P P SAVANI UNIVERSITY

Fifth Semester of B. Tech. Examination

November 2022

SECV3051 Hydrology and Water Resources Management

02.12.2022, Friday **Time: 10:00 a.m. To 12:30 p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 For a Drainage area basin of 500km², Isohyetals drawn for a storm gave the following data: estimate average depth of precipitation over the catchment. **[06] 1 3 & 5**

Isohyets Interval (CM)	18-12	12-9	9-6	6-3	3-2
Inter-isohyetal area	92	100	123	100	85

Q - 2 (a) Describe the method of determining the infiltration. **[05] 2 2**

Q - 2 (b) A 20-cm well penetrates 25 m below the static water table. After 24 hours of pumping out at the rate of 800 lpm, the water level in a test well at 80 m from the pumping well is lowered by 0.53 m and in a test well 20 m away 2.11 m. Find the coefficient of transmissibility of the aquifer. **[06] 4 4**

OR

Q - 2 (a) Explain Method of determining yield of well. **[05] 4 1**

Q - 2 (b) The ordinates of a 4-hour unit hydrograph are given below. Derive the ordinates of an 8-hour unit hydrograph by the S-curve method or otherwise. **[06] 3 4**

Time (Hours)	0	4	8	12	16	20	24	28	32	36	40	44
4-hr UGO (cumecs)	0	24	82	159	184	151	103	64	36	17	6	0

Q - 3 (a) Write short note on any one major dam project of Gujarat. **[06] 1**

Q - 3 (b) Write down the Darcy's law. **[02] 4 2**

OR

Q - 3 (a) Write down steps/method to control reservoir sedimentation. **[06] 6 2**

Q - 3 (b) Define Safe and Dependable yield. **[02] 5 2**

Q-4 A storm with a 15cm precipitation produced a direct runoff of 8.7cm. the time distribution of the storm is as follow. Determine infiltration indices. **[05] 2 3**

Time in HRs	1	2	3	4	5	6	7	8

Incremental rainfall in CM	0.6	1.35	2.25	3.45	2.7	2.4	1.5	0.75

SECTION – II

Q - 1	Answer the Following: (Short Question/Fill in the Blanks)	**[05]**		**1**
(i)	The hydraulic machine used to convert water energy into mechanical energy is called _____			
(ii)	The artificial barrier created on the banks of river at critical sections for preventing flood is called _____			
(iii)	Define maximum probable flood.			
(iv)	Define Drought.			
(v)	Enlist the natural inland storage for water harvesting.			
Q - 2(a)	Discuss the classification of Hydro power plants.	**[05]**	**7**	**1**
Q - 2(b)	Enlist the causes of drought and write the classification of drought with examples.	**[05]**	**8**	**2**
	OR			
Q - 2(a)	Describe the components of a Hydro-power plant with neat sketch and briefly explain function of each.	**[05]**	**7**	**2**
Q - 2(b)	Explain the drought contingency planning considering measures of water conservation and augmentation.	**[05]**	**8**	**2**
Q - 3(a)	Discuss the method of carrying out flood damage analysis. Briefly highlight its necessity and significance in any flood event.	**[05]**	**5**	**2**
Q - 3(b)	Compare reservoir and channel flood routing.	**[05]**	**5**	**2**
	OR			
Q - 3(a)	Discuss the various methods of channel improvement for flood prevention.	**[05]**	**5**	**2**
Q - 3(b)	Describe with suitable sketch any one method of flood routing.	**[05]**	**5**	**2**
Q - 4	Attempt any one	**[05]**	**8**	**1**
(i)	Briefly explain the method of Roof top rainwater harvesting.			
(ii)	Explain the concept of runoff enhancement. Highlight its significance.			

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create