Q=QUESTION A=ANSWER	**Program: BE CIVIL Engineering** **Curriculum Scheme: Revised** **Examination: Final Year Semester VIII** **Course Code: CE-DLO8037 and Course Name: AHFC**
Q	question_description
A	answer_description
A	**Module-1**
A	Variability of annual rainfall in India is
Q	least in regions of scanty rainfall
A	largest in regions of high rainfall
A	least in regions of high rainfall
A	largest in coastal areas
A	The standard Symons' type raingauge has a collecting area of diameter
Q	12.7 cm
A	10 cm
A	5.08 cm
A	25.4 cm
A	The following recording raingauges does not produce the mass curve of precipitation as record:
Q	Symons' raingauge
A	tipping-bucket type gauge
A	weighing-bucket type gauge
A	natural siphon gauge
A	Depth-Area-Duration curves of precipitation are drawn as
Q	minimizing envelopes through the appropriate data points
A	maximising envelopes through the appropriate data point
A	best fit mean curves through the appropriate data points
A	best fit straight lines through the appropriate data points
A	Depth-Area-Duration curves of precipitation at a station would normally be
Q	curves, concave upwards, with duration increasing outward
A	curves, concave downwards, with duration increasing outward
A	curves, concave upwards, with duration decreasing outward
A	curves, concave downwards, with duration decreasing outward
A	The probable maximum depth of precipitation over a catchment is given by the relation PMP =
Q	P + KAn
A	P + K a
A	P exp (–K An)
A	mP
A	A tropical cyclone is a
Q	Low pressure zone that occurs in the northern hemisphere only
A	High pressure zone with high winds
A	Zone of low pressure with clockwise winds in the northern hemisphere
A	Zone of low pressure with anticlockwise winds in the northern hemisphere
A	The average annual rainfall over the whole of India is estimated to be
Q	189
A	319
A	89
A	119

A	When specific information about the density of snowfall is not available, the water equivalent of snowfall is taken as
Q	50%
A	30%
A	10%
A	90%
A	A plot between rainfall intensity versus time is called as
Q	Hydrograph
A	Mass curve
A	Hyetograph
A	Isohyet
A	An isohyet is a line joining points having
Q	Equal evaporation value
A	Equal barometric pressure
A	Equal height above the MSL
A	Equal rainfall depth in a given duration
A	For a given storm the highest rainfall P_o and the average rainfall depth P^- are related as P^-/P_o=
Q	Kexp(A^n)
A	Exp($-KA^n$)
A	K^{-A}
A	Constant
A	By DAD analysis the maximum average depth over an area of 10^4 km^2 due to one-day storm is found to be 47 cm. For the same area the maximum average depth for a three-day storm can be expected to be;
Q	<47 cm
A	> 47 cm
A	= 47 cm
A	In adequate information to conclude
A	Thermo-hygrograph gives continuous recording of
Q	Discharge on a thermal sensitive paper
A	Temperature and pressure
A	Temperature and humidity
A	Solar radiation and wind velocity
A	The graph of the cumulative values of water quantity against time is known as
Q	Flowcurve
A	Discharge curve
A	Mass curve
A	hyetograph
A	A 70% index of wetness means
Q	rain excess of 30%
A	rain excess of 70%
A	rain deficiency of 70%
A	rain deficiency of 30%

A	The respective storm totals at three surrounding stations A , B and C are 110, 90 and 70 mm. If the normal annual precipitation amounts at stations X , A , B and C are respectively 1000, 1100, 1200 and 1250 mm, the estimated storm precipitation at X is
Q	75mm
A	77mm
A	79mm
A	81mm
A	Tipping bucket used in the rain gauge will turn under the action of
Q	Battery
A	Hand Movement
A	Gravity
A	Motor
A	The deficiency in rain catch due to vertical acceleration of air forced upward over the gauge is
	Greater for heavy rain
	Greater for lighter rain
	Greater for large drops
	Lesser for small rain drops

Q=QUESTION A=ANSWER	question_description answer_description **Module-2**
Q	The highest value of annual evapotranspiration in India is at Rajkot, Gujarat. Here the annual PET is about
A	150 cm
A	150 mm
A	210 cm
A	310 cm
Q	In Horton's infiltration equation fitted to data from a soil, the initial infiltration capacity is 10 mm/h, final infiltration capacity is 5 mm/h and the exponential decay constant is 0.5 h–1. Assuming the infiltration takes place at capacity rates, the total infiltration depth for a uniform storm of duration 8 hours is
A	40 mm
A	60 mm
A	80 mm
A	90 mm
Q	For a basin, in a given period Ot, there is no change in the groundwater and soil water status. If P = precipitation, R = total runoff, E = Evapotranspiration and OS = increase in the surface water storage in the basin, the hydrological water budget equation states
A	P = R – E ± OS
A	R = P + E – OS
A	P = R + E + OS
A	P = R / E + OS
Q	A stilling well is required when the stage measurement is made by employing a
A	bubble gauge
A	float gauge recorder
A	vertical staff gauge
A	inclined staff gauge
Q	In the moving-boat method of stream-flow measurement, the essential measurements are:
A	the velocity recorded by the current meter, the depths and the speed of the boat
A	the velocity and direction of the current meter, the depths and the time interval between depth readings
A	the depth, time interval between readings, speed of the boat and velocity of the stream
A	the velocity and direction of the current meter and the speed of the boat
Q	The stage discharge relation in a river during the passage of a flood wave is measured. If QR = discharge at a stage when the water surface was rising and QF = discharge at the same stage when the water surface was falling, then
A	QF = QR
A	QR > QF
A	QR < QF
A	QR/QF = constant at all stages

Q	A large irrigation canal can be approximated as a wide rectangular channel and Manning's formula is applicable to describe the flow in it. If the gauge (G) is related to discharge (Q) as $Q = Cr(G - a)þ$ where a = gauge height at zero discharge, the value of þ is
A	1.67
A	1.50
A	2.50
A	0.67
Q	In the gulp method of stream gauging by dilution technique, 60 litres of chemical X with concentration of 250 g/litre is introduced suddenly in to the stream at a section. At a downstream monitoring section the concentration profile of chemical X that crossed the section was found to be a triangle with a base of 10 hours and a peak of 0.10 ppm. The discharge in the stream can be estimated to be about
A	83 m3/s
A	180 m3/s
A	15000 m3/s
A	833 m3/s
Q	In a river the discharge was 173 m3/s, the water surface slope was 1 in 6000 and the stage at the station X was 10.00 m. If during a flood, the stage at station X was 10.00 and the water surface slope was 1/2000, the flood discharge was approximately
A	100 m3/s
A	519 m3/s
A	300 m3/s
A	371 m3/s
Q	A canal is 80 km long and has an average surface width of 15 m. I the evaporation measured in a class *A* pan is 0.5 cm/day, the volume of water evaporated in a month of 30 days is (in m^3)
A	12600
A	18000
A	180000
A	126000
Q	The slope-area method is extensively used in
A	Development of rating curve
A	Estimation of flood discharge based on high water marks
A	Cases where shifting control exist
A	Cases where backwater effect the pressure
Q	Deep vertical movement of water in the ground is called as
A	infiltration
A	percolation
A	runoff
A	seepage
Q	Vegetation cover or grass-cover
A	increases the field capacity
A	decreases the field capacity
A	may increase or decrease the field capacity
A	have no effect on field capacity
Q	Absolute humidity in air

A	Decreases at higher altitudes
A	Increases at higher altitudes
A	Remains constant at all altitudes
A	Independent of altitude
Q	The best instrument for measuring the velocity of a stream flow is
A	Pitot tube
A	current meter
A	Surface float
A	Sub-surface float
Q	Which of the following methods is used to estimate flood discharge based on high water marks left over in the past?
A	Area-velocity method
A	Moving boat method
A	Ultrasonic method
A	Slope-area method
Q	The rainfall in four successive 12 hours period on catchment are 4, 8, 9 and 3cm. If infiltration index for storm is 0,5 cm/hour, the total surface runoff will be
A	0
A	5cm
A	12cm
A	18cm
Q	Infiltration is the
A	Movement of water through soil
A	Absorption of water by soil surface
A	movement and absorption
A	None of the above
Q	The slope area method is extensively used in ….
A	Development of rating curve
A	Estimation flood discharge based on high water marks
A	Cases where shifting control exist
A	Cases where backwater is present

Q=QUESTION	question_description
A=ANSWER	answer_description
	Module-3
Q	Direct Runoff is made up of
A	Surface Runoff, prompt interflow and channel precipitation
A	Surface runoff, infiltration and evaporation
A	Overland flow only
A	rainfall and evaporation
Q	A hydrograph is a plot of
A	Rainfall intensity against time
A	stream discharge against time
A	Cumulative rainfall against time
A	cumulative runoff against time
Q	An ephemeral stream
A	is one which always carries some flow
A	does not have any base flow contribution
A	is one which has limited contribution of groundwater in wet season
A	is one which carries only snowmelt water
Q	A stream which does not have any base flow contribution is called:
A	Perennial stream
A	Intermittent stream
A	Ephemeral stream
A	Innundation stream
Q	The total rainfall in a catchment of area 1200 km2 during a 6-h storm is 16 cm while the surface runoff due to the storm is 1.2 × 108 m3. The $ index is
A	0.1 cm/h
A	1.0 cm/h
A	0.2 cm/h
A	1.5 cm/h
Q	Flow duration curve is a plot of
A	accumulated flow against time
A	discharge against time in chronological order
A	the base flow against the percentage of times the flow is exceeded
A	the stream discharge against the percentage of times the flow is equalled or exceeded
Q	Which of the following catchment shape gives greater runoff?
A	Fern leaf catchment
A	Tree shape catchment
A	If Square catchment
A	Fan shaped catchment
Q	The term base flow denotes
A	delayed groundwater flow reaching a stream
A	delayed ground water and interflow
A	annual minimum flow in stream
A	delayed ground water
Q	Flow duration curve is plot of
A	accumulated flow against time
A	discharge against time
A	base flow against time
A	stream discharge against time

Q	The runoff increases with
A	Increases in intensity of rain
A	increase in infiltration capacity
A	increase in permeability of soil
A	increase in infiltration and permeability
Q	Φ is defined as
A	Difference between maximum and minimum infiltration capacities
A	Difference between total rainfall and the total run off divided by duration of storm
A	Rainfall intensity above which the rainfall volume equals the observed runoff volume
A	Minimum infilteration rate during the storm
Q	Which of the following defines Aridity Index (AI)?
A	AI=(PET-AET)/PET×100
A	AI=PET/AET×100
A	AI=AET/PET×100
A	AI=(AET-PET)/AET×100
Q	A area is classified as drought prone area if the drought occurs in an area with a probability:
A	$0.2 \leq P \leq 0.3$
A	$0.3 \leq P \leq 0.4$
A	$0.2 \leq P \leq 0.4$
A	$0.1 \leq P \leq 0.3$
Q	The flow-mass curve is an integral curve of
A	the hydrograph
A	the hyetograph
A	the flow duration curve
A	the S-curve
Q	If run off from a drainage basin of area 4320 km^2 is estimated as 10000 cumec-days, then depth of run off will be
A	20 cm
A	40 cm
A	43.2 cm
A	21.6 cm

Q=QUESTION A=ANSWER	question_description answer_description **Module-4**
Q	Base-flow separation is performed
A	on unit hydrograph to get the direct runoff hydrograph
A	on a flood hydrograph to obtain the magnitude of effective rainfall
A	on flood hydrograph to obtain rainfall hydrograph
A	on hydrographs of effluent streams only
Q	The basic assumptions of the unit-hydrograph theory are
A	nonlinear response and time invariance
A	time invariance and linear response
A	linear response and linear time variance
A	nonlinear time variance and linear response
Q	The 3-hour unit hydrograph U1 of a catchment of area 250 km2 is in the form of a triangle with peak discharge of 40 m3/s. Another 3-hour unit hydrograph U2 is also triangular in shape and has the same base width as U1 but with a peak flow of 80 m3/s. The catchment which U2 refers to has an area of
A	125 km2
A	250 km2
A	1000 km2
A	500 km2
Q	The peak flow of a flood hydrograph caused by isolated storm was observed to be 100 m3/s. The storm had a duration of 8.0 hours and the total depth of rainfall of 7.0 cm. The base flow and the Q-index were estimated as 20 m3/s and 0.25 cm/h respectively. If in the above storm the total rainfall were 9.5 cm in the same duration of 8 hours, the flood peak would have been larger by
A	35.70%
A	40%
A	50%
A	20%
Q	An instantaneous unit hydrograph is a direct runoff hydrograph
A	of 1cm magnitude due to a rainfall excess of 1-hour duration
A	that occur instantaneously due to a unit rainfall excess of duration D-hours
A	of unit rainfall excess precipitating instantaneously over the catchment
A	occurring at any instant in a long storm
Q	The point of inflection on the recession limb of a hydrograph represents
A	the end of rainfall
A	the condition of maximum storage in the catchment
A	the end of base flow
A	peak runoff rate
Q	The unit hydrograph due to a storm may be obtained by dividing the ordinates of the direct runoff hydrograph by
A	direct runoff volume
A	period of storm
A	total rainfall
A	none of the above
Q	If area of catchment is 567km², then what will be the base width of 3h unit hydrograph, assuming it to be of triangular shape?
A	78 hrs

A	63 hrs
A	82 hrs
A	58 hrs
Q	Instantaneous unit hydrograph is a graph of
A	unit duration
A	unit rainfall
A	infinitely small duration and unit rainfall excess
A	infinitely small rainfall
Q	The time base of hydrograph increases with
A	Increase in intensity of the storm
A	Decreases in duration of the storm
A	Increase in time of concentration
A	decrease with infiltration capacity
Q	In order to prepare 2 hour unit hydrograph from a 6 hour unit hydrograph which of the following method will be applied?
A	Synthetic unit hydrograph
A	S- curved method
A	Instantaneous unit hydrograph
A	Simple unit hydrograph
Q	The best unit duration of storm for a unit hydrograph is
A	1 hour
A	One fourth of basin lag
A	One half of basin lag
A	Equal to basin lag
Q	In Synder's method of synthetic unit hydrograph development, basin lag is taken as
A	the time interval between centroid of the rainfall excess and surface runoff
A	the time interval from midpoint of the unit rainfall excess to the peak of the unit hydrograph
A	independent of rainfall characteristics
A	independent of catchment characteristics
Q	The recession limb of a flood hydrograph can be expressed with positive values of coef-ficients, as Qt/Q0 =
A	at
A	a K – at
A	a–at
A	e– at2
Q	A direct-runoff hydrograph due to a storm was found to be triangular in shape with a peak of 150 m3/s, time from start of effective storm to peak of 24 h and a total time base of 72 h. The duration of the storm in this case was
A	< 24 h
A	between 24 to 72 h
A	72 h
A	> 72 h

Q=QUESTION A=ANSWER	question_description answer_description **Module-5**
Q	A watershed of area 90 ha has a runoff coefficient of 0.4. A storm of duration larger than the time of concentration of the watershed and of intensity 4.5 cm/h creates a peak discharge of
A	11.3 m3/s
A	0.45 m3/s
A	450 m3/s
A	4.5 m3/s
Q	A rectangular parking lot, with direction of overland flow parallel to the larger side, has a time of concentration of 25 minutes. For the purpose of design of drainage, four rainfall patterns as below are to be considered. A = 35 mm/h for 15 minutes, B = 45 mm/h for 10 minutes, C = 10 mm/h for 60 minutes, D = 15 mm/h for 25 minutes, The greatest peak rate of runoff is expected in the storm
A	A
A	B
A	C
A	D
Q	For a return period of 100 years the Gumbel's reduced variate yT is
A	0.0001
A	0.001
A	0.386
A	0.632
Q	The hydraulic methods of flood routing use
A	Equation of continuity only
A	Both the equation of motion and equation of continuity
A	Energy equation only
A	Equation of motion only
Q	The St Venant equations for unsteady open-channel flow are
A	continuity and momentum equations
A	momentum equation in two different forms
A	momentum and energy equations
A	energy and continuity equations
Q	The Muskingum method of flood routing gives Q2 = C0I2 + C1I1 + C2Q1. The coefficients in this equation will have values such that
A	C0 + C1 = C2
A	C0 – C1 – C2 = 1
A	C0 + C1 + C2 = 0
A	C0 + C1 + C2 = 1
Q	In the Muskingum method of channel routing the routing equation is written as Q2 = C0I2 + C1I1 + C2Q1, If the coefficients K = 12 h and x = 0.15 and the time step for routing Ot = 4 h, the coefficient C0 is
A	0.016
A	0.048
A	0.328
A	0.656

Q	If the storage S, inflow rate I and outflow rate Q for a river reach is written as $S = K [x In + (1 – x) Qn]$
A	n = 0 represents storage routing through a reservoir
A	n = 1 represents the Muskingum method
A	n = 0 represents the Muskingum method
A	n = 0 represents a linear channel
Q	If the Gamma function F (1.5) = 0.886, the value of F (0.5) is
A	0.5907
A	1.329
A	–0.886
A	1.772
Q	The use of rational formula for estimating floods is limited to catchments of size less than
A	5000 km^2
A	500 km^2
A	50 km^2
A	5 km^2
Q	The design flood commonly adopted in India for barrages and minor dams is
A	Probable Maximum Flood
A	A flood of 50-100 years return period
A	Peak Flood
A	standard project flood or a 100-year flood, whichever is higher
Q	If the risk of a flood occurring in the next 10years is accepted to 10%, then the period for design should be
A	$1+(0.9)^{0.10}$
A	$1-(0.9)^{0.10}$
A	$1/(1- (0.9)^{0.10})$
A	$1/(1+ (0.9)^{0.10})$
Q	For a return period of 100 years the Gumbel's reduced variate yT is
A	-4.600
A	4.600
A	0.517
A	1.2853
Q	A flood wave with a known inflow hydrograph is routed through a large reservoir. The outflow hydrograph will have
A	Attenuated peak with reduced time base
A	Attenuated peak with increased time base
A	Increased peak with increased time base
A	Increased peak with reduced time base
Q	If risk of flood occurring in the next 10 years is accepted to 10%, then return period for design should be
A	$1 + (0.9)^{0.10}$
A	$1 - (0.9)^{0.10}$
A	$1/1 - (0.9)^{0.10}$
A	$1/1 + (0.9)^{0.10}$
Q	For an annual flood series arranged in decreasing order of magnitude, the return period for a magnitude at m^{th} position of N entries is

A	m/N
A	m/(N+1)
A	(N+1)/m
A	N/(m+1)

Q=QUESTION A=ANSWER	question_description answer_description **Module-6**
Q	Which of the pairs of terms used in groundwater hydrology are not synonymous?
A	Permeability and hydraulic conductivity
A	Storage coefficient and storativity
A	Actual velocity of flow and discharge velocity
A	Water table aquifer and unconfined aquifer
Q	The permeability of a soil sample at the standard temperature of 20°C was 0.01 cm/s. The permeability of the same material at a flow temperature of 10° C is in cm/s
A	< 0.01
A	> 0.01
A	0.01
A	depends upon the porous material
Q	Darcy's law is valid in a porous media flow if the Reynolds number is less than unity. This Reynolds number is defined as
A	(discharge velocity × maximum grain size)/μ
A	(actual velocity × average grain size)/v
A	(discharge velocity × average grain size)/v
A	(discharge velocity × pore size)/v
Q	The coefficient of permeability of a sample of aquifer material is found to be 5 m/day in a laboratory test conducted with water at 10°C. If the kinematic viscosity of water at various temperatures is as below: Temp in °C 10 20 30 v(m2/s) 1.30 × 106 1.00 × 106 0.80 × 106 the standard value of the coefficient of permeability of the material, in m/day, is about
A	4.0
A	5.0
A	6.5
A	9.0
Q	In one-dimensional flow in an unconfined aquifer between two water bodies, when there is a recharge, the water table profile is
A	a parabola
A	part of an ellipse
A	a straight line
A	an arc of a circle
Q	For one-dimensional flow without recharge in an unconfined aquifer between two water bodies the steady water table profile is
A	a straight line
A	a parabola
A	an ellipse

A	an arc of a circle
Q	The specific capacity of a well in confined aquifer under equilibrium conditions and within the working limits of drawdown
A	can be taken as constant
A	decreases as the drawdown increases
A	increases as the drawdown increases
A	increases or decreases depending upon the size of the well
Q	If S_y = specific yield and S_r = specific retention, then
A	$S_y + S_r$ = void ratio
A	$S_y + S_r$ = porosity
A	$S_y + S_r = 1$
A	$S_y + S_r$ = permeability
Q	In which of the following zone the stresses are beyond the elastic limits?
A	Zone of rock fracture
A	Zone of rock flowage
A	Zone of saturation
A	Zone of aeration
Q	The quantum of water contained in the soil pores which cannot be extracted by gravity drainage is called
A	pellicular water
A	capillary water
A	hygroscopic water
A	available water
Q	Field capacity of a ground aquifer equals
A	specific yield
A	100 – specific yield
A	100/ specific yield
A	specific yield-100
Q	The permeability of an aquifer (m/day) will
A	not get affected by the change in temperature of water flowing through the aquifer
A	decrease with an increase in temperature of water flowing through the aquifer
A	increase with an increase in temperature of water flowing through the aquifer
A	increase up to 20°C and then decreases with the increase in the temperature of water flowing through the aquifer
Q	When 3.68 million m^3 of water was pumped out from an unconfined aquifer of 6.2 km^2 arial extent, the water table was observed to go down by 2.6m, The specific yield of the aquifer will be
A	10.50%
A	12.80%
A	15.60%
A	22.80%
Q	For unconfined aquifers, storage co-efficient is same as
A	Porosity
A	Specific retention
A	Specific yield
A	Sediment co-efficient

Q	When there is an increase in the atmospheric pressure, the water level in a well penetrating in a confined aquifer
A	Increases
A	Decreases
A	May increase or decrease depending on the nature of aquifer
A	Does not undergo any change
Q	The amount of irrigated water required to meet the evapotranspiration needs of the crop during its full growth is called….
A	effective rainfall
A	consumptive use
A	consumptive irrigation requirement
A	net irrigation requirement