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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Civil Engineering

WATER RESOURCE ENGINEERING – I (C)

(Old Scheme – Prior to 2010 Admissions)

[Supplementary/Mercy Chance]



Time : Three Hours

Maximum : 100 Marks

Assume any missing data suitably.

Part A

Answer all questions.

Each question carries 4 marks.

1. What are the main factors which affect the water requirement of crop?
2. Discuss the relative advantages and disadvantages between Flow irrigation and Lift irrigation.
3. With a schematic diagram, explain different components of hydrologic cycle.
4. Explain any *two* methods of base flow separation with a neat diagram.
5. Draw the sketches to show the section of a canal (a) Wholly in cutting ; and (b) Wholly in filling.
6. Distinguish clearly between non-modular and semi modular outlets. Give examples.
7. State and discuss assumptions and limitations of Dupait's theory.
8. What do you understand by well shrouding?
9. What are the factors on which the selection of the site of a reservoir depend?
10. Write merits and demerits of Permeable and Impermeable groynes*

(10 × 4 = 40 marks)

Part B

Answer all questions.

Each full question carries 12 marks.

11. (a) Discuss the necessity and effects of irrigation.
- (b) The Gross area for a distributary is 8000 hectares, 80% of which is cultivable and irrigable. The intensity of irrigation for Rabi season is 50% and that of Kharif season is 30%. If the

Turn over



average duty at the head of the distributory is 2000 ha/cumecs for Rabi season and 1000 ha/cumecs for Kharif season, find out the discharge required at the head of the distributory. What will be the design discharge, if the time factor is 0.8?

(4 + 8 = 12 marks)

Or

12. (a) An area of 1 hectare was irrigated in 10 hours with a stream of 30 liters/sec. Depth of root zone was 1 m and available moisture holding capacity 16 cm/m. Irrigation was given when 50% of available moisture was depleted. Water application efficiency was 60%. Determine the water storage efficiency.
- (b) Define the terms used in irrigation practice (i) Consumptive use ; (ii) Field capacity ; (iii) Available moisture ; and (iv) Duty.

(8 + 4 = 12 marks)

13. (a) What are the factors affecting the run-off process?
- (b) Following are the ordinates of 3-hour unit hydrograph. Derive 6-hour unit hydrograph and plot the same.

Time (hr)	0	3	6	9	12	15	18	21	24	27
Ordinates of 3 hr UH (m^3/sec)	0	1.5	4.5	8.6	12.0	9.4	4.6	2.3	0.8	0

(2 + 10 = 12 marks)

Or

14. (a) Explain the steps involved in estimation of flood by unit hydrograph method.
- (b) Find the value of C and n in the empirical formula, $\theta = CA^n$ for flood discharge, θ in m^3/s from a catchment of area A km^2 , from the following data :

A (km^2)	4	10	50	100	200
θ (cumecs)	100	158	354	500	706

(6 + 6 = 12 marks)

15. (a) How would you design a canal using Kennedy's theory? Write the various steps.
- (b) Design a channel section using Lacey's theory for discharge = 15 m^3/s mean diameter of silt particle = 0.33 mm, and side slope = $1/2 : 1$. Also find the longitudinal slope.

(5 + 7 = 12 marks)

Or

16. (a) Describe three classes of outlets, their relative merits and demerits.
- (b) Calculate the economical depth of cutting for the canal section having bed width of the channel = 5 m, and top width of the bank = 2m. Side slope of excavation is 1 : 1 and of bank = $1 1/2 : 1$. Height of the banks from bed is 2.92 meter throughout.

(4 + 8 = 12 marks)

17. (a) Describe in brief various methods of developing a tube well.
- (b) An artesian tube well has a diameter of 20 cm. The thickness of aquifer is 30 m and its permeability is 40 m/day. Find its yield under a drawdown of 4 m at the well face. Use radius of influence as 250 m.

(4 + 8 = 12 marks)

Or

18. (a) Write short note on : (i) Infiltration galleries ; and (ii) Springs.
- (b) A well penetrates fully in a water bearing stratum of medium sand having coefficient of permeability of 0.005 m/sec. The well radius is 100 mm and is to be worked under a drawdown of 4 m at the well face. Calculate the discharge from the well. What will be the percentage increase in the discharge if the radius of the well is doubled. Take radius of zero draw down as 300 m in each case.

(3 + 9 = 12 marks)

19. (a) What do you understand by storage zones of a reservoir? Discuss live and dead storage.
- (b) Define River training. Describe various types of river training and protection works.

(5 + 7 = 12 marks)

Or

20. (a) Explain the steps involved in fixing the reservoir capacity using mass curve with a neat sketch.
- (b) Explain the concept of a multipurpose project.

(7 + 5 = 12 marks)

[5 × 12 = 60 marks]

