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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) / S4 (PT) (S, FE) Examination January 2024 (2015 Scheme)

Course Code: CE302
Course Name: DESIGN OF HYDRAULIC STRUCTURES

Max. Marks: 100 Duration: 4 Hours

Instructions : (i) Use of Khosla's chart, Blench curves and Montague curves are permitted in the examination hall
(ii) Assume suitable data wherever necessary

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) What are the factors to be considered in the selection of site for diversion headworks ? (5)

b) State Bligh's theory. Obtain an expression for the thickness of impervious floor using Bligh's theory (5)

c) Differentiate weir and barrage. Explain the features of different types of weirs (5)

2 a) State the functions of berms in unlined irrigation canals (4)

b) Design an unlined trapezoidal channel using Lacey's theory for the following data : (8)

Discharge : 30 cumecs; mean particle size =0.323 mm; side slope : 0.5H:1V

Also find the longitudinal slope

c) State the limitations of Kennedy's theory (3)

3 a) Explain Khosla's theory and state Khosla's interim conclusions (6)

b) Describe the features of siphon well drop with a sketch. Comment on its suitability (5)

c) Describe the features of (i) canal siphon (ii) level crossing (4)

PART B

Answer any one full question, each carries 50 marks.

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

Canal

Full supply discharge = 30 cumecs
Full supply level=202.5
Full supply depth= 1.3 m
Bed width=20 m

Cross section is trapezoidal with side slope 1.5H:1V

Drain

High flood discharge = 400 cumecs

Bed level=199.3

High flood depth=2.5

General ground level=201.5. A service road of 5 m is to be provided over the structure

b) Prepare the sketches of the following views :
(i) Half sectional plan at foundation level (15)
(ii) Section along the centre line of the canal (10)

5 a) Design a 1.5 m Sarda fall for the following data: (25)

Full supply discharge u/s and d/s=50 m^3/sec
Full supply depth u/s and d/s=2 m
Bed width u/s and d/s=35 m
Full supply level u/s=203.5
Khosla's safe exit gradient =1/5
Canal cross section is trapezoidal with side slope 1H:1V

b) Prepare the sketches of the following views :
(i) Half sectional plan at foundation level (15)
(ii) Section along the centre line of the canal (10)

PART C

Answer any two full questions, each carries 10 marks.

6 a) Obtain an expression for limiting height of gravity dams. What are low dams and high dams ? (5)

b) Explain the functions of galleries and keys in gravity dams (3)

c) What are the common instrumentation facilities provided in the gravity dams ? (2)

7 a) Explain the causes of failure of earth dams (6)

b) What is the major function of a spillway ? Differentiate chute spillways and side channel spillways (2)

c) Explain (i) factor of safety against sliding (ii) shear friction factor in the stability analysis of gravity dams (2)

8 a) Explain the features of different types of arch dams (6)

b) Describe the features of Indian standard stilling basins with sketches (4)

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