

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING EXAMINATION 2024

(Third Year, First Semester, Supplementary)

**Water Resources Engineering II
[WRE II]**

Time: Three Hours

Full Marks 100

Use a separate Answer-Script for each part. Each part carries equal marks

Q No	Part I (50 Marks)		Marks
Attempt all questions from this PART.			
<i>Assume suitable values for the parameters if not supplied</i>			
1	(a)	Define the balancing depth for excavating a channel. Why the balancing depth calculation is necessary?	CO3 2+2=4
	(b)	Draw neat sketch to show a typical cross-section of an Irrigation Canal.	CO3 4
	(c)	What is 'Berm' and 'Back Berm'? Explain the utility in brief.	CO3 5
	(d)	Design a canal to carry a discharge of 30 cumecs having sediment load concentration 40 ppm by weight. The average grain size of the bed material is 0.25mm. Assume the cross-section of the canal is trapezoidal with side slope 0.5(H): 1(V).	CO3 12
2	(a)	How the rivers can be classified? Explain briefly.	CO4 4
	(b)	How the river can be classified as tidal stretch? Explain briefly.	CO4 4
	(c)	Differentiate between 'bends' and 'meanders' of rivers. Explain the causes of meandering?	CO4 4
	(d)	What is river meandering and how it differs from river bends?	CO4 3
	(e)	What are the governing variables for meander process? Explain briefly.	CO4 5
	(f)	What are the meander indices? Explain briefly.	CO4 5

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B.E. CIVIL ENGINEERING THIRD YEAR
FIRST SEMESTER SUPPLEMENTARY EXAM 2024
SUBJECT: WATER RESOURCES ENGINEERING II
 (Name in full)

PAPER ××××

Time: Three hours

Full Marks =100

(50 marks for part I and 50 Marks for part II)

Use a same Answer-Script for each part

No. of Question Part -II CO Marks

- 1) Answer question number 1 and question number 2 in Group A.15 MCQ from Group B (out of 17 MCQ).
 2) Assume reasonable values of data if it is not supplied.
 3) Answer the Part 1 and Part 2 separately.
 4) There is no need of any code etc. for answering Part-II.
 5) In the cases where excess number of questions will be answered exceeding the required number of question/s, the first required number of question/s will be evaluated only.

Group A

- (1)(a) Write short notes on the "necessity of irrigation in India." [CO1] 2
 (b) What is KOR watering? [CO1] 2

Answer any three among (c), (d), (e), (f)

- (c) Determine the time required to irrigate a strip of land of 0.06 hectares in area from a tube well with a discharge of 0.05 cumecs. The infiltration capability of soil is taken as 6 cm/ hour and the average depth of flow on the field as 8 cm. [CO1] 3 + 2 =5
 Also determine the maximum area that can be irrigated from this tube well?
 (d) How furrow irrigation differs from border flooding techniques? [CO1] 2
 (e) Discuss the common advantages of the sprinkler system of irrigation and drip irrigation method. [CO1] 5
 (f) Classify Indian soil in perspective of the Agriculture. [CO1] 5

Answer (3) (a) and (3) (b).

- (3)(a) Wheat is to be grown at a certain place, the useful climatological conditions of which are tabulated below in the Table. Determine the evapotranspiration and consumptive irrigation requirement of wheat crop. Also determine the field irrigation requirement if the water application efficiency is 80%. Make use of Blaney Criddle equation and a crop factor equal to 0.8. [CO2] 7

Month	Monthly Temp(°C) averaged over last five years	Monthly % of day time hour of the year	Useful rainfall (cm) Averaged over last five years
November	18.0	7.20	1.70
December	15.0	7.15	1.42
January	13.5	7.30	3.01
February	14.5	7.10	2.25

- (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 12cm thick cement concrete lining, which costs Rs.170/- per 10 square metres. Given the following data work out the economics of lining & cost benefit ratio: [CO2] 9
 (i) Life of lining: 50 years
 (ii) Annual revenue per cumec of water from all crops Rs.3.33 lakhs.
 (iii) Discharge in the channel: 85.0 cumecs
 (iv) Area of the channel: 40.5 m²

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Use a same Answer-Script for each part

- (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 m².
- (viii) Seepage loss in lined canals; 0.04 cumec per million m² wetted area
- (ix) Percentage savings of annual maintenance charges in lined canals, out of annual maintenance charges for unlined canal: 36%
- (x) Rate of interest: 7.2%

Group B

- Answer any 15 MCQ only from the available 17 MCQs. Each MCQ is carrying 1 mark.
- Some MCQ question may have more than one correct alternative, so examine each alternative of each MCQ before giving your choice of the concerned MCQ.
- Giving all alternatives of any MCQ as your choices as correct answers of the concerned MCQ, will lead to zero marks for the concerned MCQ.
- If anyone attempts more than 15 MCQ, then the first 15 MCQ will be evaluated and considered only and the other extra MCQ will not be evaluated and will not be considered.
- Assume reasonable data if it is not supplied. Maintain neatness.
- All drawings must be drawn by pencil.
- All the notations used here for their conventional meanings.
- No code etc. will be needed to answer the questions of this part.

✓ Instructions (with examples) for giving answers to MCQ in this part:**Suppose you have to answer following MCQ in your answer script:**

MCQ 1) Name of the present president of the India

- a) Ramnath Kobind,
- b) Narendra Modi,
- c) Draupadi Murmu,
- d) None of the above.

MCQ 2) Dhoni is

- a) Captain of the Indian Cricket team.
- b) Husband of Shakshi,
- c) President of the BCCI,
- d) All of the above.

MCQ 3) Within the last few months

- a) Russia attacked Ukraine,
- b) The economic condition of Srilanka became very bad,
- c) China attacked India,
- d) All of the above.

Then during giving answer in your answer scripts, you have to give the answers of the above MCQ in the following style only:

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(50 marks for part I and 50 Marks for part II)

Use a same Answer-Script for each part

Part -I

Answer to MCQ 1) - c) Draupadi Murmu,

Answer to MCQ 2) - b) Husband of Shakshi,

Answer to MCQ 3) - a) Russia attacked Ukraine,

b) The economic condition of Srilanka became very bad,

Note:

(A) In MCQ 2, if anyone give alternative "a" as one of the correct alternative, he/she is wrong as Dhoni was (not "is") Captain of the Indian Cricket team. So, read each word of the alternatives very carefully before giving your answer.

(B) In MCQ 3, if anybody chooses either alternative "a" or alternative "b" as the correct alternative, he/she will get 0.5 marks as there were two correct alternatives.

(C) There is no negative marking for choosing wrong alternative as your choice in any MCQ

Choose the correct alternative/ alternatives for any 15 MCQ from the following 17 MCQ:

No. of Question	<u>Part -II</u>	CO	Marks
1) The percentage of Indian population which is directly dependent on agriculture, is		[CO1]	1
(A) More than 80%			
(B) More than 75%			
(C) More than 70%			
(D) None of the above			
2) Wild flooding		[CO1]	1
(A) is controlled by levees			
(B) is not controlled by levees			
(C) partially controlled by levees			
(D) is same as border flooding			
(E) (A) and (D) of the above			
3) 1000 m ² to 8000 m ² area of cultivation is generally noticed in		[CO1]	1
(A) Border Flooding			
(B) Check Flooding			
(C) Ordinary Flooding			
(D) All of the above			
4) In the method of _____ irrigation, the area wetted varies from 1/2 to 1/5 of total area over which crops are grown. The blank space should be filled by:		[CO1]	1
(A) Border Flooding			
(B) Furrow			
(C) Sprinkler			
(D) None of the above			
5) _____ is the densest and heaviest type of soil. The blank space should be filled by:		[CO1]	1
(A) Sand			
(B) Clay			
(C) Silt			
(D) None of the above			

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Use a same Answer-Script for each part

- 6) Mountain Soils: [CO1] 1
 (A) Are found in the Himalayas
 (B) Contain significant amounts of organic matter
 (C) Cannot be easily drained out
 (D) None of the above
- 7) The water above the watertable: [CO1] 1
 (A) is known as soil-moisture
 (B) is known as ground water
 (C) is known as potential water
 (D) (A) and (C) of the above
- 8) When the soil very dry, there may be need of: [CO1] 1
 (A) Drip Irrigation
 (B) Paleo irrigation
 (C) Sprinkler Irrigation
 (D) Both (A) and (B)
- 9) Time factor help to: [CO1] 1
 (A) Correlate with capacity factor
 (B) Supply discharge in a canal during a period to its designed full capacity
 (C) Check the dangers of over irrigation
 (D) None of the above
- 10) _____ is the ratio of the area actually irrigated by the cultivators to the mean supply discharge set out from the outlet of the distributary over the crop period. The blank space should be filled by: [CO1] 1
 (A) Duty
 (B) Nominal Duty
 (C) Storage Duty
 (D) None of the mentioned above
- 11) If the discharge at concave side is more [CO1] 1
 (A) The curve should have less radius
 (B) The curve should have more radius,
 (C) The curve should have immediately another adjacent reverse curve
 (D) None of the above
- 12) Raha is also known as [CO1] 1
 (A) Persian wheel,
 (B) Paddle wheel,
 (C) Archimedean screw,
 (D) None of the above
- 13) The irrigation water should be supplied as soon as the moisture falls up to: [CO2] 1
 (A) The field capacity moisture content
 (B) The optimum level of moisture content
 (C) The permanent wilting point
 (D) None of the above

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- 14) We can measure the consumptive use through: [CO2] 1
(A) Blaney-Criddle Equation,
(B) Penman's equation,
(C) Hargreaves class B pan evaporation method,
(D) All of the above
- 15) In estimation of consumptive use, the monthly per cent of annual day light hours for a particular month, depends on [CO2] 1
(A) Number of Days in the particular month
(B) Position of the month is respect of closeness to summer solstice
(C) Latitude of the place (of which the monthly percentage are in consideration)
(D) All of the above
- 16) Evaporation losses are generally of the order of: [CO2] 1
(A) 2 to 3 percent of the total losses,
(B) below 2 percent of the total losses,
(C) above 3 percent of the total losses,
(D) None of the above
- 17) The seepage loss in channels can be occurred either through [CO2] 1
(A) Percolation,
(B) Absorption,
(C) Evaporation,
(D) None of the above

End of Questions