

**EIGHTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE
EXAMINATION, APRIL 2015**

CE/PTCE 09 803 L15—SURFACE HYDROLOGY AND WATER POWER

Time : Three Hours

Maximum : 70 Marks

Part A*Answer all questions.*

1. Define interception and depression storage.
2. Differentiate Φ index and W index.
3. What is S Hydrograph?
4. Write about Log-Pearson Type III equation for flood frequency analysis.
5. Explain the criteria for the location of Penstocks.

(5 × 2 = 10 marks)

Part B*Answer any four questions.*

6. Write Horton's model of infiltration.
7. Briefly explain the factors affecting evaporation.
8. What are the applications of unit hydrograph?
9. Explain the concept of channel routing.
10. Write about the methods of separating base flow from a hydrograph.
11. The average annual yield of a river at a dam site is 2×10^4 ha-m. Assuming that the entire yield is available for power generation, estimate the water power potential and the available energy. The average net head is 100 m. Take overall efficiency as 90%.

(4 × 5 = 20 marks)

Part C

12. (i) Differentiate between evapo transpiration and potential evapo transpiration. Also explain Penman's method of estimating evapo transpiration.
- (ii) A storm with 15 cm. precipitation produced a direct runoff of 8.7 cm. The time distribution of the storm is as follows :

Time from start (in hour) :	1	2	3	4	5	6	7	8
Incremental rainfall in each hour (in cm.)	0.6	1.35	2.25	3.45	2.7	2.4	1.5	0.75

Estimate the Φ index of the storm.

Or

Turn over

13. (i) What are the different methods of water conservation techniques?
 (ii) Write briefly about rain water harvesting.
14. (i) What are the different components of a storm hydrograph ?
 (ii) How the unit hydrograph for ungauged basins are computed ?

Or

15. The 3 hr. unit hydrograph of a basin with an area of 20 km² at one hour intervals are given below :
 0, 0.41, 1.38, 4, 7.721, 10.06, 9.24, 6.62, 4.57, 3.86, 2.76, 2.07, 1.38, 0.83, 0.41, 0.

If the rainfall excess with intensity of 2 cm./hr. for a period of 4 h. followed immediately by another 3 h. storm with an intensity of 1 cm./h. occurs on the basin, what is the peak flow produced by this rainfall and what time after the commencement of rainfall would this peak flow occur? Assume the base flow is negligible.

16. (i) Write about the probabilistic and statistical methods of estimating peak food in a catchment.
 (ii) Define design flood and return period.

Or

17. Route the following flood hydrograph by modified Pul's method :

Storage in cumec days	:	0	51.62	105.67	163.19	225.11	292.36	365.63	445.72	533.45				
Discharge (m ³ /s.)	:	0	49.2	69.6	85.2	98.4	110	247.8	490.2	800.6				
Time in hrs.	:	0	6	12	18	24	30	36	42	48	54	60	66	72
Flow (m. ³ /s.)	:	50	180	270	360	410	370	300	230	155	90	60	35	20

Assume that the outflow from the reservoir just before the flood arrived was 200 m.³/s.

18. (i) Explain the procedure of drawing flow duration curves.
 (ii) Differentiate between canal intake and tower intake.

Or

19. Write notes on :

- (a) Firm yield and secondary yield.
 (b) Fore bay.
 (c) Factors considered for the selection of turbines.
 (d) Function of surge tanks.

(4 × 10 = 40 marks)