

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: CE 302

Course Name: DESIGN OF HYDRAULIC STRUCTURES (CE)

Max. Marks: 100

Duration: 4 Hours

Use of Khosla's Chart, Blench Curves and Montague Curves (signed by the concerned faculty member) may be permitted.

Two answer books may be used if required.

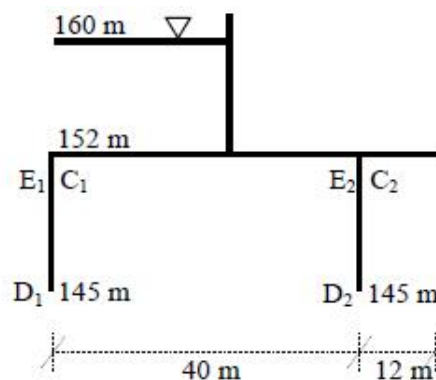
PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1
 - a) What are the general considerations for Canal alignment? (5)
 - b) What are the assumptions of Khosla's theory for design of impermeable foundation? (5)
 - c) What is a Cross Drainage work? Explain the types of Cross drainage work. (5)
- 2
 - a) Draw a neat sketch of layout of a Diversion headwork and explain the functions of components. (10)
 - b) What are the limitations of Bligh's theory of design of impermeable foundation? (3)
 - c) What is a Canal regulator? (2)
- 3
 - a) Design an irrigation channel to carry a discharge of 65 cumecs. Assume Rugosity coefficient = 0.0215. Critical velocity ratio = 1. Channel has a bed slope of 0.15 m/km (8)
 - b) Using Khosla's theory ,determine the pressure at C1 with interference correction (5)

(Use Khosla's curves)



- c) What is the difference between weir and barrage? (2)

PART B

Answer any one full question, each carry 50 marks.

- 4 Design a suitable cross drainage work for the following data at the crossing of a canal and a drainage

CANAL

Full supply discharge = 45 cumecs
Full Supply level = RL 217.00
Canal bed level = RL 213.00
Canal bed width = 20 m
Canal water depth = 1.7 m
Trapezoidal canal section with 1.5 H : 1V slope (50)

DRAIN

High flood discharge = 280 cumecs
High flood level = RL 210
High flood depth = 2.5 m
General ground level = RL 214.00

Prepare the following drawings (not to scale)

- i) Half sectional plan at foundation level
- ii) Section through the centre line of the drain

- 5 Design a Sarda type fall with a drop of 1.5 m for the following data

Upstream

Discharge = $55 \text{ m}^3/\text{s}$
Bed width = 28 m
Bed level = RL 218.00
Full supply depth = 2 m
Full supply level = RL 219.50 (50)

Downstream

Discharge = $55 \text{ m}^3/\text{s}$
Bed width = 28 m
Bed level = RL 216.50
Full supply depth = 2 m

Full supply level = RL 218.00

Prepare the following drawings (not to scale)

- i) Half plan at top and at foundation level
- ii) Longitudinal Section through the centre line of the canal

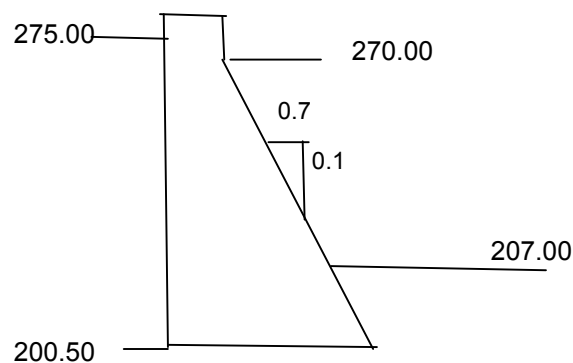
PART C

Answer any two full questions, each carries 10 marks.

- 6 a) What is a Spillway? Explain Ogee type of spillway. (6)
- b) What is meant by Elementary profile of a gravity dam? (2)
- c) What are the functions of Water stops in gravity dam? (2)
- 7 a) What is a Stilling basin? Explain Type I and Type II stilling basins (6)
- b) Explain thin cylinder method of design of Arch dam (2)
- c) What are the functions of gallery in a gravity dam? (2)
- 8 Determine the maximum and minimum vertical stresses at heel and toe, major principal stress at toe and intensity of shear stress on a horizontal plane near toe of the dam.

Weight of concrete = 23.5 kN/m^3 . Top width of dam = 8m, Bottom width = 24 m

Allowable stress in concrete = 2500 kN/m^2



(10)
