BACHELOR OF CIVIL ENGINEERING (EVENING) EXAMINATION 2017

(Fifth Year-Evening; Second Semester)

HYDRAULIC STRUCTURES

Time: Three Hours | Full Marks 100 (50 marks for each part)

Use a separate Answer-Script for each part

No. of questions		Part I (50 Marks)	Marks
		*Answer **ANY TWO** questions from this part.* *Assume suitable values for the parameters if not supplied.*	
1	(a)	Write the expression of 'Froude Number'. Derive the expression for critical depth of flow. What are the advantages of 'hydraulic jump'?	1+2+2=5
	(b)	What are the assumptions made in the momentum formula for 'Hydraulic Jump'? Discuss the effect of inclined bed, on the depth estimating equation of 'Hydraulic Jump', derived for horizontal bed. What would be the type of hydraulic jump in case of critical flow?	3+3+1=7
	(c)	Derive the expression of 'Initial Depth' in 'Hydraulic Jump', using momentum formula for horizontal bed.	13
2	(a)	What is 'Canal Fall' structure? Why it is required? Write down brief notes on different types of 'Canal Fall' structures.	2+2+5=9
	(b)	Derive the expression for discharge through a trapezoidal notch. Determine the correlation between full supply depth and half supply depth.	4+3=7
	(c)	Design the size and number of trapezoidal notches required for a 'Canal Fall' structure having the following particulars: Full supply discharge = 12 cumecs; Full supply depth = 1.5m; Bed width = 6.5m.	5
	(d)	Write down the total head loss between the inlet well and downstream full supply level of a siphon well drop.	4
3		Design an aqueduct flumed section for a cross drainage work for the following given data: Canal Data: Discharge = 30.0 Cumecs Bed width = 20.0 m Depth of Water = 1.5 m Full Supply Level (FSL) = 251.50 m RL Drainage Data: High Flood Discharge = 250.0 Cumecs High Flood Level = 252.5 m RL High Flood Depth = 2.5 m General Ground Level 250.0 m Draw (on a graph sheet) the flumed section in plan and show the profile of Total Energy Level (TEL), Water Surface and Bed Level in elevation.	18+7=25

Ref. No. **Ex/CE/5/T/507/2017(Old)**

BACHELOR OF CIVIL ENGINEERING (PART TIME) FIFTH YEAR, SECOND SEMESTER EXAMINATION 2017 (Old)

HYDRAULIC STRUCTURE

Time: Three Hours

Full Marks 100
(50 marks for each part)

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No. of questions	Part II	Marks
	Answering of Question no. 1 is mandatory and any two questions from remaining four. *Assume reasonable values of data, if not supplied.*	
1. i)	What are the functions of groyne?	2
(ii)	Define looseness factor and silt factor.	2
iii)	Write down the functions of under sluice bays.	2
iv)	Draw a typical section through a divide wall with proper leveling.	2
v)	What are the functions of navigation lock?	2
vi)	Write down the difference between silt excluder and silt ejector.	2
vii)	How many types of inspection galleries are provide for construction of dams? What are the purposes of a gallery for which it is formed in the dams?	3
viii)	What are the functions of Dry Dock?	1
2. i)	What is capacity inflow ratio? How it is influenced by the trap efficiency of a reservoir?	3
ii)	For a reservoir the area elevation data is given below. The bottom crest level of dam is 310.82m and the spillway crest is at 314.6.0m. Draw an area elevation curve and capacity curve in a single graph.	14

Elevation	water spread area in sq m	Elevation	water spread area in sq m
310.82	0	314.0	1533049
311.5	20942.4	314.6	2296792
312.0	57591.0		
312.5	135635		
313.0	360765		
313.5	754090		

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BACHELOR OF CIVIL ENGINEERING (PART TIME) FIFTH YEAR, SECOND SEMESTER EXAMINATION 2017 (Old)

HYDRAULIC STRUCTURE

Time: Three Hours

Full Marks 100
(50 marks for each part)

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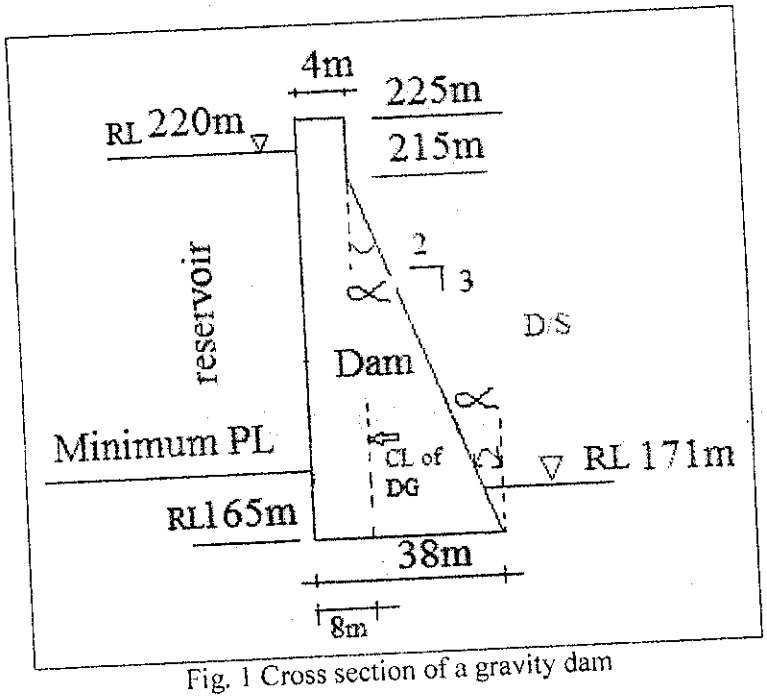
No. of questions	Part II	Marks
3.	Fig. 1 shows the section of a gravity dam built of concrete. Calculate the maximum vertical stresses at the heel and toe; major principal stress at toe and intensity of shear stress on a horizontal plane near toe of the dam. where DG means drainage gallery	17
		
	Fig. 1 Cross section of a gravity dam	
4.		
	i) What is littoral Drift?	3
	ii) What are the considerations governing the choice of a Harbor?	5
	iii) Draw and explain briefly the characteristics elements and zones of a beach profile towards sea.	5
	iv) Write down the different types locks uses in a harbor with proper figures.	4

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BACHELOR OF CIVIL ENGINEERING (PART TIME) FIFTH YEAR, SECOND SEMESTER EXAMINATION 2017 (Old)

HYDRAULIC STRUCTURE

Time: Three Hours

Full Marks 100
(50 marks for each part)

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No. of questions	Part II		Marks
5.	i)	Derive the hydrodynamic pressures on a gravity dam due to earth quake forces of horizontal acceleration according to the (i) Von-Karman and (ii) Zanger with figures.	10
	ii)	What are the load combinations for design a gravity dam?	4
	iii)	What are modes of failure of a gravity dam?	3