Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: CE 302

Course Name: DESIGN OF HYDRAULIC STRUCTURES

Max. Marks: 100 Duration: 4 Hours

Use of Khosla's chart, Blench curve and Montague curve are permitted in the exam hall

PART A

Answer any two full questions, each carries 15 marks.

Marks

1	a)	Explain the failure of hydraulic structures by sub surface flow.	(4)
	b)	Compare Kennedy's theory and Lacey's silt theory.	(5)
	c)	Explain the different types of weir with neat sketches.	(6)
2	a)	What are the functions of an under sluice and silt excluder in a diversion headwork?	(4)
	b)	Explain the different classifications of canal.	(5)
	c)	Write down the procedure for the design of a vertical drop weir.	(6)
3	a)	Draw the section of unlined canal partly in cutting and partly in filling and explain the parts	(5)
	b)	Two sheet piles of unequal length are provided at the two ends of an impervious floor of 15m length and 1m thick. Total head created on the floor is 3m. Using Khosla's method of independent variables, calculate the uplift pressure at the key points, if the upstream pile is 3m deep and downstream pile is 5m deep.	(10)

PART B

Answer any one full question, each carries 50 marks.

4	a)	Design a suitable cross drainage work for the following hydraulic particulars: Discharge of the canal = 28 cumecs Bed width of the canal = 20m Depth of water in the canal = 1.6m Bed level of canal = 250.00m High flood discharge of the drainage = 400 cumecs High flood level of drainage = 253.00m Bed level of drainage = 248.00m	(25)

General ground level = 250.00m

b) Prepare the following drawings (not to scale) (25)

i. Half plan at top and half at the foundation level.

ii. Longitudinal section along drain.

5 a) Design a 1.2m Sarda type fall for the following data. (25)

Full supply discharge through the canal = 35 cumecs.

Bed level at u/s = 110.00m

Full supply depth at u/s = 1.60m

Bed width u/s and d/s = 26.0m

Safe exit gradient = 1/5

Impervious floor design is to be carried out as per Khosla's theory.

b) Prepare the following drawings (not to scale) (25)

i. Half plan at top and half at the foundation level.

ii. Section through the centre line of the canal.

PART C

Answer any two full questions, each carries 10 marks.

6 a) Derive the most economical central angle of an arch dam. (4)

b) Obtain the condition for no-tension criteria in a gravity dam. (3)

c) Distinguish between a low dam and a high dam (3)

7 a) Write a brief note on joints in gravity dam. (4)

b) Explain chute spillway and side channel spillway. (4)

c) Draw the cross-sections of the zoned earth dam you would select if the materials available are gravel and clayey silt. (2)

8 Check the stability of the gravity dam for the following data. Top width = 5m, freeboard = 3m, u/s FRL depth = 60m, u/s batter =1/10, d/s slope = 0.7H to 1V, u/s remains vertical to a depth of 12m from top. There is no tail water and silt. (10)

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