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**END SEMESTER (REGULAR / RETEST)
EXAMINATION, DECEMBER - 2023**

Branch : Civil Engineering

Semester : 3rd

Subject Code : Cv-301

WATER RESOURCES ENGINEERING

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks
for the questions.

Instructions :

- (i) Questions No. 1, 2 and 3 are compulsory.
- (ii) Answer any *five* questions from the rest.

1. Choose the correct answers : $1 \times 6 = 6$

(a) Which of the following does not fit in with the
rest ?

(i) Rain	(ii) Snow
(iii) Frost	(iv) Sleet

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(b) Isohyets are

- (i) areas of equal precipitation
- (ii) lines of equal precipitation on maps
- (iii) lines of equal temperature on maps
- (iv) All of the above

(c) For the growth of plants, the useful soil moisture is

- (i) rain water
- (ii) gravity water
- (iii) capillary water
- (iv) All of these

(d) The diameter of the area of a standard Symon's type rain gauge is

- (i) 5.0 cm
- (ii) 7.5 cm
- (iii) 10 cm
- (iv) 12.7 cm

(e) The main function of a spillway is to

- (i) discharge flood water
- (ii) supply water for irrigation
- (iii) supply water for power generation
- (iv) None of above

(f) A delineated area with a well defined topographic boundary and water outlet is

- gross commanded area
- watershed
- cultivated commanded area
- All of these.

2. Fill in the blanks :

$1 \times 5 = 5$

(a) _____ includes the analysis, protection, development, operation or maintenance of the land, vegetation and water resources of the drainage basin to benefit its residents.

(b) If temperature is low and ground is saturated then runoff will be _____.

(c) _____ type of irrigation is practiced in hilly area having steep slopes.

(d) The ratio of area irrigated in rabi season to the area irrigated in kharif season is known as _____.

(e) Portion of precipitation, which after infiltration, percolates down and joins the ground water reservoir which is ultimately connected to the ocean is _____.

3. Define the following :

1×4=4

(a) Intensity of irrigation (b) Root Zone Depth

(c) Duty

(d) Base period.

4. (a) List the various types of irrigation which fall under controlled flooding method of irrigation.

3

(b) The duty of the canal water for a crop was assessed to be 1400 ha per cumec. First watering was done on 21st November, 2022 whereas last watering was done on 20th March, 2023.

Calculate the delta for the crop.

5

(c) What is crop rotation ? Why it is necessary ?

1+2=3

5. (a) Write down the different types of precipitation ?

2

(b) What are the available methods of computation of average rainfall over a basin ?

2

(c) Mention the points to be kept in mind while selecting the sites for a rain-gauge station.

3

(d) Suggest four important remedial measures for prevention of water logging. Also mention four effects of water logging. $2+2=4$

6. (a) Write down the objectives of watershed management. 3

(b) State the main causes of soil erosion. Write down some preventive measures to control soil erosion. What are the effects of soil erosion ?

$$3+3+2=8$$

7. (a) Explain briefly how silt prevention devices control the silt entry to the off-taking canals. 3

(b) How dams are classified according to use ? Explain briefly each type. $2+6=8$

8. Briefly explain the causes of failure of earth dam. Suggest protection measures that can be undertaken against failure of earthen dam. $6+5=11$

9. (a) What are the purposes of canal lining ? Write down some advantages of canal lining. $2+3=5$

(b) What are the different types of cross-drainage works ? Give at least two examples for each type. $3+3=6$

10. (a) Write short notes on (any *three*) : $2 \times 3 = 6$

- (i) Hydrological cycle
- (ii) Forces acting on gravity dam
- (iii) Function of barrage
- (iv) Recording type rain gauge.

(b) Briefly explain the process of hydrological cycle with a neat sketch. 5