

SECTION A: COMPULSORY QUESTION

Question 1:

- (a) Explain why maximum precipitation occurs below mountain summits in the tropics while in temperate regions maximum precipitation occurs at mountain summits. (20 marks)
 - (b) Explain why water is a renewable resource. (10 marks)
 - (c) 'The hydrologic cycle is regarded as a water purifying mechanism'. Discuss. (10 marks)
- (40 marks)**

SECTION B: ANSWER ANY TWO QUESTIONS

Question 2:

- (a) Explain why it is important to measure and/or estimate evaporation in water resources planning and management. (20 marks)
 - (b) Estimate the evaporation from a free water surface for the month of December using the following meteorological variables: wind speed $U_2 = 10.5$ km/hour and e_s and e_a are 14.5 and 11.5 mm of mercury respectively. (10 marks)
- (30 marks)**

Question 3:

Discuss the role of hydrology in socio-economic development. (30 marks)

Question 4:

Explain the assumptions of the unit hydrograph and its practical application. (30 marks)

Question 5:

Table 1 shows the total runoff hydrograph ordinates and the base flow ordinates from a rain storm that lasted for one day in the Mtilane river. The effective rainfall was estimated to be 2.7 mm. Derive the one day unit hydrograph. (30 marks)

Table 1. Runoff hydrograph ordinates for the Mtilane river at Lozihta bridge.

Time (days)	Total RO Hyd. ordinates (m ³ /s)	Base flow ordinates (m ³ /s)
1	0.47	0.47
2	1.06	0.34
3	1.99	0.27
3.5	3.08	0.23
4	1.99	0.28
5	1.48	0.40
6	1.03	0.50
7	0.84	0.62
7.5	0.68	0.68