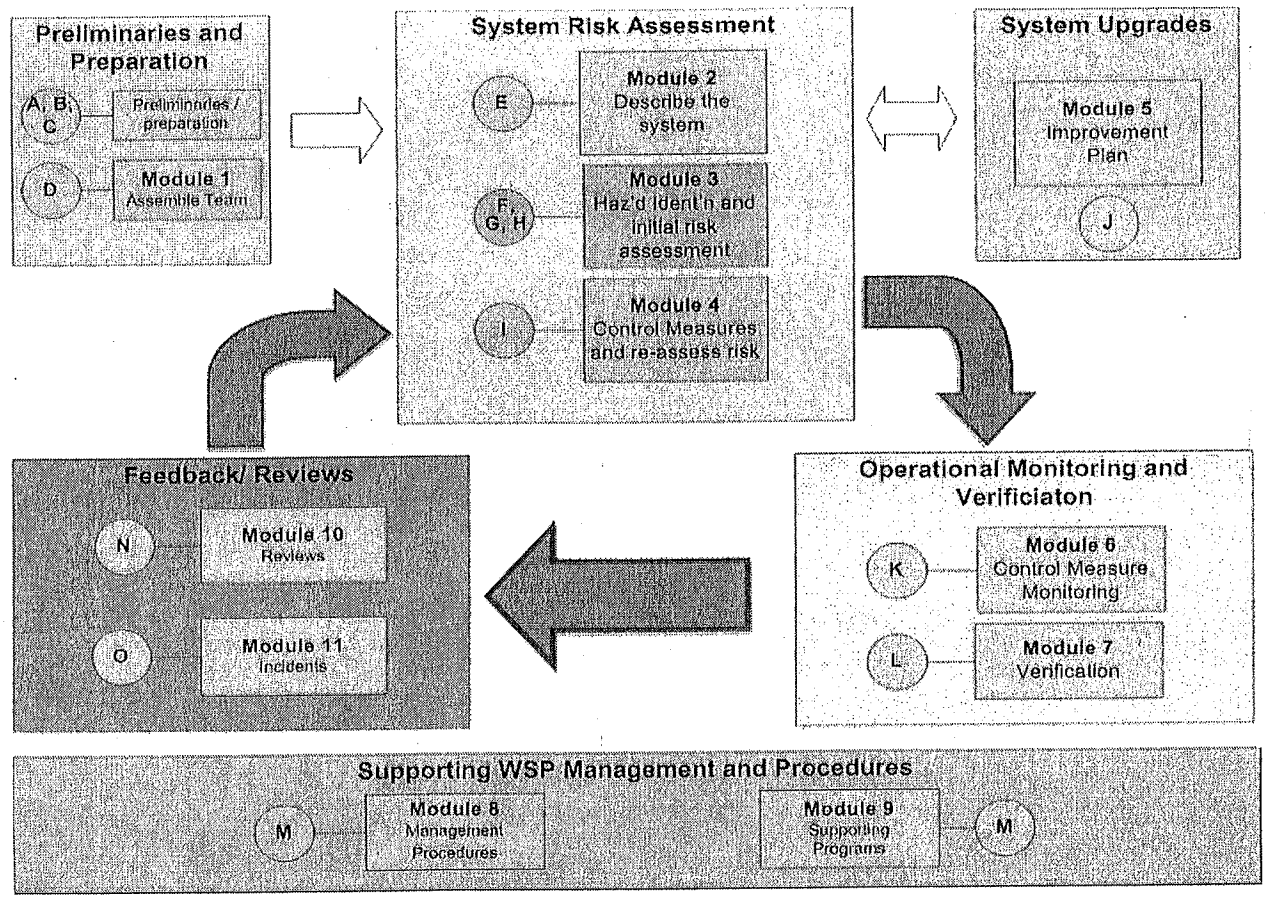
Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 Level 2nd Semester Examination – December 2017
MRT 381-2 Water Safety Plan

Uva Wellassa University

Instructions
Duration: 02 hours
Number of questions: 04
Number of questions to be answered: 04
Mark allocation: 100 (Each question carries 25 mark)
Illustrate your answers with sketches/diagrams where necessary

Index Number:-

1. The Water Safety Plan (WSP) modules considered in an urban Water Supply Scheme is given below.



1. List out the most important five (05) modules in an urban WSP step by step approach. (5 mark)
2. Explain briefly the importance of above each with examples. (20 mark)

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2. The six tasks to develop and implement a WSP in a rural area are given below.

TASK 1 – Engage the community and assemble a water safety plan team.

TASK 2 – Describe the community water supply.

TASK 3 – Identify and assess hazards, hazardous events, risks and existing control measures.

TASK 4 – Develop and implement an incremental improvement plan.

TASK 5 – Monitor control measures and verifies the effectiveness of the water safety plan.

TASK 6 – Document, review and improve all aspects of water safety plan implementation.

a. Compare urban and rural step by step WSP approach (7 mark)

b. Explain how would you guide a rural community in development and implementation of a WSP for a water supply scheme? (18 mark)

3. In WSP manual reporting a hazard/ hazardous event is very much important. According to World Health Organization (WHO), **"X happens to water (Y) because of Z** "format is preferred in reporting hazard/ hazardous event.

Write down the following incidents in x happen to water because of z formula.

a. It was reported that pesticides are heavily used in the paddy cultivation in upstream of the Mahaweli River bank during ploughing.

b. Absence of proper waste handling procedure in the upstream townships of Alawwa water supply scheme.

c. Toxic chemicals from a rubber factory are released to the Kelani River at Avissawella.

d. A bowser truck carrying 33,000 L of diesel toppling over, and spilling part of its content into a tributary of the Mahaweli River.

e. Domestic wastewater from the surrounding tea estates are washed down to Matale town during the rainy period.

(25 mark)

4. The Kelani Right Bank (KRB) water supply scheme provides water to Gampaha urban town and 8 Divisional Secretory areas. The water source is Kelani River and water intake is located at 3 km downstream of Biyagama town and distance to the sea is about 6 km. The present water treatment capacity is 150,000 m^3/day. The treatment system is based on the conventional water techniques.

The KRB water supply schemes is selected for applying WSP. Accordingly, a catchment survey has been conducted by the Water Safety Plan (WSP) team for the selected Water Supply Scheme (WSS). During the detailed catchment surveys, the following locations have been identified as potential hazards to the water supply system;

A. A Board of Investment (BOI) operated industrial zone is located 5 km upstream of the water intake. There are 100 factories under operation at present, 25 new factories will be initiated from next year. At present, sewerage treatment plant is functioning to treat sewer of BOI industrial zone. However, the plant capacity is not enough to meet the current demand. Therefore, they release their runoff water through tributary to the Kelani River.

B. A rice mill and several sawmills are located in the upstream and they release their waste directly to the water source.
C. In the immediate catchment, sand mining and clay mining activities for brick industry are being carried out.
D. Biyagama town is located 3 km in the upstream of the KRB Water Intake and no systematic solid and sewer waste management system is present.
E. Several land development projects are being carried out for new housing schemes.
F. People living in the surrounding environment have no proper solid waste and sewer waste management system.
G. Paddy, Rubber and vegetable cultivations are being carried out about 6 km in the upstream.

a. Identify all possible Hazardous events in the catchment as per above descriptions and record them as per WSP format. (5 marks)
b. Do raw risk assessment using semi quantitative risk matrix and re-assess the risk with existing controls. (5 marks)
c. Prioritize the final risk based on the risk assessment. (5 marks)
d. Prepare short /long term improvement plan. (10 marks)