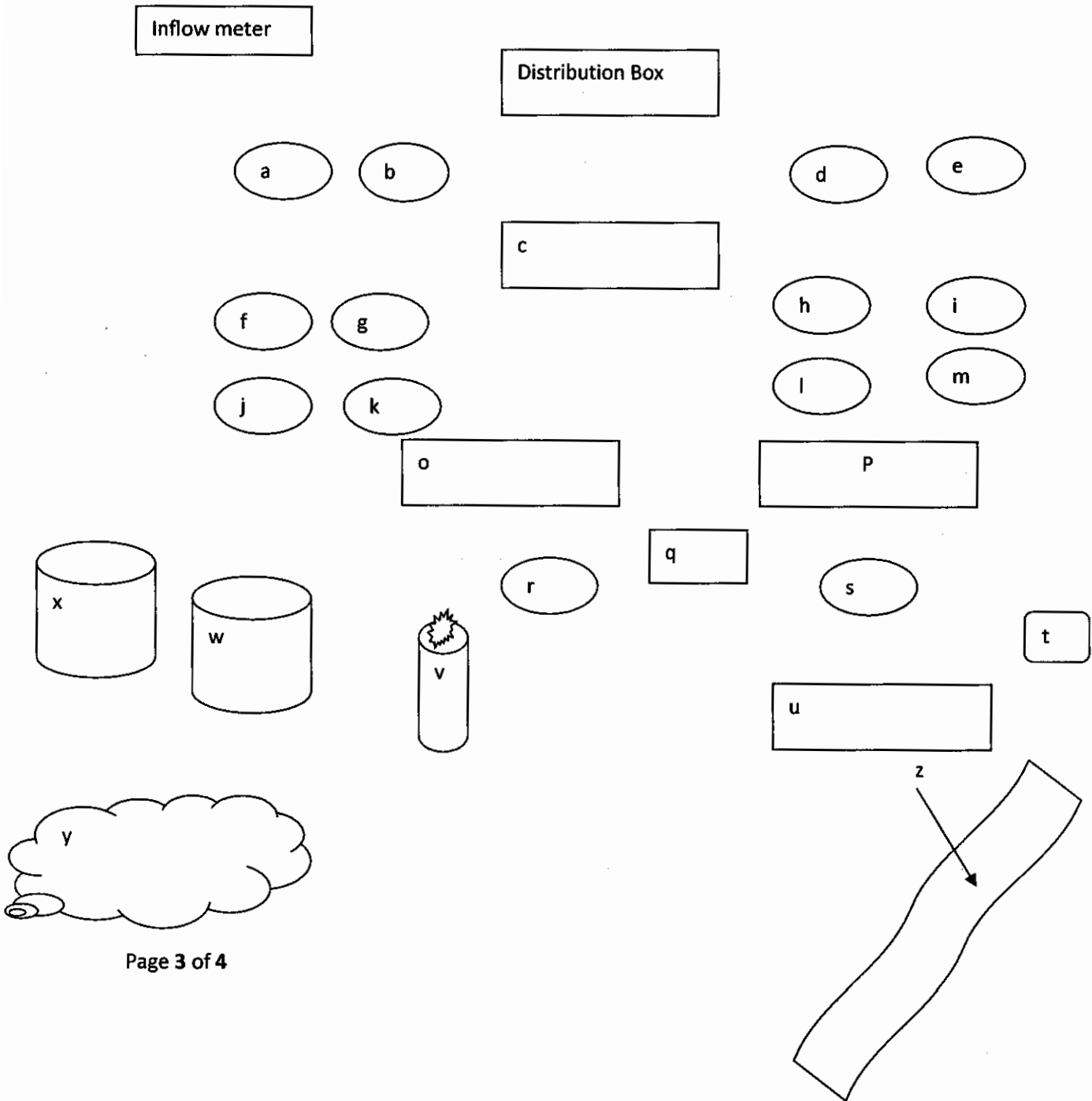
- a) In an Activated Sludge process define the following;
  - i. RAS [2]
  - ii. SAS [2]
  - iii. HMI [2]
- b) There are at least four critical factors that are important in the design and operation of an Activated Sludge process for waste water treatment. Which are those? [8]
- c) Evaluate waste water sources for Mbabane and Matsapha respectively and suggest possible waste water characteristics of the respective areas mentioned [9]
- d) Give two examples of decentralized sewage treatment systems and state role played by such systems [2]

**QUESTION THREE**

- a) Indicate the various daily operational observations that a waste water treatment supervisor must make in order for a treatment plant to operate efficiently. [16]
- b) Describe the process of pretreatment in a waste water treatment plant. [3]
- c) Give at least four likely by-products during pretreatment processes [4]
- d) Differentiate between aerobic and anaerobic decomposition in a waste treatment plant and clarify under what conditions each type of decomposition mode is desired. [2]

**QUESTION FOUR**

- a) Consider the following as the schematic diagram representing a process flow chart for the biological trickling. Label accordingly. [ 25]



**QUESTION FIVE**

- a) Discuss five usual problems associated with trickling filter processes and how you can go about solving those problems. [10]
  - b) Outline the importance of recirculation in a trickling filters [3]
  - c) There are three component parts of trickling filter tanks. These are the Rotary distributors, filter medium and the underdrain system. State the functions of each. [9]
  - d) The Activated Sludge is consider a superior treatment system compared to the other treatment system. Give at least three reasons why this is so. [3]
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