Ref. No. Ex/CE/T/225/2018

# BACHELOR OF CIVIL ENGINEERING EXAMINATION 2018

(Second Year, Second Semester)

## IRRIGATION ENGINEERING

Time: Three Hours

| Full Marks: 100 |
|---|
| Part I: 60 Marks<br>Part II: 40 Marks |

*Use a separate Answer-Script for each part*

| Question No. | | PART I (60 Marks) | Marks |
|---|---|---|---|
| | | *Answer any **THREE** questions from this PART.*<br>*Assume suitable values for the parameters if not supplied* | |
| 1 | (a) | When a land said to be water-logged area? What are the ill effects of water-logging? Explain briefly. | 1+3=4 |
| | (b) | Explain the causes of water-logging. | 8 |
| | (c) | Explain the controlling measures for water-logging. | 8 |
| 2 | (a) | Discuss the causes of meandering. What are the governing variables of meandering process? | 2+3=5 |
| | (b) | What are meander indices? Explain briefly with neat sketches. | 4 |
| | (c) | What may the reason behind formation of oxbow lake? Explain briefly with neat sketch. | 3 |
| | (d) | What is the objective of river training works? | 4 |
| | (e) | Note down the classification of river training work? Explain briefly. | 1+3=4 |
| 3 | (a) | Who has given the concept of regime initially? Who has modified the same? Compare those. | 1+3=4 |
| | (b) | Design a regime channel for a discharge of 50 cumecs and silt factor 1.1, using Lacey's theory. | 6 |
| | (c) | Find out the normal water depth and velocity in a channel carrying a discharge of 12 cumecs and having bed width 5m. Assume Manning's n=0.0225, Bed slope = 0.0020, and Side slope 1.5 (H): 1(V). | 7 |
| | (d) | Prove that the shear stress required to move a grain on the bank is less than the shear stress required to move the grain on bed. | 3 |
| 4 | (a) | What is the importance of rivers and necessities of controlling them? | 3 |
| | (b) | What is the importance of study on sediment transport? | 3 |
| | (c) | How the rivers can be classified on the basis of topography and Flood Hydrograph? Explain briefly. | 2+6=8 |
| | (d) | How the river flood plain can be classified? Explain briefly. | 1+3=4 |
| | (e) | Differentiate between 'bends' and 'meanders' of rivers. | 2 |

Form A: Paper-setting Blank. Ref No. Ex/CE/T/225/2018

# B.E. CIVIL ENGINEERING SECOND YEAR
## SECOND SEMESTER EXAM 2018

(~~1st~~/2nd Semester/~~Repeat/Supplementary /Spl. Supplementary /Old/Annual/Bi-Annual~~)

## SUBJECT: IRRIGATION ENGINEERING

(Name in full)

## PAPER ××××

Time: ~~Two hours~~/ Three hours/~~Four hours/Six hours~~ Full Marks ~~30~~/100

(~~15~~/40 marks for this part)

Use a separate Answer-Script for each part



No. of Question | Part -II | Marks

[redacted]

- *Maintain neatness.*
- *Assume reasonable data if it is not supplied.*
- *Answer any two questions*

[redacted]

- No code etc. will be needed to answer the questions of this part

(1)(a) Discuss 'check flooding' method of application of irrigation water to the field with the help of a neat sketch. 5

(b) Between the drip irrigation method & sprinkler irrigation method, which one will be preferred by you & why? 5

(c) What is meant by surface & sub surface irrigation? How flow irrigation differs from lift irrigation? 2+2+3=7

(d) Distinguish between Perennial and Flood Irrigation. 3

(2)(a) Define "Duty" and "Delta" and derive their relationship. 6

(b) What is Kor watering? 2

(c) When are the conventionally official dates of start & end of rabi & kharif season? 2

(d) What are meant by optimum utilization of water? 3

(e) What is meant by-'consumptive use of water' for a crop? 2

(f) Using Blaney-Criddle formula, estimate the PET of an area for the season June to October in which rice (k for rice = 1.10) is grown. The area is in south India with mean monthly temperature and monthly day time hours percentages ($P_h$ ) as follows : 5

| Month | June | July | Aug | Sept. | Oct. |
|---|---|---|---|---|---|
| Monthly mean temp. (in °c) | 31.5 | 31.0 | 30.0 | 29.0 | 28. 0 |
| $P_h$ | 8.80 | 9.05 | 8.83 | 8.28 | 8.26 |

(3)(a) Briefly explain the advantages of lined channel in comparison with earthen channel. 5

(b) An unlined canal giving a seepage loss of 3.0 cumecs per million square metres of wetted area is proposed to be lined with 10cm thick cement concrete lining, which costs Rs.240/- per 10 $m^2$. Using following data, work out the economics of lining & benefit cost ratio: 10

(i) Life of lining: 45 years
(ii) Annual revenue per cumec of water from all crops Rs.3.5 lakhs.
(iii) Discharge in the channel: 85 cumecs
(iv) Area of the channel: 42$m^2$
(v) Wetted perimeter of the channel: 18.3m
(vi) Wetted perimeter of the lining: 18.1 m
(vii) Annual maintenance cost of unlined channel: Rs. 1.0/per 10 $m^2$.
(viii) Seepage loss in lined canals; 0.04 cumec per million $m^2$ wetted area
(ix) Percentage savings of annual maintenance charges in lined canals, out of annual maintenance charges for unlined canal: 37%
(x) Rate of interest:6.3%

(c) What are the different types of canal linings? 5

End of the Question