

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- VIIth SEMESTER-EXAMINATION – MAY/JUNE- 2012****Subject code: 170602****Date: 08/06/2012****Subject Name: Irrigation Engineering****Time: 02:30 pm – 05:00 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) Differentiate between the following: **07**
 (i) Sprinkler Irrigation and Drip Irrigation
 (ii) Weir and Barrage
- (b) Write brief notes on the following: **07**
 (i) Benefits and Ill-effects of Irrigation
 (ii) Types of Canal Falls

- Q.2** (a) Explain various irrigation efficiencies. **07**
 (b) Discuss classification of soil moisture. Also explain significance of field capacity and permanent wilting point in deciding frequency of irrigation. **07**

OR

- (b) The following table provides the base period, duty and cultivated area for various crops, which are commanded by a canal off-taking from a reservoir. Determine the reservoir capacity, if losses in the canal and reservoir are 25% and 10% respectively. **07**

Crop	Base Period (day)	Duty at the field (hectare/cumec)	Area under cultivation (hectare)
Sugarcane	330	1500	2500
Cotton	200	1400	3500
Wheat	120	1800	5000
Rice	120	900	2000
Vegetables	120	1000	1500

- Q.3** (a) What are limitations of Kennedy's silt theory? Describe Lacey's regime theory in brief. **07**
 (b) Write short note on water logging and remedial measures to prevent it. **07**

OR

- Q.3** (a) Sketch a typical cross-section of a canal which is partly in cutting and partly in filling. Also, explain balancing depth in canal. **07**
 (b) Design an irrigation channel in alluvial soil using Lacey's theory, for the following data: **07**
 (i) Full supply discharge = 10 cumec
 (ii) Lacey's silt factor = 0.9
 (iii) Side slopes of channel = 0.5 (H) : 1 (V)

- Q.4** (a) Discuss causes of failure of weirs and briefly explain measures to prevent such failures. **07**
 (b) Explain Khosla's method of independent variables for design of a weir. **07**

OR

- Q.4** (a) Draw a typical layout of a diversion headwork founded on a permeable soil. **07**
Explain any three components shown therein.
- (b) Details of an elementary profile of a weir with horizontal floor and a downstream pile are as follows: **07**
- (i) Length of upstream floor = 10 m
 - (ii) Length of downstream floor = 20 m
 - (iii) Height of crest above the floor = 3 m
(No gates are provided over the crest).
 - (iv) Depth of the downstream pile = 4 m
- Invoking Khosla's theory, calculate,
- (i) Uplift pressure at the key points
 - (ii) If thickness of concrete floor at downstream end of the structure is 1.0 m, find the corrected uplift pressures. Also check whether the provided downstream end thickness is safe. Take specific gravity of concrete = 2.24.
 - (iii) Check exit gradient with respect to safe exit gradient of 1/5.

- Q.5** (a) Discuss, in brief, the various types of cross-drainage works on a canal, including conditions of suitability of the each work. **07**
- (b) Explain functions of cross regulator and distributory head regulator. **07**

OR

- Q.5** (a) Discuss the methods for estimation of the design discharge and waterway for a drain at an aqueduct. **07**
- (b) Explain method of finding out uplift pressure on barrels of a siphon aqueduct. **07**

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