

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Design & Drawing of Irrigation Structures (18CE0145)Course & Branch: B.Tech& CEYear & Sem: IV-B.Tech& I-SemRegulation: R18

<u>UNIT-I</u> DESIGN AND DRAWING OF SLOPING GLACIS WEIR

1	Design a sloping glacis weir with	hydraulic particulars.	[L4][CO1]	[60M]	
	<u>U/S</u>	D/S			
	Full supply discharge :	7.5 cumecs	7.5 cumecs		
	Bed width :	6.0 m 6.0 m			
	Bed level :	+ 10.00	+10.00 $+8.00$		
	F.S.D. (Full Supply Depth):	1.5 m	1.5 m		
	F.S.L. :	+ 11.50	+9.50		
	Top of Bank Level :		+ 10.50		
	Hard soil is available for four	dations below	+ 8.00 level		
	Draw the following:				
	a) Plan				
	b) Sectional Elevation				
2	Design the sloping glacis weir acr	oss the stream	for the following data:	[L4][CO1]	[60M]
	<u>U/S</u>		C		
	Full supply discharge	: 7.0cun	necs 7.0cumecs		
	Bed width	: 6.0 m	6.0 m		
	Bed level	: + 12.0	0 + 10.00		
	F.S.D. (Full Supply Depth)	: 1.5 m	1.5 m		
	F.S.L.	: +13.5	0 + 11.50		
	Top of Bank Level	: +14.5	0 + 12.50		
	Hard soil is available for four	dations below	+ 10.00 level		
	Draw the following:				
	a) Plan				
	b) Sectional Elevation				
3	Design the sloping glacis weir acr	oss the stream	for the following data:	[L4][CO1]	[60M]
		Up-			
	Hydraulicparticulars	streamof	Downstreamofdrop		
		drop	_		
	Fullsupplydischarge	$9.0 \mathrm{m}^3/\mathrm{sec}$	9.0m ³ /sec		
	Bedwidth	6.5m	6.5m		
	Bedlevel	+ 19.00	+ 17.00		
	Fullsupplydepth	1.60m	1.60m		
	F.S.L	+ 20.60	+ 18.60		
	Topofbanklevel(T.B.L)	+ 21.60	+ 19.60		
	Hard strata is available below + 1	7.00 level for f	oundation.		
	Draw the plan and sectional eleva	able scale			



4	Design the sloping glacis weir ac	[L4][CO1]	[60M]		
	Hydraulicparticulars	Up- streamof drop	Downstreamofdrop		
	Fullsupplydischarge	$7.5 \mathrm{m}^{3/\mathrm{sec}}$	7.5m ³ /sec		
	Bedwidth	6.0m	6.0m		
	Bedlevel	+ 10.00	+ 8.00		
	Fullsupplydepth	1.50m	1.50m		
	F.S.L	+ 11.50	+ 9.50		
	Topofbanklevel(T.B.L)	+ 12.50	+ 10.50		
	Hard strata is available below + 8	8.00 level for for	oundation.		
	Draw the plan and sectional elev	ation to the suit	table scale		
5	Design the sloping glacis weir ac U/		for the following data:	[L4][C01]	[60M]
	Full supply discharge :		8.0cumecs		
	Bed width :	6.0 m	6.0 m		
	Bed level :	+ 12.00	+ 10.00		
	F.S.D. (Full Supply Depth):	1.5 m	1.5 m		
		+ 13.50			
	Top of Bank Level :	+ 14.50	+ 12.50		
	Hard soil is available for fou	ndations below	1 + 10.00 level		
	Draw the following:				
	a) Plan				
	b) Sectional Elevation				

Course Code: 18CE0145

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<u>UNIT-II</u> <u>DESIGN AND DRAWING OF SURPLUS WEIR</u>

1	Design a surplus weir for a minor tank	forming a group of tanks with the	[L4][C	[60
	following data:	0 0 0 r	01]	M]
	Combined catchment area	$= 25.89 \text{ km}^2$		
	Intercepted catchment area	$= 20.71 \text{ km}^2$		
	Top width of the bund	= 2 m		
	Side slopes of the bund	= 2:1on both sides		
	Top level of bund	= +14.50		
	Maximum Water Level (MWL)			
	Full Tank Level(FTL) General ground level at the site	= +12.00 = +11.00		
	Ground level slopes offtoa level	= +10.00 in about 6 m		
	Stould level stopes official level	distance		
	The foundations are of hand gravel	= +9.50		
	Saturation gradient	= 4:1with1 m clean cover		
	Provision is to be made to store water	up to MWL in-times of necessity		
	Draw the following:	- dette a lessal		
	(a) Half plan at top and half plan at fou	indation level		
2	(b) Half longitudinal section and half l Design a surplus weir for a minor tan		[L4][C	[60
4	following data:	k torning a group of tanks with the	$\begin{bmatrix} 124 \end{bmatrix} \begin{bmatrix} 01 \end{bmatrix}$	[00 M]
	Combined catchment area	$= 35 \text{ km}^2$		TAT
	Intercepted catchment area	$= 10 \text{ km}^2$		
	Top width of the bund	= 2 m		
	Side slopes of the bund	= 2 in = 2:1on both sides		
	Top level of bund	= 2.100 both sides = +12.25		
	•			
	Maximum Water Level (MWL)	= +10.75		
	Full Tank Level(FTL)	= +10.00		
	General ground level at the site	= +8.50		
	Ground level slopes off to a level	= +8.00 in about6 m distance		
	The foundation are of hand gravel	= +7.00		
	Saturation gradient	= 4:1 with 1 m clean cover		
	-			
	Provision is to be made to store water	up to MWL in-times of necessity		
	Draw the following:			
	(a) Half plan at top and half plan at for			
	(b) Half longitudinal section and half l			Г (2)
3		partofachainoftanks.Thecombinedcatch	[L4][C	[60 M]
		5.89 sq. kilometers and the area of the	01]	M]
	catchmentinterceptedbytheuppertanksi	-		
	It is decided to store water in the	tank to a level of +11.00 meters above		
	M.S.L. (Mean Sea Level) limiting t	he sub mersion of foreshore lands up		
	toalevelof+11.75meters above M.S.	L. The general ground level at the		
	proposed site of work	is +10.00 meters, and		
	thegroundlevelbelowtheproposedsurpl	usslopesofftillitreaches+09.00metersina		
	bout6metersdistance.	-		



	-	ersatlevel+13.50with2:1sideslopesoneithe		
	rside. The tank bunds are designed for	r a saturation gradient of 4:1 with 1 meter		
	clear			
	cover.Provisionmaybemadetomakeku	tcharegulatingarrangementstostorewateru		
	ptoM.W.L.attimesof necessity.			
	The foundations are of hard gravel a			
	work. Also draw the plan and longitud			
4	Design a surplus weir for a minor tank		[L4][C	[60
	following data:	romming a group of tanks with the	01]	M]
	Combined catchment area	$= 25.89 \text{ km}^2$	-	-
	Intercepted catchment area	$= 20.71 \text{ km}^2$		
	Top width of the bund	= 2 m		
	-	= 2:1on both sides		
	Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL)	= +14.50		
	Maximum Water Level (MWL)	= +12.75		
	Full Tank Level(FTL)	= +12.00		
	General ground level at the site	= +11.00		
	Ground level slopes off toa level			
		distance		
	The foundations areofhand gravel	= +9.50		
	Saturationgradient	= 4:1 with 1 m clean cover		
	Suturationgradient			
	Provision is to be made to store water	up to MWL in-times of necessity		
	Draw the following:			
	(a) Half plan at top and half plan at fo	oundation level		
	(b) Sectionacrossweir			
5	Design a surplus weir for a minor tank	k forming a group of tanks with the	[L4][C	[60
	following data:		01]	M]
		$= 35 \text{ km}^2$		
	Intercented catchment area	3		
1	Intercepted catchment area	$= 10 \text{ km}^2$		
	Top width of the bund	= 10 km^2 = 2 m		
	-			
	Top width of the bund	= 2 m		
	Top width of the bund Side slopes of the bund	= 2 m= 2:1on both sides		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL)	= 2 m = 2:1on both sides = +12.25 = +10.75		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL)	= 2 m = 2:1on both sides = +12.25 = +10.75 = +10.00		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site	= 2 m = 2:1on both sides = +12.25 = +10.75 = +10.00 = +8.50		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL)	= 2 m = 2:1on both sides = +12.25 = +10.75 = +10.00		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site	 = 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m 		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel	 = 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance 		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel Saturation gradient	 = 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance = +7.00 = 4:1 with1 m clean cover 		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel	 = 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance = +7.00 = 4:1 with1 m clean cover 		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel Saturation gradient Provision is to be made to store water	 = 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance = +7.00 = 4:1 with1 m clean cover 		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel Saturation gradient Provision is to be made to store water Lin-times of necessity	 = 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance = +7.00 = 4:1 with1 m clean cover 		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel Saturation gradient Provision is to be made to store water Lin-times of necessity Draw the following:	= 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance = +7.00 = 4:1 with1 m clean cover up to MW		
	Top width of the bund Side slopes of the bund Top level of bund Maximum Water Level (MWL) Full Tank Level(FTL) General ground level at the site Ground level slopes off to a level The foundations are of hand gravel Saturation gradient Provision is to be made to store water Lin-times of necessity	= 2 m = 2:10n both sides = +12.25 = +10.75 = +10.00 = +8.50 = +8.00 in about6 m distance = +7.00 = 4:1 with1 m clean cover up to MW		



UNIT-III DESIGN AND DRAWING OF TANK SLUICE WITH A TOWER HEAD

1				[(0) /]
1	Design a tank sluice with tower head	-	[L4][CO1]	[60M]
	Ayacut to be irrigated	= 200 ha		
	Duty	= 1000ha/cumec		
	Top width of the tank bund	= 2mwith 2:1 side slopes		
	The top level of bank	= +40.00		
	The ground level at the site			
	Hard soil for foundation	= +33.50		
	The sill of the sluice at off take	= +34.00		
	The maximum water level in tank	= +38.00		
	The Full Tank Level	= +37.00		
	Average low water level of the tank			
	The channel bed level	= +34.00		
	Full supply level	= +34.50		
	Bed width	= 1.25 m		
	Side slopes of channel	= 1.5 to 1 with top of bank at + 35.50		
	ollowing:			
	(a) Half plan at top & half plan at fou	indation level		
	(b) Longitudinal section through the	barrel		
2	Design a tank gluiga with tower hand	for the data given below:	[L4][CO1]	[60M]
	Design a tank sluice with tower head Ayacut to be irrigated	= 200 ha		
	Duty	= 200 ha = 900ha/cumec		
	Top width of the tank bund	= 2mwith 2:1 side slopes		
	The top level of bank	= 211 with 2.1 side slopes = +140.00		
	The ground level at the site			
	Hard soil for foundation	= +131.50 = +133.50		
	The sill of the sluice at off take			
	The maximum water level in tank			
	The Full Tank Level	= +137.00		
	Average low water level of the tank	= +135.00		
	The channel bed level	= +134.00		
	Full supply level	= +134.50		
	Bed width	= 1.25 m		
	Side slopes of channel	= 1.5to 1 with top of bank at		
	L	+135.50		
	ollowing:			
		indation level		
	(a) Half plan at top & half plan at fou(b) Longitudinal section through the			
3			[L4]	[60M]
	Design a tank sluice with tower head	0	[CO1]	[]
	Ayacut to be irrigated	= 400 ha	[]	
	Duty Tan aridth of the tends have d	= 1000ha/cumec		
	Top width of the tank bund	= 3 mwith 2:1 side slopes		
	The top level of bank	= +40.00		
	The ground level at the site	= +34.50		
	Hard soil for foundation	= +33.50		
	The sill of the sluice at off take	= +34.00		
	The maximum water level in tank	= +38.00		
	The Full Tank Level	= +37.00		

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				1
	Average low water level of the tank			
	The channel bed level	= +34.00		
	Full supply level	= +34.50		
	Bed width	= 1.25 m		
	Side slopes of channel	= 1.5 to 1 with top of bankat + 35.50		
	ollowing:			
	(a) Half plan at top & half plan at fou	ndation level		
	(b) Longitudinal section through the b			
4			[L4][CO1]	[60M]
4	Design a sluice taking off from 1000ha/cumec duty. The tank bund th has a top width of 2 meters with 2:1 +40.00 and the ground level at si foundation is available at+33.50.Th +34.00. The maximum water level in is +37.00. Average low water level of the channel below the sluice are as un Bed level +34.00 F.S.L. +34.50 Bed width 1.25meters Side slope 1.5 to1withtopof bankat+	brough which the sluice is taking off side slopes. The top level of bank is te is $+34.50$. Good hard soil for the sill of the sluice at off-take is in tank is $+38.00$. The full tank level of the tank is $+35.00$. The details of order.		
	Also draw the plan and longitudinal s	ection.		
5			[L4][CO1]	[60M]
	Design a tank sluice with tower head Discharge	= 0.2cumec		
	Top width of the tank bund			
	The top level of bank	= 211 with 2.1 side stopes $= +40.00$		
	1			
	The ground level at the site Hard soil for foundation	= +34.50 = +33.50		
	The sill of the sluice at off take	= +33.30 = +34.00		
	The maximum water level in tank	= +34.00 = +38.00		
	The Full Tank Level	= +38.00 = +37.00		
	Average low water level of the tank	= +37.00 = +35.00		
	The channel bed level	= +33.00 = +34.00		
	Full supply level	= +34.00 = +34.50		
1	Bed width	= +34.50 = 1.25 m		
	Side slopes of channel	= 1.25 m = 1.5 to 1 with top of bank at +		
		35.50		
1	During the fall and use			
1	Draw the following:			
	_	ndation level		
	 (a) Half plan at top & half plan at fou (b) Longitudinal section through the 			



<u>UNIT –IV</u> <u>DESIGN AND DRAWING OF TYPE – III SYPHON AQUEDUCT</u>

1	Design a symbol as a subduct Type III for the	f . 11	anning data.		[60]/1
1	Design a syphon aqueduct Type – III for the	owing data:	[L4][CO1]	[60M]	
	<u>Canal</u> :		27 3		
	Discharge		$35 \text{ m}^3/\text{s}$		
	Bed width Bed Level		20.00 m		
			+40.00		
	Full supply level Ultimate Bed level		+42.00 +39.75		
	Ultimate full supply level		+39.73 +42.50		
	Average velocity in the canal		+42.50 0.83m/s		
	Left bank top width		5.00 m		
	1		2.00 m		
	Right bank top width	=			
	Canal side slopes both inside and outside		2:1		
	Top of canal bank	=	+43.50		
	Drain:				
	Catchment area	=	8.0 km^2		
1	Maximum computed discharge	=	$60 \text{ m}^{3}/\text{s}$		
	Maximum flood level of the drain at the	=	+39.75(observed)		
	Site crossing				
	Average bed level of the drain at the site	=	+38.00		
	Crossing				
	Hard soil is available at	=	+37.00		
	Draw the following:				
	a) Half plan at top and half plan at foundat	ion			
	b) Section across syphon barrel				
2	Design a syphon aqueduct Type – III for the	C 11	• 1 /	IT 4110011	F (03 / 1
4	Design a syphon aqueduct Type – In for the	e foll	owing data:	[L4][CO1]	[60M]
4	<u>Canal</u>:	e foll	owing data:		[60M]
2	Canal:		$35 \text{ m}^3/\text{s}$		[60][1]
2		=	-		[60][1]
2	Canal: Discharge	=	35 m ³ /s		[60][1]
2	Canal: Discharge Bed width	=	35 m ³ /s 20.00 m		[60]41]
2	Canal: Discharge Bed width Bed Level	= = =	35 m ³ /s 20.00 m +40.00		[60]/1]
2	Canal: Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level	= = =	35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50		[60][1]
	<u>Canal</u> : Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s		[60][1]
	Canal: Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50		[60]/1]
	<u>Canal</u> : Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s		[60]/1]
	Canal: Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m		[60]/1]
	Canal: Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m		[60]/1]
	Canal: Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both inside and outside		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1		[60]/1]
	Canal: Discharge Bed width Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both inside and outside Top of canal bank		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment area		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ²		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed discharge		$35 \text{ m}^{3}\text{/s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}\text{/s}$		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at the		35 m ³ /s 20.00 m +40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ²		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at theSite crossing		$35 \text{ m}^{3}\text{/s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}\text{/s}$ $+39.75(\text{observed})$		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at theSite crossingAverage bed level of the drain at the site		$35 \text{ m}^{3}\text{/s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}\text{/s}$		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at theSite crossingAverage bed level of the drain at the siteCrossing		$35 \text{ m}^{3}/\text{s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}/\text{s}$ $+39.75 \text{ (observed)}$ $+38.00$		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at theSite crossingAverage bed level of the drain at the siteCrossingHard soil is available at		$35 \text{ m}^{3}\text{/s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}\text{/s}$ $+39.75(\text{observed})$		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at theSite crossingAverage bed level of the drain at the siteCrossingHard soil is available atDraw the following:		$35 \text{ m}^{3}/\text{s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}/\text{s}$ $+39.75 \text{ (observed)}$ $+38.00$		[60][1]
	Canal:DischargeBed widthBed LevelFull supply levelUltimate Bed levelUltimate full supply levelAverage velocity in the canalLeft bank top widthRight bank top widthCanal side slopes both inside and outsideTop of canal bankDrain:Catchment areaMaximum computed dischargeMaximum flood level of the drain at theSite crossingAverage bed level of the drain at the siteCrossingHard soil is available at		$35 \text{ m}^{3}/\text{s}$ 20.00 m $+40.00$ $+42.00$ $+39.75$ $+42.50$ 0.83 m/s 5.00 m 2.00 m 2.1 $+43.50$ 8.0 km^{2} $60 \text{ m}^{3}/\text{s}$ $+39.75 \text{ (observed)}$ $+38.00$		[60][1]



3	Design a syphon aqueduct Type – III for the	e foll	owing data:	[L4][CO1]	[60M]
	inal:	- 1011	······································		
	Discharge	=	35 m ³ /s		
	Bed width	_	20.00 m		
	Bed Level		+40.00		
	Full supply level		+42.00		
	Ultimate Bed level	=	+39.75		
	Ultimate full supply level		+42.50		
	Average velocity in the canal				
	Left bank top width		5.00 m		
	Right bank top width	=	2.00 m		
	Canal side slopes both inside and outside	=	2:1		
	Top of canal bank	=	+43.50		
	Drain:				
	Catchment area	=	8.0 km^2		
	Maximum computed discharge		$60 \text{ m}^3/\text{s}$		
	Maximum flood level of the drain at the		+39.75(observed)		
	Site crossing	_	- 57.75(00serveu)		
	Average bed level of the drain at the site	=	+38.00		
	crossing				
	Hard soil is available at		+37.00		
		=	T37.00		
	Draw the following:				
	a) Half plan at top and half plan at foundatb) Elevation from D/S drain and section th		a mood ometage		
4	Design a syphon aqueduct Type – III for the			[L4][CO1]	[60M]
	inal:	5 1011	Jwing data.		
	Discharge	_	$36 \text{ m}^{3}/\text{s}$		
	Bed width	—	50 III /S		
	Ded widdli		20.00 m		
		=	20.00 m		
	Bed Level	=	+40.00		
	Bed Level Full supply level	=	+40.00 +42.00		
	Bed Level Full supply level Ultimate Bed level	= = =	+40.00 +42.00 +39.75		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level	= = =	+40.00 +42.00 +39.75 +42.50		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal		+40.00 +42.00 +39.75 +42.50 0.83m/s		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level	= = =	+40.00 +42.00 +39.75 +42.50		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal		+40.00 +42.00 +39.75 +42.50 0.83m/s		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width	= = = =	+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank <u>Drain:</u>		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ²		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ² 60 m ³ /s		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge Maximum flood level of the drain at the		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ²		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ² 60 m ³ /s +39.75(observed)		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge Maximum flood level of the drain at the Site crossing Average bed level of the drain at the site Crossing		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ² 60 m ³ /s +39.75(observed) +38.00		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge Maximum flood level of the drain at the Site crossing Average bed level of the drain at the site Crossing Hard soil is available at		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ² 60 m ³ /s +39.75(observed)		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge Maximum flood level of the drain at the Site crossing Average bed level of the drain at the site Crossing Hard soil is available at Draw the following:		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ² 60 m ³ /s +39.75(observed) +38.00		
	Bed Level Full supply level Ultimate Bed level Ultimate full supply level Average velocity in the canal Left bank top width Right bank top width Canal side slopes both in side and outside Top of canal bank Drain: Catchment area Maximum computed discharge Maximum flood level of the drain at the Site crossing Average bed level of the drain at the site Crossing Hard soil is available at		+40.00 +42.00 +39.75 +42.50 0.83m/s 5.00 m 2.00 m 2:1 +43.50 8.0 km ² 60 m ³ /s +39.75(observed) +38.00		



5	Design a syphon aqueduct Type – III for the	e foll	owing data:	[L4][CO1]	[60M]
	<u>Canal</u> :				
	Discharge	=	$36 \text{ m}^3/\text{s}$		
	Bed width	=	20.00 m		
	Bed Level	=	+40.00		
	Full supply level	=	+42.00		
	Ultimate Bed level	=	+39.75		
	Ultimate full supply level	=	+42.50		
	Average velocity in the canal	=	0.83m/s		
	Left bank top width	=	5.00 m		
	Right bank top width	=	2.00 m		
	Canal side slopes both inside and outside	=	2:1		
	Top of canal bank	=	+43.50		
	Drain:				
	Catchment area	=	8.0 km^2		
	Maximum computed discharge	=	$60 \text{ m}^{3}/\text{s}$		
	Maximum flood level of the drain at the	=	+39.75(observed)		
	Site crossing				
	Average bed level of the drain at the site	=	+38.00		
	Crossing				
	Hard soil is available at	=	+37.00		
	Draw the following:				
	a) Half plan at top and half plan at foundat	ion			
	b) Longitudinal section along barrel				



<u>UNIT –V</u> <u>DESIGN AND DRAWING OF CANAL REGULATOR</u>

	~			F < 0
1	6 6	bridge with the following data:	[L4][CO1]	[60M]
	Hydraulic particulars of c			
	Full supply discharge			
	Bed width	: 15 m		
	Bed Level	: + 20.00		
	11 2 1	: 2.0 m		
		: + 22.00		
	Top level of bank $:+23$			
	The right bank is 5 m wide			
	Hydraulic particulars of c	2		
	Full supply discharge			
	Bed width : 15 m	1		
	Bed Level : + 20.00			
	Full Supply Depth	: 1.75 m		
	F.S.L.	: + 21.75		
	Top Level of Bank	: + 22.75		
	Good foundation soil is available	ilable at : + 19.00		
	The general ground level at	site :+ 22.00		
		same as those on the upstream side. The		
	1	single lane designed for IRC loading class		
	•	d of one meter above F.S.L. for the road		
	bridge. Also draw the plan a			
2		bridge with the following data :	[L4][CO1]	[60M]
	Hydraulic particulars of ca		- JE J	
	Full supply discharge	$: 18 \text{ m}^{3}/\text{s}$		
	Bed width	: 14 m		
	Bed Level	: + 15.00		
		: 2.0 m		
	F.S.L.	: + 17.00		
	Top level of bank			
	The right bank is 5 m wide a			
	Hydraulic particulars of ca			
	Full supply discharge	$\cdot 12 \text{ m}^3/\text{s}$		
	Bed width	: 12 m /s		
	Bed Level	14 m 1 + 15.00		
	Full Supply Depth	: 1.60 m		
	F.S.L.	: + 16.60		
	Top Level of Bank	(+10.00) (+17.60)		
	Good foundation soil is avai			
	The general ground level at a			
	-	same as those on the upstream side. The		
	•	single lane designed for IRC loading class		
	1	rd of one meter above F.S.L. for the road		
	bridge.			
			1	



half plan at foundation and Hydraulic particulars	U	canal	D/S can	al	
Full supply discharge	22 1	m^3/s	$16 \text{ m}^{3/s}$	3	
Bed width	15	m	15 m		
Bed Level +2).00	+20.00		
Full Supply Depth	2	m	1.75 m		
F.S.L	+22	2.00	+21.75		
Top level of bank	+23	3.00	+22.75		
regulator carries a road way 'A' provides clear free boo bridge. The right bank is 5 m wide D/S.Good foundation soil +22.00 Design a regulator cum road half plan at foundation and	he road U/S and nd level] [60M			
Hydraulic particulars		U/S cana	D/S ca	anal	
Full supply discharge		16 m ³ /s	12 m	³ /s	
Bed width		14 m		m	
Bed Level		+15.00	+15.	00	
Full Supply Depth		2 m	1.60	m	
F.S.L		+17.00	+16.	60	
Top level of bank		+18.00	+17.	60	
Top width of banks are the regulator carries a road way 'A' provide clear free boa bridge. The right bank is 5 m wide D/S.Good foundation soil +17.00 Design a regulator cum road	y single lan rd of one e and left b is available d bridge wi	the designed meter above ank is 2 m $\frac{1}{2}$ e at + 14.00 th the follow	for IRC loadi e F.S.L. for t wide on both) m and groun	ng class he road U/S and nd level] [60M
half plan at foundation and Hydraulic particulars		nal section S canal D/S c		al	
Full supply discharge	21 1	m^3/s	$16 \text{ m}^{3/s}$	3	
Bed width	15	m	15 m	———————————————————————————————————————	
Bed Level	+20).00	+20.00		
Full Supply Depth	2	m	1.75 m		
			01.75		
F.S.L	+22	2.00	+21.75		



'A' provides clear free board of one meter above F.S.L. for the road	
bridge.	
The right bank is 5 m wide and left bank is 2 m wide on both U/S and	
D/S.Good foundation soil is available at + 19.00 m and ground level	
+22.00	

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