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%.	10	L3	CO2

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

OR

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**

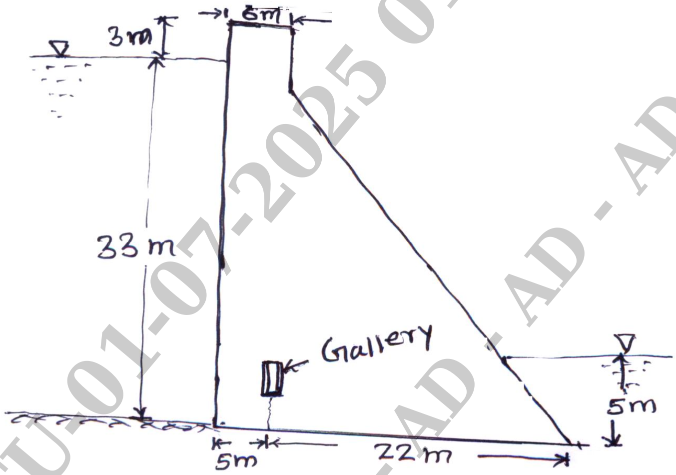

Fig. Q.5(b) Cross section of gravity dam

		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 x 10^6 KN – m ii) Total resisting moment about toe = 2.5 x 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**

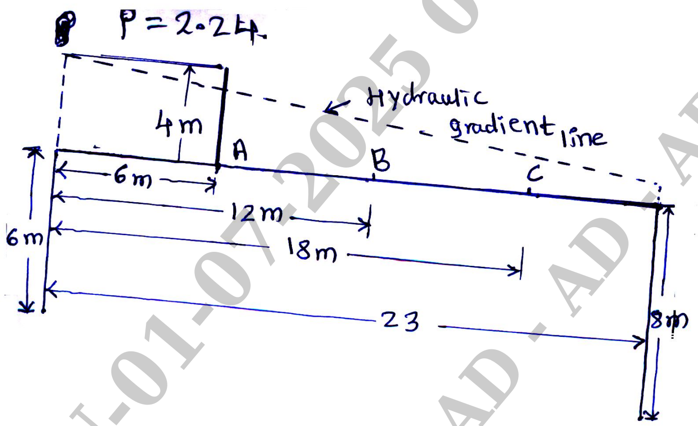

Fig. Q.9(b) Hydraulic Structure

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**

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