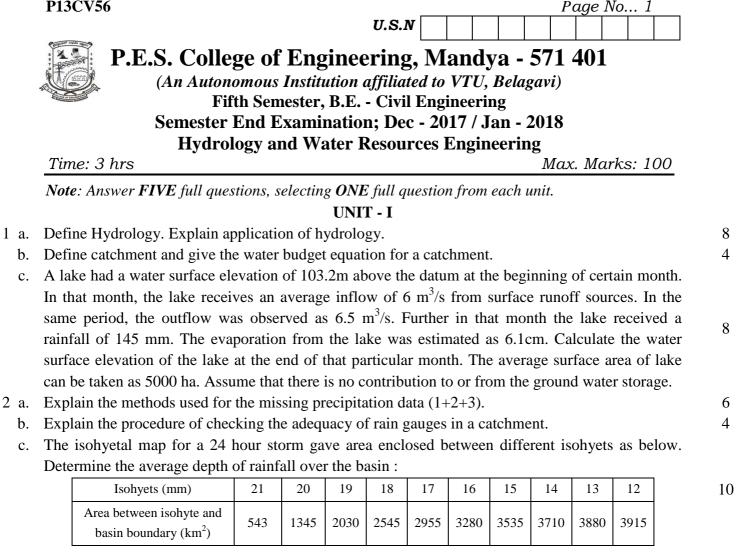
1 a.

b.



UNIT - II

- 3 a. Make a note on Infiltration indices.
 - What is runoff? Explain the components of runoff. b.
 - A 6 hour rainfall event delivers 2, 4.5, 4.8, 3.2, 2.2 and 1.6 cm of rainfall in a catchment. The с. ¢-indices for the catchment are 25 mm/hr for the first 30% of the area, 30 mm/hr for another 30% and 20 mm/hr for the remaining area. Estimate the average depth of runoff from the catchment.
- 4 a. What is evapo-transpiration? What are the factors that affect evapo-transpiration?
 - b. Make a note on reducing reservoir evaporation.
 - In a infiltration test on a ring of 35 cm diameter yielded the following data : с.

Time from start (min)	0	2	5	10	20	30	60	90	150	210
Cum. Volume of water added in cm ³	0	278	658	1173	1924	2500	3345	3875	4595	5315

Find:

- i) Infiltration capacity rate for the time interval in the experiment
- ii) Ultimate infiltration capacity rate
- iii) Average infiltration capacity for the first 10 min and 30 min of the experiment.

UNIT - III

- What is stream flow? Discuss in brief the type of streams. 5 a.
 - Make a note on rating curve for a stream. b.

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c. Compute the stream flow for the measured data given below :

Distance in m	0.0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6
Depth in m	0.0	0.3	1.29	2.16	2.55	2.22	1.68	1.41	1.05	0.63	0.42	0.00
V _{0.2y} in m/s	0.0	0.42	0.57	0.78	0.87	0.81	0.75	0.69	0.63	0.54	0.45	0.0
V _{0.8y} in m/s	0.0	0.21	0.36	0.54	0.60	0.30	0.51	0.45	0.39	0.33	0.30	0.0

- 6 a. What is a hydrograph? With a neat sketch, explain the components of a hydrograph.
 - b. Find the ordinates of storm hydrograph resulting from a 3 hour storm with rainfall of 2, 6.75, and 3.75 cm during subsequent 3 hour intervals. The ordinates of unit hydrograph are given in the table below. Assume an initial loss of 5 mm, infiltration index of 2.5 mm/hr and base flow of 10 cumecs :

Time in Hr.	3	6	9	12	15	18	21	24	3	6	9	12	15	18	21	24
Ordinates of unit hydrograph m ³ /s	0	110	365	500	390	310	250	235	175	130	95	65	40	22	10	0

UNIT - IV

- 7 a. Briefly discuss the importance of ground water hydrology.
 - b. Derive an equation for yield from a well penetrating in to an unconfined aquifer with steady radial flow.
 - c. What should be the diameter of an open well to give a safe yield of 4.8 lps? Assume the working head as 3.75 m and the sub soil consists of fine sand for which C = 0.5 / hr.
- 8 a. State Darcy's law, Discuss about its validity.
 - b. Explain the tests used for determining sale yield of well.
 - c. A 20 cm well penetrates 30 m below static water level (GWT). After a long period of pumping at rate of 1800 lpm, the drawdown in the observation wells at 12 m and 36 m from the pumping well are 1.2 m and 0.5 m respectively. Determine;
 - i) The transmissibility of the aquifer
 - ii) The drawdown in the pumping well assuming the radius of influence as 300 m
 - iii) The specific capacity of the well.

UNIT - V

- 9 a. Define flood routing. Explain Muskingum method of channel routing.
 - b. For the inflow hydrograph shown below. Perform the routing through the reservoir reach. Assuming K = 12 hours and X = 0.20;

Time in hr	0	6	12	18	24	30	36	42	48	54
Inflow in m ³ /s	10	20	50	60	55	45	35	27	20	15

- 10a. What is design flood? Explain the rational method of estimating design flood.
 - b. Assuming that Gumbel's distribution fits the 40 year data of stream, estimate the 100 year and 200 year flood. Given that mean of the variate = $530 \text{ m}^3/\text{s}$, S D of variate = $161.547 \text{ m}^3/\text{s}$, S.D of 10 reduced variate = 1.14132 and mean of reduce variate = 0.54362.

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