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# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### TEST - 1

**Even Semester**: 2018-19 | **Date**: 06 March 2019

**Course Code**: CIV 207 | **Time**: 1 Hour

**Course Name**: Hydraulic Structures and Irrigation Engineering | **Max Marks**: 40

**Programme & Sem**: B.Tech (CIV) & IV Sem | **Weightage**: 20%

**Instructions:**

*(i) Answer all the questions.*
*(ii) Use of non-programmable calculators is permitted.*
*(iii) Assume relevant data, wherever required.*

### Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3Qx4M=12)

1. Define Saturation Capacity and Field Capacity.
2. What is the effect of excess sodium in irrigation water on the crops? How can we remediate this effect?
3. Water is diverted to a 32 hectare field at a rate of 10 $m^3/s$ for 4 hours. Soil probing after irrigation showed that 0.3 m of water had been stored in the root zone. Determine the water application efficiency for this case.

### Part B

Answer **both** the Questions. **Each** question carries **eight** marks. (2Qx8M=16)

4. Define Duty and Delta. Derive a relationship between Duty (D) and Delta (Δ).
5. Water is released at the rate of 10 $m^3$/sec at the head of the canal. Estimate the area that can be irrigated if duty at field is 1220 ha/cumec and transition loss of water is 18%.

### Part C

Answer the Question. Question carries **twelve** marks. (1Qx12M=12)

6. (a) What is balancing depth for an irrigation canal?

   (b) Find the balancing depth of a canal carrying irrigation water for a stretch of 15 km, whose bed width is 5 m, top width of the filling is 2.5 m, slopes in cutting and filling are 1H:1V and 1.5H:1V respectively, taking the full supply depth as 3.5 m and free board as 0.5 m.

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GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### TEST - 2

**Even Semester**: 2018-19 | **Date**: 16 April 2019

**Course Code**: CIV 207 | **Time**: 1 Hour

**Course Name**: Hydraulic Structures and Irrigation Engineering | **Max Marks**: 40

**Program & Sem**: B.Tech (CIV) & IV Sem | **Weightage**: 20%

**Instructions:**

*(i)* ***Answer all the questions***

*(ii)* ***Use of Non-programmable calculators is permitted***

*(iii)* ***Assume suitable data, if necessary, by stating it clearly***

### Part A

Answer **all** the Questions. **Each** Question carries **two** marks. (4Qx2M=8)

1. What are the requirements of a good module?
2. With a neat Sketch mention the conditions when the following Cross Drainage Works are provided:

   i) Syphon Aqueduct; ii) Super Passage
3. Calculate how much salt is added to a land with 100ha area, 1000 mm/year irrigation with the water salinity of 1.25 dS/m.
4. Classify the Dams according to

   i) Height of the Dam; ii) Statical design of the Dam body

### Part B

Answer **both** the Questions. **Each** Question carries **six** marks. (2Qx6M=12)

5. Draw a neat sketch of a layout of a diversion headwork, explain the functions of any four component.
6. List six types of canal falls used in canal regulation works and explain any three with neat sketch.

### Part C

Answer **both** the Questions. **Each** question carries **ten** marks. (2Qx10M=20)

7. What are the Limitations of Bligh's Theory in the design of impervious floor for subsurface flow? How it has been improved by Lane's Weighted Creep Theory

8. Design Mitra's hyperbolic transistors (Contraction and Expansion) with constant water depth throughout for an aqueduct with following data:

   i) Bed width of the normal canal = 20 m

   ii) bed width of the flumed canal = 10 m

   iii) Length of transition, for U/S = 10 m and for D/S 15m

   Tabulate the flumed section dimensions at an interval of 2 m and Draw both the transitions (contraction and expansion)

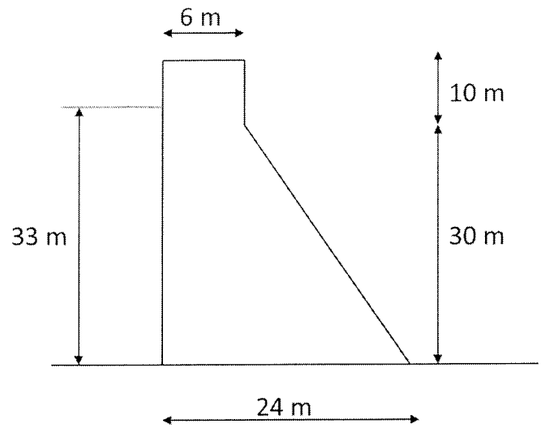


Figure1.

7. For a homogeneous earth dam 50 m high and 2 m free board, a flow net was construct and the following results have been obtained:
   Number of equipotential drops= 24
   Number of flow channels = 4 and
   The dam has a horizontal filter of 40 m at its downstream end.
   Calculate the discharge per meter length of the dam if the coefficient of permeability of dam material is $3 \times 10^{-3}$ cm/sec

8. a) what are the five essential requirement of spillway
   b) Why it is necessary to have energy dissipaters at the downstream of the spillway
   c) Write an equation to calculate the height of the jump when the water is flowing over an ogee spillway, support your answer with sketch.



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GAIN MORE KNOWLEDGE
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# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### END TERM FINAL EXAMINATION

**Even Semester**: 2018-19 | **Date**: 23 May 2019

**Course Code**: CIV 207 | **Time**: 3 Hours

**Course Name**: Hydraulic Structures and Irrigation Engineering (HSIE) | **Max Marks**: 80

**Program & Sem**: B.Tech & IV Sem | **Weightage**: 40%

**Instructions:**

*(i) Answer all the questions*
*(ii) Use of Non-programmable calculators is permitted*
*(iii) Assume suitable data, if necessary, by stating it clearly*

## Part A

Answer **all** the Questions. **Each** question carries **one** mark. (20Qx1M=20M)

1.

i. A land is said to be water-logged when
   A. the air circulation is stopped in the root zone due to the rise in water table
   B. it is submerged in flood
   C. the soil pores within a depth of 40 cm are saturated
   D. all of the above

ii. The crops require maximum water during
   A. first watering before sowing the crops
   B. last watering before harvesting
   C. first watering when the crop has grown a few centimeters-
   D. all of the above

iii. Which of the following statement is correct as a Preventive measures to control waterlogging.
   A. Providing inefficient surface Drainage.
   B. Increasing percolation from canals.
   C. Adoption of sprinkler method for irrigation
   D. All of the above

iv. Crop ratio is the ratio of area irrigated
   A. in Rabi season to Kharif season
   B. in Kharif season to Rabi season
   C. under perennial crop to total crop
   D. under perennial crop to non-perennial crop

v. Kennedy, in his silt theory, assumed that the silt is kept in suspension because of eddies generated from the

A. bed only
B. sides only
C. whole perimeter
D. any one of these

vi. Which of the following statement is correct?

A. The gravity water is harmful to the crops.
B. The hygroscopic water remains attached to the soil molecules by chemical bonds.
C. The capillary water is utilised by the plants
D. Both A and B

vii. In Syphon aqueduct, the allowable velocity in barrel will be

A. 1 – 1.5 m/s
B. 2 – 3 m/s
C. 3 – 4 m/s
D. None of the above

viii. The causes of failure of earth dam as per the percentage of failure are as follows:

A. Hydraulic failures (40%)
B. Structural failures (33%)
C. All of the above
D. None of the above

ix. Which of the following statement(s) are correct about Krishnarajsagar (KRS) dam

A. Length: 3.5km
B. River: Kapila
C. Type: Masonry Dam
D. Both A and C

x. 45 $m^3$ of water was pumped into a farm distribution system. 36 $m^3$ of water is delivered to a turnout (at head ditch) which is 2 km from the well, the Conveyance Efficiency will be

A. 83.34%
B. 90.12%
C. 84.44%
D. None of the above

xi. The river having flow for very short periods following heavy rainfall or snowmelt is known as----------

xii. A structure constructed in an irrigation canal for the purpose of removing surplus water, is known as a ----------



xiii. The kor depth for rice is 190 mm and kor period is 14 days. The outlet factor for this will be ---------- hectares/$m^3$/sec

xiv. The soil becomes, practically, infertile if its pH value is----------

xv. Under normal flood situations, the main spillways may be operated but if the flood is excessive, ---------- can be brought into operation.

xvi. Uplift pressure is the downward pressure exerted by water as it seeps through the body of the dam or its foundation---**True/False**

xvii. The term balancing depth has the same meaning as the depth of water in canal. --- **True/False**

xviii. Bligh's Creep Theory proposed a weightage factor of 1/3 for horizontal creep as against the 1 for vertical creep. --- **True/False**

xix. Leaching should preferably be done when the soil moisture content is low and the ground water table is deep. --- **True/False**

xx. If the height of the dam is between 10m and 15m and, if the reservoir capacity is larger than 1 Million $m^3$, then International Commission on Large Dams (ICOLD) accepts the dam as big. --- **True/False**

## Part B

Answer **all** the Questions. **Each** question carries **six** marks. (4Qx6M=24M)

2. Enlist twelve important factors to be considered for the selection of site for a dam
3. Dams are not designed to take any tension load. Justify
4. Compare to earth and rock fill dams list six advantages and four disadvantages of gravity dams.
5. Name five principle types energy dissipaters for spillways and explain hydraulic jump stilling basins.

## Part C

Answer **all** the Questions. **Each** question carries **twelve** marks. (3Qx12M=36M)

6. Calculate the following forces on dam shown in figure 1.
   i) Weight of the dam
   ii) Water Pressure
   iii) Uplift Pressure
   iv) Wave Pressure and
   v) Earthquake

   Take: $\gamma_m$ = 2500 kg/$m^3$, $\gamma_w$ =1000 kg/$m^3$, $h_w$ = 1.5 m