Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S6 (PT) (S, FE) Examination December 2024 (2019 Scheme)

Course Code: CET306

Course Name: DESIGN OF HYDRAULIC STRUCTURES

Max. Marks: 100 Duration: 3 Hours

- **Use of Khosla's Chart, Blench Curves, and Montague Curves are permitted in the Examination Hall**
- **Assume suitable design data whichever is necessary**

PART A

Answer one full question from each module, each carries 15 marks. Marks

Module I

1 a) Explain the functions of a fish ladder, divide wall, and silt excluders in a diversion headwork. (6)

b) Distinguish between Khosla's theory from Bligh's theory. (4)

c) Write any five limitations of Bligh's Creep theory. (5)

OR

2 a) A weir on a permeable foundation has a level floor of negligible thickness and is 12m long in the direction of flow. At the two ends of the floor, 3m deep piles are provided. Using Khosla's theory calculate the uplift pressure at the mid-length of the floor. The effective head of water is 3m. (10)

b) Explain the causes of the failure of weirs on permeable soils. (5)

Module II

3 a) Define canal falls and explain any five types of canal falls. (7)

b) Discuss the factors that affect the alignment ~~of~~ a canal. (3)

c) Explain cross-drainage work and the types of cross-drainage work. (5)

OR

4 a) Design an irrigation canal for a discharge of 30 cumecs using Lacey's theory. Assume Lacey's silt factor = 1 and side slopes = ½ : 1 (9)

b) Discuss the purpose of berms, borrow pits, and spoil banks in a canal cross-section (6)

PART B

Answer anyone full question

Module III

5 a) Design a suitable cross drainage work for the following hydraulic particulars: (25)

Canal: Full supply discharge = 25 cumecs

Full supply level = +113.50

Canal bed level = +112.00

Canal bed width = 18m

Canal side slope = 1.5H: 1V

Drainage: High flood discharge = 320 cumecs

High flood level = +110.00

High flood depth = 3.20m

General ground level = +113.10 m

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

i. Half-sectional plan at the foundation level

ii. Longitudinal section along the drain

OR

6 a) (25)

Design a canal drop of 2m for the following data

Details above drop:

Full supply discharge = 4 cumecs

Bed level = + 10m

Bed width = 6 m

Full supply level = + 11.50m

Top of bank 2m wide at level = + 12.50m

Half supply depth = 1m

Side slope = 1:1

Details below drop:

Full supply discharge = 4 cumecs

Bed level = + 8 m

Bed width = 6 m

Full supply level = + 9.50m

Top of bank 2m wide at level = +10.50m

Good soil is available for foundation at level +8.50m

b) Develop the drawings of: (25)

(a) Half sectional plan at foundation level

(b) Section along the centre line of the canal

PART C

Answer one full question from each module, each question carries 10 marks

Module IV

7 a) Discuss the various purposes for which galleries are provided in dams. (3)

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

c) Explain the elementary profile of a gravity dam (4)

OR

8 a) Write a brief note on joints and keys in the gravity dam (4)

b) Explain the various forces acting in a gravity dam (6)

Module V

9 a) Derive the most economical central angle of an arch dam (5)

b) Explain the limitations of thin cylinder theory for arch dams (5)

OR

10 a) Describe briefly the different types of spillways (5)

b) Explain the cause of failure and design criteria of an earth dam (5)

****