

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. Sem. – IInd - Examination – June/July- 2011****Subject code: 1721203****Subject Name: Design of Canal Network and Regulation work****Date: 27/06/2011****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) Discuss the salient features of Kennedy's theory for the design of unlined canal and mention its limitation. **07**
- (b) What are the different types of cross-drainage works that are necessary on a canal alignment? State briefly the conditions under which each one is used. **07**

- Q.2** (a) Derive $P - Q$ and $V - Q - f$ relation from the Lacey's fundamental equations. **07**
- (b) Derive an expression for the average tractive force per unit wetted area that is generated in a trapezoidal channel section of given R and S . **07**

OR

- (b) Determine the dimensions of the irrigation canal by Kennedy's theory for the following data : B/D ratio = 3.7; $N = 0.0225$; $m = 1.0$ and $S = 1/4000$. Also determine the discharge which will be flowing in the channel. **07**

- Q.3** (a) What are modules? What are the requirements of a good module? **07**
- (b) Explain Bligh's creep theory mentioning its limitations. **07**

OR

- Q.3** (a) Define sensitivity and flexibility. Find the relation between sensitivity and flexibility of an outlet. **07**
- (b) What is meant by piping in a hydraulic structure? What are the precautionary methods to avoid the ill effect of piping? **07**

- Q.4** (a) Explain various functions of cross regulators and distributory head regulators. **07**
- (b) Design a vertical drop weir (up to weir wall) for the following data. **07**
- Max. flood discharge = 2800 cumec
 - HFL before construction = 285 m
 - Minimum water level = d/s bed level = 278 m
 - FSL of canal = 284 m
 - Allowable afflux = 1 m

OR

- Q.4 (a)** Explain canal escape in detail. **07**
(b) Design a Sarda type fall (crest and cistern) across a canal **07**
for the following data. Flow conditions on u/s and d/s
remains same.
- FSL discharge = 15 cumec
- Drop = 1.0 m
- FSL depth = 1.8 m
- Bed width = 10 m

- Q.5 (a)** Explain the Hind's method of designing canal transitions. **07**
(b) Explain classification of irrigation canal based on discharge **07**
and relative importance in given network of canal.

OR

- Q.5 (a)** Explain briefly Khosla's Exit gradient concept. **07**
(b) Determine uplift pressure at key points and Exit gradient **07**
for a weir of following data:
Total length of impervious floor = 30 m
Head causing flow = 3.5 m
Depth of u/s pile = 4.0 m
Depth of d/s pile = 6.0 m
