

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING EXAMINATION 2024

(Third Year, First Semester)

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)	Derive the expression for estimation of 'Average Unit Tractive Force' acts on channel bed and draw the sketch by showing the distribution of 'Tractive Force' on bed and both the banks.	CO3 7
	(e)	Find out the normal water depth and velocity in a channel carrying a discharge of 15 cumecs and having bed width 4.0m. Assume Manning's $n=0.0220$, Bed slope = 0.0010, and Side slope 2(H): 1(V).	CO3
2	(a)	How the rivers can be classified on the basis of topography? Explain briefly.	CO4 4
	(b)	How the river flood plain can be classified? 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

[Turn over

**B.E. CIVIL ENGINEERING THIRD YEAR
FIRST SEMESTER EXAM 2024**

(Name in full)

**WATER RESOURCE ENGINEERING II
PAPER II**

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

Part –II

- **Answer any 25 MCQ only from the available 30 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 25 MCQ, then the first 25 MCQ will be evaluated and considered only and the other extra MCQ will not be evaluated and will not be considered.**
- **Either Question 31 or Question 32 (apart from the MCQ questions in this part) has to be answered.**
- **Then Question 33 has to be answered. This question is mandatory.**
- 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 prime minister of the India

- a) Jawaharlal Nehru,
- b) Narendra Modi,
- c) Manmohan Singh,
- d) None of the above.

MCQ 2) Virat Kohli is

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

MCQ 3) Within the last few months

- a) Israel attacked Palestine,
- b) IIC World Cup has been started,
- 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:

Part –II

Answer to MCQ 1) : b) Narendra Modi,

Answer to MCQ 2) : b) Husband of Anuska Sharma,

Answer to MCQ 3) : a) Israel attacked Palestine,

b) IIC World Cup has been started,

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FIRST SEMESTER EXAM 2024**

(Name in full)

**WATER RESOURCE ENGINEERING II
PAPER II**

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.....
Note:

(A) In MCQ 2, if anyone give alternative "a" as one of the correct alternative, he/she is wrong as Virat Kohli 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 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.

Group- A**Choose the correct alternative/ alternatives for any 25 MCQ from the following 30 MCQ:**

Question	CO	Marks
1) The percentage of Indian population which is directly dependent on agriculture, is (A) More than 80% (B) More than 75% (C) More than 70% (D) None of the above	CO1	1
2) In free flooding (A) Water application efficiency is low (B) land preparation cost is low (C) Labour requirements are not low (D) All the above	CO1	1
3) Wild flooding (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	CO1	1
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: (A) Border Flooding (B) Furrow (C) Sprinkler (D) None of the above	CO1	1
5) Particularly in the delta regions of the India, the most commonly noticed soil is (A) Red and Yellow Soils (B) Alluvial Soils (C) Black Soils (D) None of the above	CO1	1
6) _____ is the densest and heaviest type of soil. The blank space should be filled by: (A) Sand	CO1	1

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Use a same Answer-Script for each part

(B) Clay (C) Silt (D) None of the above		
7) Extending down -from the ground surface, the soil zone , which is defined as being the depth of overburden that is penetrated by the roots of vegetation, is nothing but (A) The Capillary Zone (B) The root zone (C) The intermediate zone (D) None of the above	CO1	1
8) Mountain Soils: (A) Are found in the Himalayas (B) Contain significant amounts of organic matter (C) Cannot be easily drained out (D) None of the above	CO1	1
9) In border flooding, supply of irrigation water from the respective source, has to be cut off when: (A) irrigation water has progressed to about 60 percent of the length of the border (B) irrigation water has progressed to about 70 percent of the length of the border (C) irrigation water has progressed to about 80 percent of the length of the border (D) irrigation water has progressed to about 90 percent of the length of the border	CO1	1
10) Levees generally have vertical intervals of about: (A) 20 to 25 cm, (B) 15 to 20 cm (C) 10 to 15 cm (D) 5 to 10 cm	CO1	1
11) Rotation of Crops is needed (A) To increase the fertility of the land, (B) To limit the Concentration of Pests and Diseases, (C) To make the soil regain its original structure, (D) All of the above	CO1	1
12) In heavy soils water absorption rates are: (A) Vey high (B) High (C) Medium (D) Low	CO1	1
13) Submergence causes (A) Damage of the soil structure (B) Aerobic conditions, (C) Increases the mobility of the organic substance	CO1	1

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

Use a same Answer-Script for each part

(D) None of the above		
14) _____ 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: (A) Duty (B) Nominal Duty (C) Storage Duty (D) None of the mentioned above	CO1	1
15) If the discharge at concave side is more (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	CO1	1
16) Crop Insurance comprises: (A) Crop-revenue insurance (B) Functional -yield insurance (C) Crop-yield insurance (D) All of the above	CO1	1
17) NAIS is (A) National Agriculture Irrigation Scheme (B) National Advanced Insurance Scheme (C) National Agriculture Insurance Scheme (D) Nationwide Agriculture Irrigation Scheme	CO1	1
18) When a permeable stratum is confined between impervious strata at the top and bottom, then that condition may lead to the development of an: (A) Infiltration well (B) Artesian well (C) Infiltration Gallery (D) All of the above	CO1	1
19) The power output of the Human Powered Devices, may be limited within the range of (A) 0.08 to 0.1 hp (B) 0.12 to 0.15 hp (C) 0.04 to 0.07 hp (D) None of the above	CO1	1
20) Productive canal is said to be good if it recovers (A) 4% of its initial investment per annum (B) 6% of its initial investment per annum (C) 7% of its initial investment per annum (D) More than 7% of its initial investment per annum	CO1	1
21) The irrigation water should be supplied as soon as the moisture falls up to: (A) The field capacity moisture content (B) The optimum level of moisture content	CO2	1

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(C) The permanent wilting point (D) None of the above		
22) When the soil very dry, there may be need of: (A) Drip Irrigation (B) Paleo irrigation (C) Sprinkler Irrigation (D) Both (A) and (B)	CO2	1
23) Rabi Kharif ratio is: (A) 1: 2 (B) Approximately 1: 2 (C) 2: 1 (D) Approximately 2: 1	CO2	1
24) We can measure the consumptive use through: (A) Blaney-Criddle Equation, (B) Penman's equation, (C) Hargreaves class B pan evaporation method, (D) All of the above	CO2	1
25) In estimation of consumptive use, the monthly per cent of annual day light hours for a particular month, depends on (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	CO2	1
26) Time factor help to: (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	CO2	1
27) Evaporation losses are generally of the order of: (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	CO2	1
28) Seepage loss in Canals is dependent on: (A) Percolation or Absorption (B) Permeability of the soil (C) Canal Condition (D) All of the above (E) (A) and (B) above	CO2	1
29) Irrigation scheduling is (A) the process used by irrigation system managers (B) the process to determine the correct frequency of watering (C) the process to determine the correct duration of watering	CO2	1

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Use a same Answer-Script for each part

(D) All of the above		
30) For Irrigation scheduling, the factor/s which should be taken into consideration is/ are: (A) Precipitation rate of the irrigation equipment (B) Distribution uniformity of the irrigation system (C) Policy decision taken by the planners (D) All of the above	CO2	1

Group- B

Answer either question number 31 or question number 32. If anyone answers both 31 and 32, then 31 will be evaluated and considered only and 32 will not be evaluated and will not be considered.

	Question	CO	Marks
(31) (a)	Compute the flow diagram of canal irrigation system.	CO1	3
(b)	Define "Duty" and "Delta" and derive their relationship.	CO1	3×2=6
(c)	Distinguish between hygroscopic water and gravitational water and explain which of these two types is useful for plant growth.	CO1	6
(d)	A reservoir is proposed to be constructed to command an area equal to 1,20,000 hectares. The various crops are: Paddy, Groundnut, Maize, Cotton, Sugarcane and Chillies. The areas under irrigation of these crops are going to be: 20%, 5%, 5%, 10%, 10%, 3% of command respectively. Determine the annual storage required for the reservoir, assuming canal losses as 25% of head discharge, and reservoir evaporation and dead storage losses as 20% of gross capacity.	CO1	2+3
(32) (a)	In which ways you can align irrigation canals?	CO1	6
(b)	Write short notes on Animal Powered Devices.	CO1	3
(c)	Classify Mechanically Powered Water Lifting Devices with the tree diagram.	CO1	5
(d)	Classify canals with the tree diagram. Describe permanent canal, power canal.	CO1	2×3=6

Group- C

Answer question number 33. This is mandatory question.

(33) (a)	What is transit loss? Why duty varies with places?	CO2	5
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End of Questions