KADI SARVA VISHWAVIDYALAYA

BE Semester-V Examination, November'2016

Subject Code-CV-504 **Subject: Hydrology & Water Resources**

Date: 17/11/2016 **Time: 10:30 am to 1:30 pm** **Total Marks: 70**

Instructions:

(1) Answer each section in separate answer sheet
(2) Use of scientific calculator is permitted
(3) All questions are Compulsory
(4) Indicate **Clearly**, the options you attempt along with its respective questions number.
(5) Use the last page of main supplementary for **rough work**

Section-I

Q-1 **(All Compulsory)**

(A) Enlist steps in the estimations of optimum number of rain gauge stations in detail. [5]

(B) Explain non-structural approaches of controlling damage due to floods. [5]

(C) Describe briefly various investigations required for reservoir planning. [5]

OR

(C) Explain factors affecting evaporation [5]

Q-2 **Answer the following Questions**

(A) Fill in the blank for following. [5]

(1) The number of years in which flood can be expected once or a flood of given magnitude will be equalled or exceeded only once is called_____

(2) _____ is the time in hours taken by rain water that falls at the farthest point to reach the outlet of basin.

(3) _____ of an aquifer is the ratio of the volume of water drained freely from the material to the volume of soil sample.

(4) The arithmetic average of the_____ and _____ over a long period of time is called the average yield

(B) Explain Muskingum method of channel routing. [5]

OR

Q-2 **Answer the following Questions**

(A) Fill in the blank for following. [5]

(1) _____ is the time between which the rainfall rate is more than infiltration rate

(2) The drawdown due to the well losses resulting from the flow through the well screen & axial flow within the well to the pump intake is called _____

(3) The number of times a flood of given magnitude will be equalled or exceeded in any one year & usually expressed in percentage is called _____

(4) _____ is maximum quantity of water which can be supplied during a critical (or worst) dry period

(5) A geological formation that neither contains nor transmits water is called an_____

(B) Explain Modified Pul's method of reservoir routing. [5]

Q-3 **Answer the following Questions**

(A) Define ground water hydrology. Explain division of subsurface water with sketch [5]

(B) Explain following terms: (1) Useful storage (2) Perched aquifer (3) Well hydraulics (4) Valley storage (5) Load factor. [5]

OR

Q-3 **Answer the following Questions**

(A) Differentiate between of hydro power & thermal power plant. [5]

(B) What is unit hydrograph? Write assumptions and limitations of the unit hydrograph. [5]

Section-II

Q-4 (All Compulsory)

(A) Explain 'Drought'. Discuss causes of drought. **[5]**

(B) Flood frequency records on a river have been collected for 10 Years starting from 2001 to 2010 & peak value of floods observed during each of these 10 years is tabulated in table given below. Find the value of flood peak for year 2005 & Estimate the magnitude of flood having return period equal to 100 years using Gumbel's probability method by using analytical method. Use Weibull probability equitation & Find chance percent. **[5]**

$\sum X^2 = 212.44 \times 10^6$, Reduced mean is 0.4952 & Reduced standard deviation is 0.9496

Year	Flood peak m^3/s	Year	Flood peak m^3/s
2001	3100	2006	4000
2002	4500	2007	3400
2003	6100	2008	6800
2004	3600	2009	5500
2005	(?)	2010	4400

(C) Explain various causes of flood in detail. **[5]**

OR

(C) Design a tube well for the following data : **[5]**
Yield required = 0.081 cumecs, Thickness of confined aquifer = 30 m, Radius of circle of influence = 300 m, Permeability coefficient = 60 m/day, Drawdown =5 m.

Q-5 Answer the following Questions

(A) Describe common pitfalls in water resources planning. **[5]**

(B) Discuss factors consider while selecting suitable site for a reservoir. **[5]**

OR

Q-5 Answer the following Questions

(A) Briefly explain various water conservation measures. **[5]**

(B) Explain methods used for the control of sedimentation of reservoirs in details. **[5]**

Q-6 Answer the following Questions

(A) Find analytical the ordinates of a storm hydrograph resulting from a 3 hours storm with rainfalls of 2.6, 6.65, & 3.85 cm during subsequent 3 hours intervals. The ordinates of unit hydrograph are given below: **[5]**

Time in hour	Ordinates of unit hydrographs (cumecs)	Time in hour	Ordinates of unit hydrographs (cumecs)	Time in hour	Ordinates of unit hydrographs (cumecs)	Time in hour	Ordinates of unit hydrographs (cumecs)
03	0	15	340	03	175	15	50
06	115	18	310	06	130	18	25
09	370	21	255	09	90	21	15
12	515	24	225	12	65	24	0

Assume an initial loss of 5 mm, infiltration index 2.5 mm/hour & base flow of 70 cumecs

(B) Enlist three methods to calculate the average depth of rainfall & explain any two. **[5]**

OR

Q-6 Answer the following Questions

(A) Explain Symon's rain gauge instrument with sketch. **[5]**

(B) Explain types of infiltration indices **[5]**

********** *All The Best* **********

KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER-V EXAMINATION NOVEMBER-2015

Subject Code:CV504 Subject Name: Hydrology and Water Resources

Date: 26/11/2015 TIME: 10:30a.m. To 1:30p.m. Total marks: 70

Instruction:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate **clearly** the options you attempted along with its respective question number
5. Use the last page of supplementary for rough work.

Section-1

Q.1	(A)	Describe recording type raingauge with sketch.	[05]
	(B)	Discuss factors to be considered while selecting suitable site for a reservoir.	[05]
	(C)	Write principal components of hydroelectric scheme. Discuss utility of each component.	[05]
		OR	
	(C)	Define Firm power, Secondary power and Plant factor.	[05]
Q.2	(A)	Explain the procedure of fixing the capacity of reservoir using mass curve?	[05]
	(B)	Explain ø- index and W-index with the procedure to determine the same.	[05]
		OR	
Q.2	(A)	The average annual rainfall in cm at 4 existing raingauge stations in a basin are 105,79,70 and 66. If the average depth of rainfall over the basin is to be estimated within 10% error, determine the additional number of gauges needed.	[05]
	(B)	Discuss factors affecting evapo-transpiration.	[05]
Q.3	(A)	Explain Aquiclude, Aquitard and Leaky aquifer.	[05]
	(B)	Describe constant level pumping test for open well.	[05]
		OR	
Q.3	(A)	Precipitation at station 'X' was inoperative for part of a month during which a storm occurred. The respective storm totals at three surrounding stations A, B and C were, 107, 89 and 122 mm. The normal annual precipitation amounts of stations X, A, B and C are 977, 1120, 935 and 1200 mm respectively. Estimate the storm Precipitation for station X.	[05]
	(B)	Describe various factors that affect run-off from a basin area.	[05]

Section-2

Q.4	(A)	Discuss the use of levees and flood walls for flood control. What are their relative advantages and disadvantages?	[05]
	(B)	Discuss the objectives of water resources development.	[05]

(C) Discuss flow duration curve. How it is plotted? [05]

OR

(C) Sketch a typical flood hydrograph for a catchment and show different components of the hydrograph. [05]

Q.5 (A) Explain different methods of controlling reservoir sedimentation. [05]

(B) The ordinates of a 3-hrs unit hydrograph are given below: [05]

Time in hours	0	3	6	9	12	15	18	21	24	27	30
Ordinates (cumecs)	0	15	28	20	18	14	10	8	6	4	0

Find the ordinates of a 6-hour unit hydrograph for the same basin, analytically.

OR

Q.5 (A) For a river, the estimated flood peaks for two return periods by using Gumbel's method are as follows: [05]

Return period (years)	Peak flood (m^3/s)
50	350
25	275

What flood discharge in this river will have a return period of 100 years?

(B) Discuss modified Puls method of reservoir routing. [05]

Q.6 (A) What measures you will suggest for the water conservation and augmentation? [05]

(B) What are the environmental issues in water resources projects? [05]

OR

Q.6 (A) Distinguish between hydrological draught and meteorological draught. [05]

(B) Explain draught & causes of draught. [05]

---------All the Best---------

KADI SARVA VISHWAVIDYALAYA

B.E. (Civil) Semester-V Examination, November'2014

Subject Code-CV-504 **Subject: Hydrology & Water Resources**

Date: 20/11/2014 **Time: 10:30 am to 1:30 pm** **Total Marks: 70**

Instructions:

(1) Answer each section in separate answer sheet
(2) Use of scientific calculator is permitted
(3) All questions are Compulsory
(4) Indicate **Clearly**, the options you attempt along with its respective questions number.
(5) Use the last page of main supplementary for **rough work**

Section-I

Q-1 **(All Compulsory)**

(A) What is infiltration? Discuss the factors affecting the infiltration rate. [5]

(B) Explain types of infiltration indices with sketch [5]

(C) **Explain :** (1) Specific retention (2) Perched Aquifer (3) Permeability (4) Porosity (5) Drizzle [5]

OR

(C) The isohyets for annual rainfall over a catchment basin were drawn. The areas of strips between the isohyets are indicated below in the table. Find the average depth of annual precipitation over the basin. [5]

Isohyets (cm)	75-85	85-95	95-105	105-115	115-135	135-155
Area (Sq.Km)	580	2960	2850	1000	610	160

Q-2 **Answer the following Questions**

(A) What is unit hydrograph? How it is constructed? Write assumptions and limitations of the unit hydrograph. [5]

(B) Water was pumped out from a well in a confided aquifer 10.0 m thick, having a hydraulic conductivity of 1.5m/day. The drawdown observed in the two adjoining wells at 10.0 m & 50.0 m from the pumping well was 3.2m & 0.08 m, respectively. Find the constant rate of Pumping [5]

OR

(A) What is S-hydrograph? How it is constructed? What are its uses? [5]

(B) Derive an expression for discharge from a well which is fully penetrated in confined aquifer. [5]

Q-3 **Answer the following Questions**

(A) Enlist automatic recording rain gauges & explain any one with sketch. [5]

(B) What is well hydraulics? Write assumption made in Dupuit Thiem theory to analysis the radial flow of Ground Water towards a well [5]

OR

(A) The ordinates of 3 hour unit hydrograph are given below: Find the ordinates of a 6 hour unit hydrograph for the same basin analytically. Hydrograph. [5]

Time in hour	0	3	6	9	12	15	18	21	24	27	30
Ordinates m3/sec	0	12	24	21	16	10	9	7	5	3	0

(B) Explain division of subsurface water with sketch. [5]

Section-II

Q-4 **(All Compulsory)**

(A) Design a tube well for the following data : **[5]**

(1) Yield required = 0.08 cumecs
(2) Thickness of confined aquifer = 30 m.
(3) Radius of circle of influence = 300 m.
(4) Permeability coefficient = 80 m/day
(5) Drawdown = 5.0 m.

(B) On the basin of is pluvial map, the 50 year 24 hr maximum rainfall at Anandt is found to be 60 cm, Determine the probability of 24 hr rainfall of magnitude equal to or greater than 60 cm occurring at Anand. At least once in 10 successive years **[5]**

(C) Define water resources project. Explain impact on environmental in water resources planning. **[5]**

OR

(C) Explain the terms : **[5]**

(1) Reservoir Yield **(2)** Density Currents **(3)** Prism storage **(4)** Trap efficiency. **(5)** Recurrence interval

Q-5 **Answer the following Questions**

(A) Discuss utility of principal components of a hydro electrical scheme? **[5]**

(B) Explain Muskingum Method of Channel routing **[5]**

OR

(A) What is reservoir planning? Describe briefly various investigations required for reservoir planning **[5]**

(B) Define flood routing & explain Channel routing & Reservoir routing **[5]**

Q-6 **Answer the following Questions**

(A) Explain structural approaches of controlling damage due to floods. **[5]**

(B) Define drought & Write a note on Causes of drought **[5]**

OR

(A) Enlist various water conservation methods Draw neat & clean sketch of roof top rain water harvesting system & explain each in brief **[5]**

(B) Explain with neat sketch storage zones of a reservoir **[5]**

********** *All The Best* **********