Code No: **RT41014** **R13** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, October/November - 2017

WATER RESOURCE ENGINEERING - II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THEE questions from Part-B
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PART–A ***(22 Marks)***

1. a) What is crop rotation? [3]
   b) Distinguish between ridge canal and contour canal [3]
   c) Define a canal fall. [4]
   d) Define consumptive use and list out methods of its estimation. [4]
   e) What are the zones of storage? [4]
   f) What are the measures to control seepage in earth dams? [4]

PART–B ***(3x16 = 48 Marks)***

2. a) Develop relation between duty and delta. [8]
   b) After how many days do you supply water for irrigation, given the following data.

Soil field capacity	:	24%
Plant wilting point	:	13%
Density of soil	:	1.7 g/cm^3
Plant root zone depth	:	100 cm
Daily consumptive use	:	1.4 cm

[8]

3. a) What are the features of Lacey's method of design of irrigation channels [8]
   b) Design an irrigation channel based on Kennedy's theory with the following details

Discharge	:	56 cumec
Bed Slope	:	1 in 7000
Critical Velocity Ratio m	:	1.05
Rugosity coefficient	:	0.02

[8]

4. a) Differentiate between weir and barrage. Explain with neat sketch. [8]
   b) Bring out features of a river training work. [8]

5. a) What are the components of a diversion head work? Draw the layout and show the components. [8]
   b) Explain the Bligh's theory of design of weirs on permeable foundations. How is it different from Khosla's theory? [8]

6. Write short note on the following
   a) Galleries in gravity dams
   b) Foundation treatment of gravity dams
   c) Determination of principle shear stress in gravity dams. [16]

7. a) How are the failures of earth dams classified? [8]
   b) Explain how energy dissipation arrangements are made below a spillway. [8]

Code No: **RT41014** **R13** **Set No. 2**

IV B.Tech I Semester Regular/Supplementary Examinations, October/November - 2017

WATER RESOURCE ENGINEERING - II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THEE questions from Part-B
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PART–A *(22 Marks)*

1. a) What are methods of application of irrigation water? [3]
   b) What is a contour canal? What are its benefits? [3]
   c) Where is canal syphon adopted? [4]
   d) What is exit gradient? [4]
   e) Explain how force due to waves in a reservoir, can be found [4]
   f) Discuss ogee spillway [4]

PART–B *(3x16 = 48 Marks)*

2. a) Discuss the standards of quality for irrigation water. [8]
   b) Find the frequency of irrigation if the following data is given.

Field capacity	:	26%
Wilting point	:	14%
Density of soil	:	1.7 g/cm^3
Root zone depth	:	1.2 m
Daily consumptive use	:	15 mm

[8]

3. a) Compare the design principles of channels by Kennydy's and Lacey's methods. [8]
   b) Design an irrigation channel for the following data

Water Discharge	:	33 m^3/Sec
B/D Ratio	:	4
Critical Velocity Ratio	:	1.02
Rugosity Coefficient	:	0.022

[8]

4. a) What is a cross drainage work? List out different types and discuss them [8]
   b) List different types of canal outlets and discuss them. [8]

5. The line diagram of a weir on permeable foundation has the following details

Length of floor	: 40 m
Number of piles	: 1 (Intermediate pile)
Distance of Intermediate pile from upstream end	: 10 m
Depth of intermediate pile	: 5 m
Depth of water held on the upstream side	: 4 m

Draw the line diagram and find out out the uplift pressure at 20 m from the downstream point using Bligh's theory and Lane's weighted theory. [16]

6. A concrete dam 15 m high is trapezoidal in section with a top width of 1m and bottom width of 8.25m. The upstream face has a batter of 1:15. The water is stored up to 15m height. There is no downstream water. Find the factor of safety against sliding. Consider water force, self weight and full uplift pressure. Assume unit weight of concrete and water suitably. [16]

7. a) What are different types of spill way gates? [8]
   b) What is a phreatic line? How do you draw it to estimate seepage through an earth dam? [8]

Code No: **RT41014** **R13** **Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, October/November - 2017

WATER RESOURCE ENGINEERING - II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THEE questions from Part-B
Khosla's curves will be supplied

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PART–A ***(22 Marks)***

1. a) Explain what you understand by wilting point. [3]
   b) What do mean by economic cross section of a canal? [3]
   c) Differentiate between head regulator and cross regulator [4]
   d) Discuss the failure of rupture of a weir, due to uplift pressure [4]
   e) What is reservoir sedimentation? [4]
   f) What is a stilling basin? [4]

PART–B ***(3x16 = 48 Marks)***

2. a) Discuss different methods of application of irrigation water . [8]
   b) Find the delta for a crop if the following details are given
   Duty at the head of water supply source : 2200 hectares per cumec
   The period between first and last watering : 142 days [8]

3. a) Discuss the Kennedy's theory of design of irrigation channels. [8]
   b) Design an irrigation channel using Lacey's theory for the following data
   Discharge : 55 m^3/sec
   Silt factor : 1.02
   Side Slope : ½ : 1 [8]

4. a) Write about the following features of canal outlets
   Sensitivity
   Flexibility
   Proportionality [8]
   b) Explain the features of river training work [8]

5. A weir has got a horizontal floor laid on permeable foundation. The length of the floor is 30 m. An intermediate pile of depth 7 m is at a distance of 10 m from the upstream end. The depth of water on the upstream side is 4m. Find the uplift pressures at the key points of the intermediate pile using Khosla's curves. [16]

6. a) Explain how you will select site for a reservoir [8]
   b) What is elementary profile of a gravity dam? What is the base width of the elementary profile? [8]

7. a) How are the earth dams classified? [8]
   b) List out types of spillways and discuss them. [8]

Code No: **RT41014** **R13** **Set No. 4**

IV B.Tech I Semester Regular/Supplementary Examinations, October/November - 2017

WATER RESOURCE ENGINEERING - II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THEE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) What is consumptive use of water? What are the units? [3]
   b) What is a canal and what are economic benefits associated with it? [3]
   c) Where do you provide drop in a canal? [4]
   d) What is exit gradient? What are the units? [4]
   e) What is practical profile of a gravity dam? [4]
   f) What different types of spillways? [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain different types of Irrigation efficiencies. [8]
   b) A crop requires a total depth of water of 130 cm. Find the duty of water if the base period for the crop is 100 days. [8]

3. a) What do you mean by economic cross section of a canal? [8]
   b) Explain the design features of Lacey's theory of design of irrigation channels. Design an irrigation channel for the following data using the same theory. Discharge : 63m^3/sec, Silt factor : 1.00, Side Slope : ½ : 1 [8]

4. a) Explain the design principles of Sarda type fall [8]
   b) What is a regulator? Differentiate between head regulator and cross regulator [8]

5. a) Discuss the types of failure of a weir founded on a permeable foundation [8]
   b) Compare Bligh's theory and Khosla's theory of design of weirs on permeable foundations. [8]

6. A gravity dam has the following details
   Top width : 2m
   Bottom width : 14 m
   Slope of U/S face : Vertical
   Depth of Water on U/S : 20 m
   Depth of Water on D/S : 0 m
   Height of free board : 2.5 m
   Find the factors of safety against sliding of the gravity dam about base. Take unit weight of dam material as 24 KN /m^3 and consider water load, self weight and full uplift load. [16]

7. Write short note on the following
   a) Ogee spillways b) Types of crest gates [16]