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The Open University of Sri Lanka
 Faculty of Engineering Technology
 Department of Agricultural & Plantation Engineering



Study Programme : Bachelor of Industrial Studies (Agriculture)
 Name of the Examination : Final Examination
 Course Code and Title : AGX6535 Hydrology and Water resources +
 Academic Year : 2017/18 AEX6235
 Date : 2nd February 2019
 Time : 0930-1230hrs
 Duration : 3 hours

SECTION 2: Answer any four (04) questions. All questions carry equal marks.

1. (a) Briefly describe the components of Hydrograph

(b) The 4-hour unit hydrograph for a 550 km² catchment is given below. A uniform-intensity storm of 4 hours' duration with an intensity of 6 mm/h is followed after a 2 hour break by a further uniform-intensity storm of 2 hours duration and an intensity of 11mm/hr. The rain loss is estimated at 1mm/hr on both storms. Base flow was estimated to be 10m³/s at the beginning of the first storm and 40m³/s at the end of the runoff period of the second storm.

Compute the likely peak discharge and its time of occurrence.

Hours	Q m ³ /s	Hours	Q m ³ /s
0	0	12	62
1	11	13	51
2	71	14	40
3	124	15	31
4	170	16	24
5	198	17	17
6	172	18	11
7	147	19	5
8	127	20	3
9	107	21	0
10	90		
11	76		

2. (a) Derive the equation to calculate the discharge (Q) for a well in an unconfined aquifer in equilibrium condition using suitable diagram.

(b) A well with a diameter of 200 mm in a confined aquifer with a thickness of 10 m is pumped at a steady rate of 30 l/minute. The drawdown at the pumping well is 2 m below ground level and the drawdown at an observation well 500 m away is 0.5 m. Assuming the ground to be flat and equilibrium conditions determine the transmissivity of the aquifer.

3. (a) Briefly explain the types of current meters used in stream gauge measurements with suitable diagrams and the advantages of using current meters.

(b) Compute the discharge of the stream whose current meter readings are as follows:

Distance (m)	0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6
Depth(d) in m	0	0.3	1.2	2.1	2.5	2.2	1.6	1.4	1.0	0.6	0.4	0
Velocity (m/sec) at 0.2d	0	0.4	0.5	0.7	0.8	0.8	0.7	0.6	0.5	0.5	0.4	0
Velocity (m/sec) At 0.8d	0	0.2	0.3	0.5	0.6	0.3	0.5	0.4	0.3	0.3	0.3	0

4. (a) Write a brief note on role of runoff on soil water storage and natural recharge using suitable diagrams
- (b) Briefly describe how you can minimize runoff after intensive rainfall using your knowledge on factors affecting runoff.

5. (a) Briefly explain the important physical, chemical and biological properties of water and also explain how you would measure them.
- (b) List the common pollutants which lead to reduce surface water quality.
- (c) Briefly describe the possible sources of contamination of groundwater and describe what steps you would take to minimize the contamination.

6. Write short notes on any three (03) of the following
 - (a) Role of solid waste on groundwater contamination
 - (b) Factors affecting runoff
 - (c) Recording Rain gauges
 - (d) Construction of tube wells

