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December 2023 (REEXAM)

~~SY~~ /TY/~~B.TECH~~ (SEMESTER - I)

COURSE NAME: IRRIGATION ENGG.II Branch: CIVIL ENGG COURSE CODE: CVUA 31201

(PATTERN 2020)

Time: [2 Hrs] **[Max. Marks: 60]**

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any two sub questions each from each Question 1 ,2, 3,4,5, and 6 respectively**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Define of mass curve, demand curve. Elaborate the significance of mass curve and demand curve and write their applications.	[5]	1	Understand
	b) The runoff data for a river during a lean year are given below. What is the maximum uniform demand that can be met? What is the minimum storage capacity to meet this demand without any spilling?	[5]	1	Apply
	c) Define and write the significance of each term enlisted below. Reservoir Yield, Reservoir planning and reservoir operation curves, Reservoir storage, Reservoir clearance.	[5]	1	Understand
Q2	a) Enlist four conditions favoring for an arch dam. Also state any four types of arch dam and value of most economical central angle for an arch dam.	[5]	2	Understand
	b)Gravity dam has following parameters. Determine Hydraulic pressure on the upstream side of the dam and uplift pressure on the base of the dam considering effect of provision of drainage gallery. 1) Total height of the dam = 94.00 m ,2) Total height of water retained = 90.00 m ,3) Free Board = 4.0 m, 4) Top width = 6.00 m ,5) Upstream slope = 1H:6 V with total height of 60.00 m 6) Total base width = 80.00 m ,7) Coefficient of horizontal earthquake acceleration = 0.1 ,8) coefficient of uplift pressure = 1	[5]	2	Apply
	c) Enlist the types, advantages, and limitations of Buttress dam	[5]	2	Understand
Q3.	a) Design only downstream profile for an Ogee spillway using the following data. Design Discharge = 5000 cumec ,Maximum reservoir level = 500 m, River bed level = 478 m, Effective length of spillway = 400 m, Slope of	[5]	3	Apply

Month	1	2	3	4	5	6
River flow (10^6 m^3)	180	100	35	26	16	48

Month	7	8	9	10	11	12
River flow (10^6 m^3)	212	180	116	92	67	37

	upstream face = vertical , Slope of downstream face = 0.8 H to 1V , Coefficient of discharge 'C' = 2.1 . b) Distinguish between the side channel spillway, chute spillway and shaft spillway c) Classify the spillway crest gates and enlist advantages and disadvantages of spillway crest gates.	[5] [5]	3 3	Apply Apply
Q.4	a) Draw a line sketch showing all the parts of zoned embankment type , homogeneous embankment type and diaphragm type of earthen dams and write advantages of each of these dams. b) Explain in detail the hydraulic fill method and rock fill method of construction of earthen dam c) An earthen dam made of homogeneous material has the following data: level of the top dam = 200 m , level of deepest river bed = 178.0 m ,HFL of reservoir = 197.5 m, Width of top of dam = 4.5 m ,U/S slope = 3: 1, D/S slope = 2: 1, cohesion of soil of the dam = 24 KN/m^2, Length of the hori. Filter from d/s toe , inwards = 25 m ,cohesion of soil of foundation of the dam = 54 KN/m^2, Angle of internal friction of soil in dam = 25^0 Angle of internal friction of soil in foundation = 12^0,Dry wt. of soil in the dam = 18 KN/m^3, Submerged wt. of soil in the dam = 12 KN/m^3,Dry unit wt. of soil in the foundation = 18.3 KN/m^3, coefficient of permeability of the dam material is 5 x 10^{-4} cm/sec. The foundation soil consists of 8 m thick layer of clay having negligible coefficient of permeability, then determine factor of safety against failure due to horizontal shear at base while checking the overall stability of the dam section as a whole.	[5] [5] [5]	4 4 4	Apply Understand Apply
Q.5	a) Draw a typical layout of a diversion head works and explain the use of each component in it . b) A head regulator of canal has 3 openings each 3 m wide. The water is flowing between the upper and lower gates. The vertical opening of the gate is 1 m. The head on regulator is 0.45 m(afflux) if the upstream water level rises by 0.20 m find how much the upper gates must be lowered to maintain the canal discharge unchanged. c) Enlist all the advantages and disadvantages of a weir as well as a barrage.	[5] [5] [5]	5 5 5	Understand and Apply Apply Understand
Q.6)	a) Enlist all the norms of site selection for Cross Drainage work with proper reasoning b) Draw a neat sketch of following C.D. works and explain the use cases of these C.D. works 1) Aqueduct and Syphon aqueduct 2) Super passage and syphon 3) level crossing c) What are river training works? What is the objective of these works? Give classification of river training works	[5] [5] [5]	6 6 6	Understand Apply Understand