

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2170609

Date: 10/11/2017

Subject Name: Irrigation Engineering

Time: 10:30 AM TO 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**
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| (a) Define saturation capacity, field capacity and wilting point. | 03 |
| (b) State the consideration for location of canal falls | 04 |
| (c) With the help of a neat lay out plan explain the component of storage cum diversion irrigation scheme. | 07 |
- Q.2**
- | | |
|---|-----------|
| (a) Explain the term duty and delta and develop a relationship between them. | 03 |
| (b) Define the terms: crop ratio, overlap allowance, capacity factor and full supply coefficient. | 04 |
| (c) Find out the culturable command area that a tube well can command for a tube well discharge of $120 \text{ m}^3/\text{hr}$ assuming 3200 hours of working per year taking intensity of irrigation 45% and the average depth required for the kharif crop 50 cm. | 07 |

OR

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| (c) Explain average discharge and peak discharge of a canal. A field canal has a culturable command area of 10^7 square meters. The crop X grown in the command area has an intensity of irrigation 50%, kor period 21 days and kor depth 15 cm. Crop Y has intensity of irrigation 40%, kor period 14 days and kor depth 10 cm. Both crops X and Y are rabi crops sown on the same date. Calculate the design discharge of the field channel. | 07 |
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- Q.3**
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|---|-----------|
| (a) Define the terms transpiration, evapotranspiration and consumptive use. | 03 |
| (b) Describe with the help of a neat sketch various forms of soil moisture content and explain available moisture. | 04 |
| (c) Develop a relationship between depth of irrigation water, field capacity, permanent wilting point, root zone depth and dry density of soil. Knowing the daily evapotranspiration how you will decide the irrigation interval. | 07 |

OR

- Q.3**
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|---|-----------|
| (a) Explain Lacey's concept of initial, final and permanent regime | 03 |
| (b) With the help of a neat sketch illustrate the classification of canals based on their alignment. Explain for which alignment the number of cross drainage works will be | 04 |

	minimum and maximum respectively.	
	(c) With the help of neat sketches explain the working of the following components of a weir: silt excluder and fish ladder	07
Q.4	(a) Draw sectional view of a typical barrage. Compare different aspects of a weir and barrage.	03
	(b) Develop an expression for floor thickness of a weir to resist water pressure by self weight.	04
	(c) Draw neat sketches to explain canal cross section in cut, in fill and canal section partially in cut partially in fill. Obtain an expression for balancing depth in terms of section geometry.	07
	OR	
Q.4	(a) Define exit gradient and scour depth and explain their utility in weir design.	03
	(b) Explain uplift forces and arrangements done in the gravity dam to release uplift forces.	04
	(c) Draw a sectional sketch of a head regulator to explain its components and explain how it functions as a drowned weir.	07
Q.5	(a) Define super passage, aquaduct and siphon aquaduct	03
	(b) With the help of a neat sketch explain the working principle and utility of parshall flume in flow measurements of irrigation channels.	04
	(c) Draw a neat sketch to explain the uplift pressure under siphon barrel. Discuss the conditions (i) canal running full and no water in drain (ii) canal empty and drain at high flood level considered for design of barrel floor.	07
	OR	
Q.5	(a) State the functions of the following: bed bars, skimming platforms, canal fall cisterns.	03
	(b) Give a comparison of sub surface drainage and surface drainage used for land reclamation.	04
	(c) Given the value of the design discharge, Manning's N , bed slope, side slope and maximum permissible velocity; give the design steps for the cross section design of a non alluvial channel	07
