

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013****Subject code: 1721203****Date: 03-06-2013****Subject Name: Design of Canal Network and Regulation Work****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain Khosla's solution for a horizontal floor of negligible thickness and length b . **07**
- (b) Determine the uplift pressure at the salient points E, D and C of the d/s pile shown in fig.1. Also determine the exit gradient of this structure. If the permissible value of exit gradient for foundation soil is $1/6$, say whether this structure is safe or not? **07**

- Q.2** (a) State Lacey's silt theory with its limitations. **07**
- (b) State the different causes of failure of weirs founded on permeable soils with remedies. **07**

OR

- (b) Design an alluvial canal by using Lacey's theory from the following data: **07**
- (i) Full supply discharge = 35 cumec.
 - (ii) Roughness coefficient = 0.025
 - (iii) Side slope 1:1
 - (iv) Average CVR = 0.9 to 1.1
 - (v) Standard roughness coefficient of soil $N_a = 0.0225$
- Q.3** (a) Explain the procedure for the design of an alluvial canal by Khosla's theory when bed slope is known. **07**
- (b) Design an irrigation canal to carry a discharge of 20 cumec. Take $N = 0.0225$, $S = 1/2500$ and $m = 1.0$. Use Garrate's diagram. **07**

OR

- Q.3** (a) State the requirements of suitable site for cross drainage works. Describe Aqueduct in detail. **07**
- (b) A siphon aqueduct has single barrel of 3 m diameter, length 90 m, discharge capacity of 25 cumec, f in Darcy-Wiesbach formula 0.013, coefficient of (i) bend loss (2 bends) 0.1, (ii) in expansion at outlet 0.2 and (iii) in contraction of inlet 0.1. Determine afflux. Neglect the velocity of approach. **07**
- Q.4** (a) State the points for the selection of suitable type of canal lining. Explain briefly cement mortar lining. **07**
- (b) What is financial justification of lining a canal? Design a lined canal for 250 cumec discharge, side slope 1.25:1, bed slope 1 in 6666 and $N = 0.013$. Assume permissible velocity = 1.75 m/s. **07**

OR

- Q.4** (a) State different type of fall and explain any two of them in detail. **07**
- (b) Design a meter flume for a distributory of 3 cumec capacity, bed width 6 m, depth = 1.0 m, fall = 0.25 m. Given other data (i) FSL = 101.00, (ii) Bed level = 99.75, (iii) Cistern level = 99.60 **07**

Q.5 (a) State the design criteria for Head Regulator and explain the same by giving neat figure. **07**

(b) Explain the term Outlet. What are the essential requirements of a good outlet? **07**

OR

Q.5 Write Short Notes (Any Four): **14**

- (i) Bligh's creep theory.
- (ii) Drawbacks in Kennedy's and Lacey's theory.
- (iii) Difference between barrage and weir.
- (iv) Khosla's method of independent variables.
- (v) Vertical drop weirs.



