Government Engineering College, Jhalawar

B. Tech VIII Semester First Mid Term-2018

8CE1A- WATER RESOURCES ENGINEERING-II

Maximum Marks : 10 **Duration : 1:00 Hours**

1. What do you mean by canal regulation work and Canal Falls. Write types of Canal falls. **(2 Marks)**
2. Explain different regulations works and components. **(2 Marks)**
3. What are the different cross drainage works. Explain in detail with neat diagram. (Aqueduct, Syphon aqueduct, super passage, canal syphon, inlet and outlets, cross leveleing etc.) **(2 Marks)**
4. Explain Canal Falls briefly and Design a 1.5 m Sarda type fall for a canal having discharge of **50** cumecs with the following:
   Bed Level of U/S = **203.5 meter, Bed Level of D/S = 202.0 meter.**
   Side slopes of Channel = 1:1.
   Full supply level U/S = **1.5 meter.**
   Bed width U/S and D/S = **35 meter.**
   Assume any suitable data if needed and apply Khosla's Theory. **(4 Marks)**

Course B.Tech. Branch civil Year/Semester IV th / 8 th Session 2017-18

Subject W.R.E - II nd Midterm No./Internal Practical 1 st Date 14-2-18

Max. Marks 10 Marks Obtain 9 1/2 Signature of Invigilator 16/4/18

Ans 4.

Canal Regulation works

* meaning of Regulation work is the => Regulation of discharge, velosity, flow depth.

* Construction works done for Regulate the discharge velocity and flow depth Across the ~~Canal~~ Canal. known As @ Canal Regulation works.

Example Canal Falls, outlets modules, Canal Escape, Canal Regulators, etc.

Canal Falls :- It is a Hydrulic Structure Constructed Acro Across the ~~Canal~~ Canal to maintain the slope of bed of ~~Canal~~ Canal.

Location :- Sudden Change in slope.
(natural slope > design slope)

Necessity :- To Avoid the Scouring of bed Slope.

Types of Canal Falls

1. Ogee fall
2. Rapid fall
3. Stepped fall
4. notch type fall
5. well type fall
6. vertical or sarda fall
7. montague fall
8. Inglis fall or Buffle wall
9. meter non meter fall
10.

Ans ②

Different Regulation works

- Canal Falls
- Canal Escape
  - Surplus Escape
  - Scour Escape
  - Tail Escape
- Canal Regulator
  - Cross Regulator
  - Head Regulator
- Outlets and modules
  - non modular
  - Semi modular
  - modular

* Canal fall :

work ⇒ To avoid the scouring of bed slope.
[To dissipate the energy in form of Hydraulic Jump and Turbulence]

→ Location ⇒ Sudden Change in Slope.

⇒ Slope is provided According to design Slope.

* Canal Escape →
It is a hydraulic structure constructed in Irrigation Canals.

work → / Necessity

* To avoid the Control the surplus water
* If design mistake or maintaince of Head is difficult.
* The water supply in the offtaking Canal due to breach..
* Excess Rain.

work ⇒ to dispose the surplus water in drain Natural drain or river.

Canal Regulators

work ⇒ Regulate the discharge in main Canal or in Off taking Canal
→ Main-tain the flow depth
→ Control Sediment & entry.
→ Repearing work allowance.

Cross – Regulator ⇒ Across the main Canal
Head Regulator ⇒ Across the off taking Canal

Canal outlets

⇒ Introduction ⇒ provided At the Junction of distributor Canal and water Course

⇒ Type
modular ⇒ discharge is independent of water level in dis. And water Coyse
Semi modular ⇒ " " depends only water level in distributory Canal

Aqueduct => depends on both d/c and water level difference.

Ans:-

Cross drainage works

- Canal is over the drain
- drain is over the Canal
- both at same level

Aqueduct

- System Aqueduct — on the basis of SFL, HFL and Canal bed level
- Super Passage — on the basis of SFL, HFL and drain bed level
- Canal Syphon
- Inlet
- Outlet
- Level crossing — on the basis of Canal and drain bed level

Canal over the drain

* divided on the basis of

1. HFL < Bed level of Canal ⇒ Aqueduct
2. HFL > Bed level of Canal ⇒ Syphone

Aqueduct

Head way

FSL

Canal

Flow under Gravity

HFL drain

DA HFL drain

Drain

* Syphone Aqueduct

FSL

Flow under Gravity Action

HFL

DA HFL

vertical drop

drain over the Canal

drain

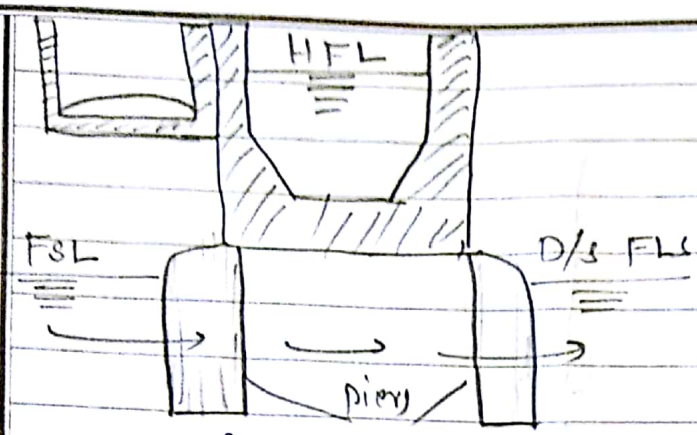
Canal

SFL < Bed slope of drain ⇒ Super Passage

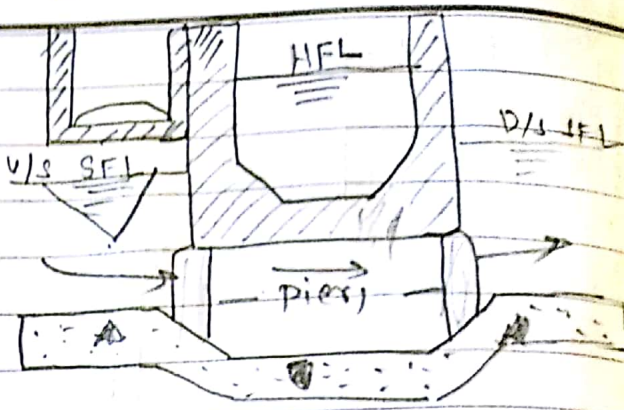
SFL > Bed of drain ⇒ Canal Syphone

Super Passage :-

Canal Syphone



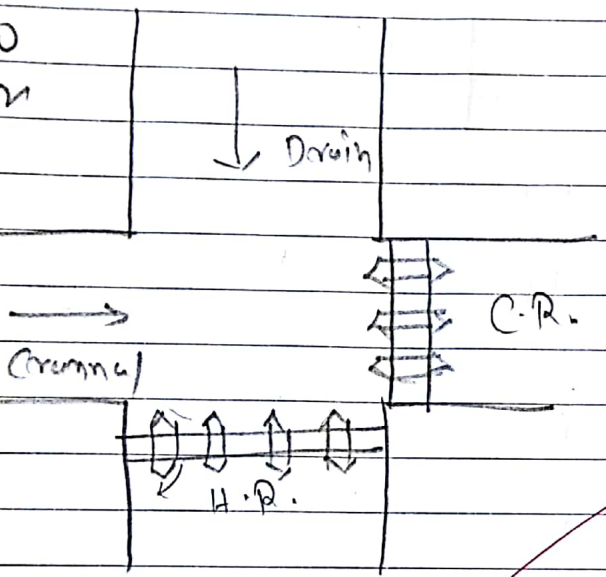
Flow under Gravity.

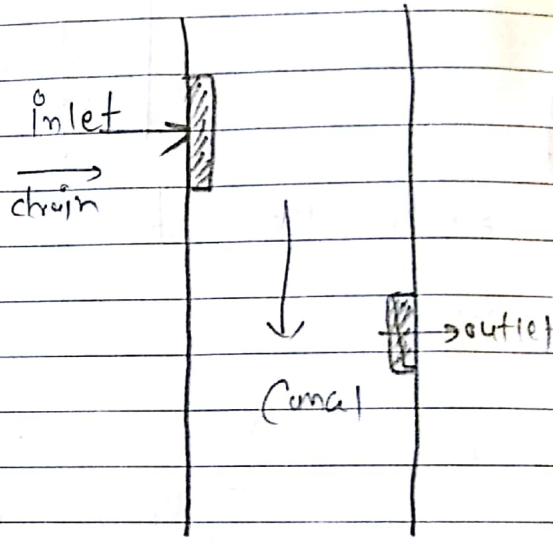


Flow under Syphonic Action

Both at Same level

Peak flow
Both open





Cross leveling.

Inlet - outlet

Ans. (9) Given discharge Q = 14 Cumecs

Shape - Trapezoidal Crest Wall

Step - 1st

Calculation for H, d, H.V. 3/2

$$Q = 1.99 \cdot L \cdot (H)^{3/2} \cdot \left(\frac{H}{B}\right)^{1/6}$$

L = 35m $\quad B = 0.55\sqrt{H+d}$.

* Assume Bed level drop = 1 m.

H+d = 1m + 1.5m = 2.5m.

$B = 0.55\sqrt{2.5} = 0.86$ m.

Let provide = 1 m.

* Calculation for H

$$50 = 1.99 \times 35 \times (H)^{3/2} \left(\frac{H}{B \to 1m}\right)^{1/6}$$

$$0.71 = (H)^{10/6}$$

$$H = 0.81 \text{ m}$$

* (d)

H+d = 2.5m

d = 2.5 - 0.81 ; d = 1.69 m.

Step (2) / design of crest.

R.L. of Crest => R.L. of FSL U/S - H

=> 203.5 - 0.81 => 202.69 m

Step (3) design of cistern.

length of cistern = $5 (EH_L)^{1/2}$

$x = \frac{1}{4}[EH_L]^{2/3}$

E => T.E.L - (R.L.) crest

H_L => $(R.L)_{U/S} - (R.L)_{D/S}$ => 1.5m

T.E.L. => $(U/S)_{RL} + \frac{V^2}{2g}$; $V = \frac{Q}{A}$; $A = (B+y)y$

$V = \frac{50}{77.25}$ => 0.64

T.E.L. = $203.5 + \frac{0.41}{2 \times 9.81}$ => 203.5089

2/3 + 1/6

6

$f = 0.818$

* $d_c = 5(0.818 \times 1.5)^{0.5} \Rightarrow 5.5\,ym.$

* $x = \alpha d_c - Y_4(0.81 \times 1.5)^{2/3} \Rightarrow 0.28\,m.$

⇒ P

⇒ P.L. of the dam ⇒ $(P.L)_{D/S} - x$ ⇒ 201.72 m

step-① **Design of Impervious Floor**

total creep length = $2(d_1 + d_2) + l$ → Cut-off wall

$CH_S = 2(d_1 + d_2) + l$

Assume $C = 8$, $d_1 = ?$, $d_2 = 1.2m$

$H_S = d$

$\Rightarrow 8 \times 1.69 = 2(2.2) + l$

$l = 9.12\,m$

minimum at toe side ⇒ $2(D + 1.2) + h_L$

$2(1.5 + 1.2) + 1.5 \Rightarrow 6.9m$

$(D/S)_L = 6.9m$

$(U/S)_L = 2.22m$

Thickness of Impervious Floor ⇒ $t = \frac{y}{3}\frac{H}{\rho - 1}$ assume $\rho = 2.24$

H ⇒ at the U/S side of (re)t wall ⇒ $1.5 - 0.11 \times 4.2 + 0.28$ ⇒ 1.38 m

toe.

Total gradient = $\frac{1.5}{13.52}\left(\frac{\text{Head}}{\text{total elm}}\right) = 0.11$

thickness ⇒ $\frac{y}{3}\frac{1.38}{(2.44 - 1)}$ ⇒ 1.27m or

without (4/3) ⇒ 0.95 m Approx

3 1/2

Govt. Engineering College Jhalawar

IV Yr. B.Tech VIII Sem. 2017-18

Mid Term Award list

Civil Engineering

Subject with code: WRE-II, 8CE1A Date of Exam: 14.02.2018

S. No	Roll No.	Name of Student	Max. Marks : I Mid Term Marks	II Mid Term Marks	Total Marks
1	2014UCE001	AJAY KUMAR YADAV (TFWS)	09		
2	2014UCE002	AKASH LUNIA	04		
3	2014UCE004	AMAN CHAWLA	07		
4	2014UCE005	AMIT KUMAR KHINCHI	06		
5	2014UCE006	AMIT PAL	07		
6	2014UCE007	ANUSREE	AB		
7	2014UCE008	ASHISH GUPTA (TFWS)	02		
8	2014UCE009	BUSH RC	06		
9	2014UCE010	CHAYAN PANCHORI	10		
10	2014UCE011	CHHAYA BAIRWA	AB		
11	2014UCE012	DEEPAK DANGI	AB		
12	2014UCE013	DEEPAK GAUTAM	07		
13	2014UCE014	DHARMENDRA MEENA	08, 09		
14	2014UCE015	DIVYA MOHAN KABRA	10		
15	2014UCE016	DUNGAR SINGH	04		
16	2014UCE017	GARVIT MEENA	06		
17	2014UCE018	HEMANT KUMAR MEENA	07		
18	2014UCE019	JITESH SAINI	03		
19	2014UCE020	JITIN RAJPUT	AB		
20	2014UCE021	KAPIL KUMAR PRAJAPATI	09		
21	2014UCE022	KAUSHAL CHAWLA	09		
22	2014UCE023	KESHAV SHARMA	07		
23	2014UCE025	KHEMRAJ POONIYA	07		
24	2014UCE026	LOKESH GUNAWAT	07		
25	2014UCE027	LOKESH LOHAR	09		
26	2014UCE028	MAHENDRA RAWAL	04		
27	2014UCE029	MAHIR HUSSAIN	05		
28	2014UCE030	MOHAMMAD SHARJIL	06		
29	2014UCE031	NARPAT SINGH	06		
30	2014UCE032	NAVEEN MEHRA	06		
31	2014UCE033	NEERAJ AJMERA	07		
32	2014UCE034	NEHA SAINI	08		
33	2014UCE035	NIRMAL KUMAR AGRAWAL	07		
34	2014UCE036	PANKAJ SAINI	08		
35	2014UCE037	PAVAN KUMAR GUPTA	05		

36	2014UCE038	PRATISHTHA SUMAN	05		
37	2014UCE039	PRAVAL PRATAP SINGH	10		
38	2014UCE040	PRAVEEN MEENA	07		
39	2014UCE041	PUNEET KUMAR MEENA	06		
40	2014UCE043	RAJNI MEENA	AB		
41	2014UCE044	RAVI KUMAR	AB		
42	2014UCE045	RAVISH KUMAR JAGRAWAL	AB		
43	2014UCE046	ROHIT RATHORE	09		
44	2014UCE047	SACHIN KUMAR	05		
45	2014UCE048	SANKET SOUGRIA	10		
46	2014UCE049	SHIVAM SONI	04		
47	2014UCE050	SHUBHAM GURJAR	05		
48	2014UCE051	SHUBHASH VISHNOI	06		
49	2014UCE052	SUNIL KUMAR DHOBI	AB		
50	2014UCE053	SURESH DAN	AB		
51	2014UCE054	TARUN NAGAR	09		
52	2014UCE055	VARSHA RANI	08		
53	2014UCE056	VINIT KUMAR MEENA	08		
54	2014UCE057	VIRENDRA VERMA	04		
55	2014UCE058	VISHAL PAREEK (TFWS)	10		
56	2014UCE059	VISHNU RATHORE	06		
57	2014UCE060	YATINDAR KUMAR CHOUDHARY	06		
58	2014UCE061	YOGESH MEENA	06		
59	2014UCE300	MOHAMMAD ARIZ	09		
60	2014UCE301	SHUBHAM KUMAR	04		
61	2015UCE200	BHUPESH KUMAR MEENA	05		
62	2015UCE201	CHAVI RANWAH	09		
63	2015UCE202	DEEPAK KUMAR KHARNIWAL	06		
64	2015UCE203	GAURAV SHARMA	06		
65	2015UCE204	GAURAV SHARMA	08		
66	2015UCE206	PARMANAND	07		
67	2015UCE207	PRASHANT KUMAR	06		
68	2015UCE209	UMESH KUMAR JAT	05		

Signature of Examiner

Name of Examiner UTKARSH NIGAM