

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.*

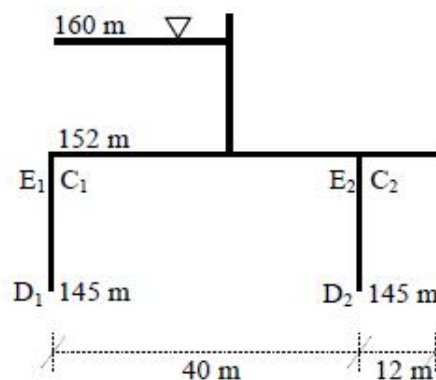
**PART A**

*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 m<sup>3</sup>/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 m<sup>3</sup>/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

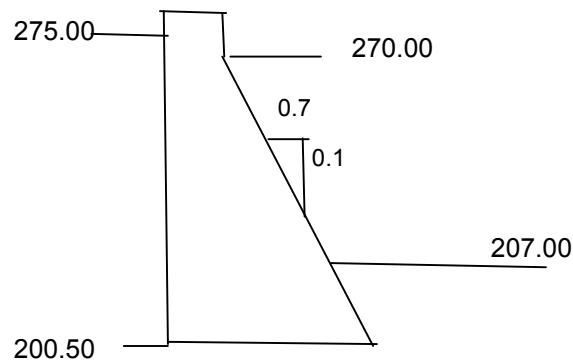
### PART C

*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 =  $23.5 \text{ kN/m}^3$ . Top width of dam = 8m, Bottom width = 24 m

Allowable stress in concrete =  $2500 \text{ kN/m}^2$



(10)

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