

CBCS SCHEME

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BCV602

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025 Irrigation Engineering And Hydraulic Structures

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

		Module – 1	M	L	C																								
Q.1	a.	Define irrigation. Write the benefits and ill effects of irrigation.	10	L1	CO2																								
	b.	The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the reservoir capacity if the canal losses are 20% and the reservoir losses are 15%. <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Crop</th> <th style="text-align: center;">Base Period (days)</th> <th style="text-align: center;">Area (hect)</th> <th style="text-align: center;">Duty (hect/cumecs)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Wheat</td> <td style="text-align: center;">120</td> <td style="text-align: center;">4800</td> <td style="text-align: center;">1800</td> </tr> <tr> <td style="text-align: center;">Sugar-Cane</td> <td style="text-align: center;">360</td> <td style="text-align: center;">5600</td> <td style="text-align: center;">800</td> </tr> <tr> <td style="text-align: center;">Cotton</td> <td style="text-align: center;">200</td> <td style="text-align: center;">2400</td> <td style="text-align: center;">1400</td> </tr> <tr> <td style="text-align: center;">Rice</td> <td style="text-align: center;">120</td> <td style="text-align: center;">3200</td> <td style="text-align: center;">900</td> </tr> <tr> <td style="text-align: center;">Vegetables</td> <td style="text-align: center;">120</td> <td style="text-align: center;">1400</td> <td style="text-align: center;">700</td> </tr> </tbody> </table>	Crop	Base Period (days)	Area (hect)	Duty (hect/cumecs)	Wheat	120	4800	1800	Sugar-Cane	360	5600	800	Cotton	200	2400	1400	Rice	120	3200	900	Vegetables	120	1400	700	10	L3	CO2
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Q.2	a.	Write a note on i) Bandhara irrigation ii) Frequency of irrigation.	10	L2	CO2																								
	b.	Define duty, delta and Base period and derive relationship between them.	05	L2	CO2																								
	c.	A canal has a discharge of 20 cumecs. It irrigates 25,920 hectare of land during a base period of 120 days. Find the duty and delta of the canal.	05	L3	CO3																								
Module – 2																													
Q.3	a.	Define canal and explain classification of canal based on canal alignment.	10	L2	CO3																								
	b.	Design an irrigation channel in alluvial soil from following data using Lacey's Theory. Discharge = 18m ³ /Sec. Lacey's silt factor = 1 Side slope = ½:1.	10	L4	CO3																								
OR																													
Q.4	a.	Define reservoir and what are the investigations for the selection of a reservoir site.	10	L1	CO3																								
	b.	Design an irrigation channel on Kennedy's Theory to carry a discharge of 45 m ³ /sec. Take N = 0.0225 and m=1.05. The channel has a bed slope of 1 in 5000. Assume Trail depth 2m, side slope 0.5:1.	10	L4	CO3																								

Module - 3

Q.5	a.	Define gravity dam and briefly explain the forces acting on a gravity dam.	10	L2	CO1
	b.	Determine the uplift force at the base of a gravity dam as shown in Fig.Q.5(b) for the following Three cases. a) No drains b) with drain and grout curtain at a distance of 5 m from U/S end c) Tension cracks upto 2 m from U/S end.	10	L3	CO1

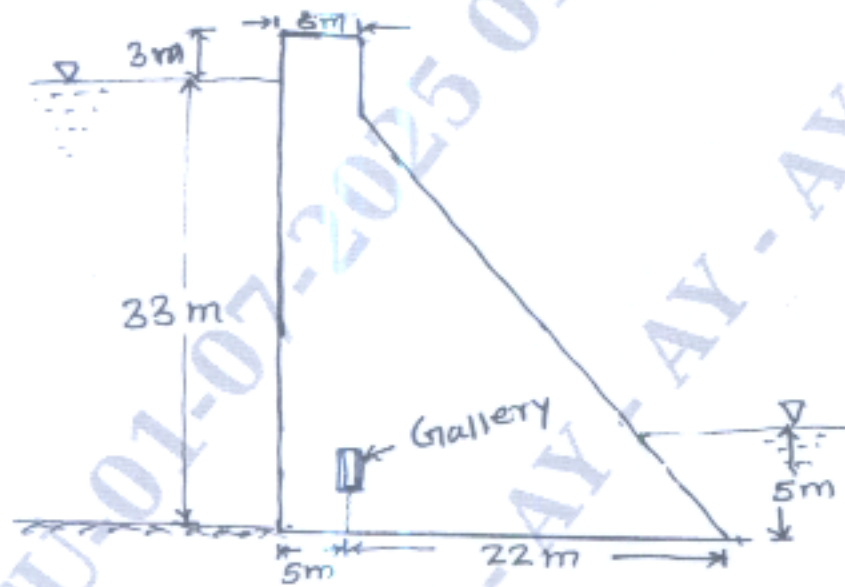


Fig. Q.5(b) Cross section of gravity dam

OR

Q.6	a.	Write a note on : i) Practical Profile of a gravity dam ii) Drainage and inspection galleries.	10	L2	CO1
	b.	Following data were obtained from the stability analysis of concrete gravity dam : i) Total overturning moment about toe = 1.5×10^6 KN-m ii) Total resisting moment about toe = 2.5×10^6 KN-m iii) Total vertical force above base = 60,000 KN iv) Base width of the dam = 48 m v) Slope of D/S face = 0.8(H) : 1(V). Calculate the maximum and minimum vertical stress to which the foundation will be subjected to, what is the maximum principal stress at toe ? Assume there is no tail water.	10	L4	CO1

Module - 4

Q.7	a.	Explain the causes of failure of earthen dams.	10	L2	CO1
	b.	Briefly explain the methods of seepage control through foundation and body of earthen dams.	10	L2	CO1

OR

Q.8	a.	Define earthen dam and explain the design criteria for earthen dams.	10	L2	CO1
	b.	Write a note on : i) Ogee spillways ii) Stilling Basins.	10	L2	CO1

Module - 5

Q.9 a. Explain the types of diversion head works and causes of their failure. 10 L2 CO1

b. Fig.Q.9(b), shows the section of hydraulic structure founded on sand. Calculate the average hydraulic gradient. Also find the uplift pressure at point 6,12 and 18 m from the U/S ends of the floor and find the thickness of the floor at these points taking $P = 2.24$. 10 L3 CO1

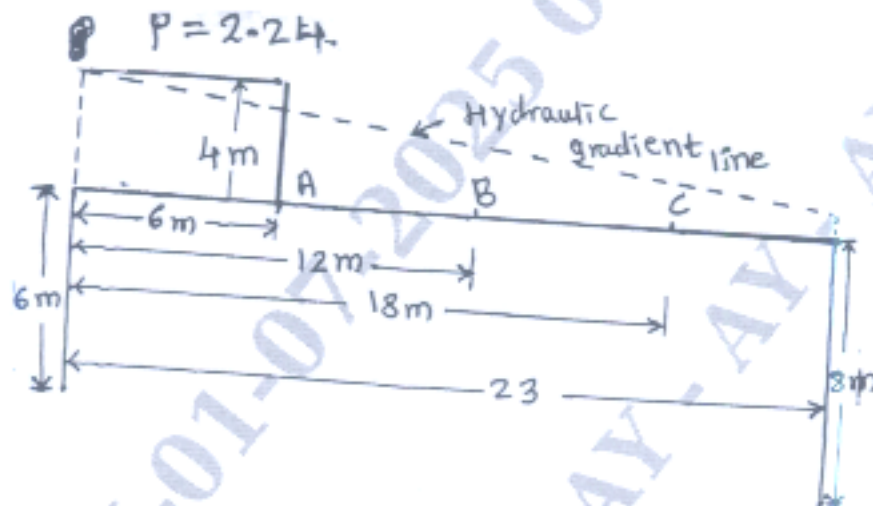


Fig. Q.9(b) Hydraulic Structure

OR

Q.10 a. Describe with neat sketches, the working of a silt excluders and silt ejectors. 10 L2 CO1

b. Explain the following :
 i) Draw a layout of headwork, label the component and describe the function of each component.
 ii) Explain the Lane's weighted creep theory. 10 L2 CO1
