Reg. No. : | | | | | | | | | | | |

Question Paper Code : P 1147

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Fifth Semester

(Regulation 2004)

Civil Engineering

CE 1301 — IRRIGATION ENGINEERING

(Common to B.E. (Part-Time) Fourth Semester Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate 'duty' and 'delta'.

2. Distinguish between : 'Consumptive Irrigation Requirement' (CIR) and Net Irrigation requirement (NTR).

3. State a few specific (say four) advantages of sprinkler irrigation.

4. State the various ways of aligning an irrigation canal.

5. Define : 'Canal drop'. Where it is employed?

6. List the types of dams, classified according to their use.

7. Differentiate 'aqueduct' and 'syphon aqueduct'.

8. What are the advantages of 'river training works'?

9. Mention the conditions under which the base width of the elementary profile of a dam is determined.

10. What is the need for community participation in water resources management projects?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the relationship between 'duty', 'delta' and 'base period'. (6)

(ii) Following table gives the details of area irrigated in different seasons. If the 'time factor' of the canal is $\left(\frac{15}{22}\right)$, calculate the discharge at the head of the canal, assuming :

(1) a peak demand of 20% and

(2) losses in the transmit as 25%.

Sl. No.	Crop	Base period (in days)	Area under crop (in hectares)	Outlet factor
1	Wheat	120	800	1800
2	Maize	120	600	2400
3	Vegetables (in Summer)	120	400	720
4	Sugarcane (as a overlap of crop in summer)	90	200	650
5	Sugarcane	320	840	650

It may be further assumed that :

(A) maize as a monsoon crop and

(B) wheat and sugarcane as 'winter crops'. (10)

Or

(b) (i) State the various factors which affect the 'consumptive use'. (4)

(ii) State the most and simple methods used for estimating consumptive use. (4)

(iii) Wheat is grown at a certain place, the relevant climatological conditions of which are given in the following table. Determine :

(1) consumptive use ;

(2) field irrigation requirement. Assume : water application efficiency as 80% ; Blaney-Criddle formula is applicable with crop factor (R) = 0.8

Month	Monthly temp. in °C, averaged over the last 5 years	Monthly % of day time hrs. of the year, computed from sunshine tables	Useful main face in cm averaged over the last 5 years
1	2	3	4
Nov.	18.0	7.20	1.70
Dec.	15.0	7.15	1.42
Jan.	13.5	7.30	3.01
Feb	14.5	7.10	2.25

(8)

12. (a) (i) State the classification of 'surface irrigation'. (6)

(ii) Explain the various methods of 'surface irrigation system', bringing out clearly merits and applicability of each method. (10)

Or

(b) (i) Explain briefly the 'sprinkler' and 'drip' methods of irrigation systems. (6)

(ii) State the 'relative merits' of the above two methods of irrigation. (10)

13. (a) Fig. 1 shows the section of a gravity dam built of concrete. Examine the stability of this section at the base given the following, when the dam is empty :

Earthquake force = 0.1 g for horizontal forces

= 0.05 g for vertical forces

(where g = acceleration due to gravity)

Uplift pressure = hydrostatic pressure at either ends and acting over 60% of the area of section.

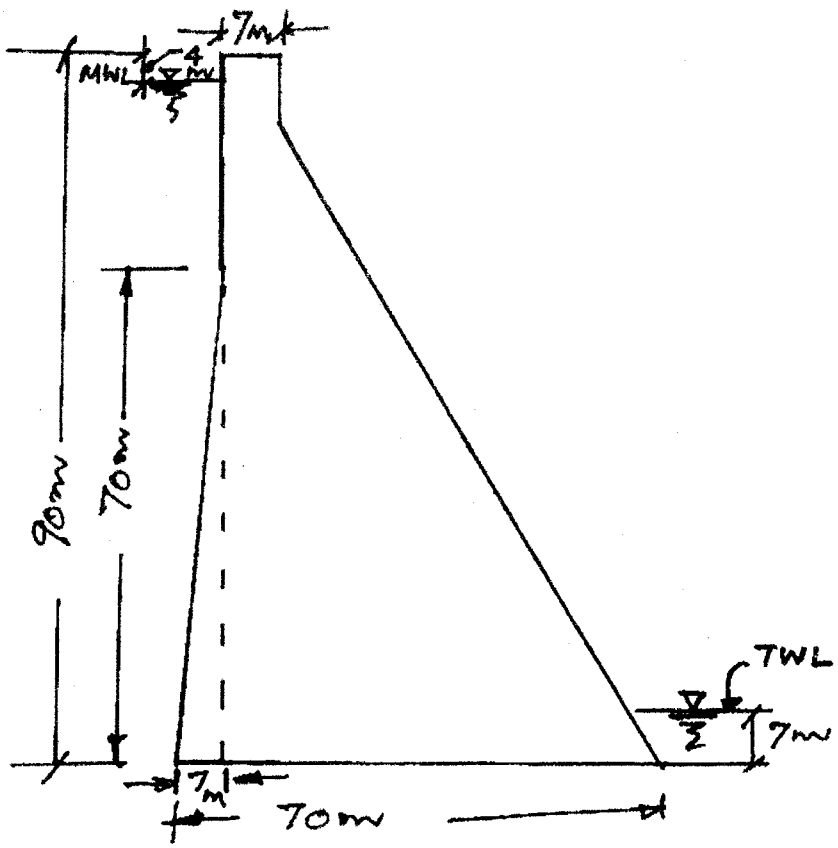

Fig. 1

Tail water depth = 7m (when dam is Fule)

= zero (when dam is empty)

Determine also the stresses developed at 'toe' and 'heel'. (16)

Or

(b) (i) State the 'causes of failure' of earth dams. Describe them briefly. (8)

(ii) List the 'major types' of spillways. Briefly explain their salient features with suitable sketches and their suitability. (8)

14. (a) (i) Distinguish between 'metered and non-metered' fall. (2)

(ii) What are the Four types modern falls recognised? Briefly describe them. (8)

(iii) Briefly describe the salient principles of design of a straight glacis fall. (6)

Or

(b) (i) State the factors to be considered for the choice of a suitable type of cross-drainage (CD) work. (8)

(ii) Briefly discuss the design considerations of a canal trough for an aqueduct and an aqueduct syphon. (8)

15. (a) (i) What are the main functions of a 'head regulator'? (3)

(ii) What are the main functions of a 'cross-regulator'? (4)

(iii) State the various design considerations for the design of 'cross regulator' and 'distributing head regulator'. (9)

Or

(b) (i) What are various ways of 'minimising irrigation water losses'? (4)

(ii) What is a 'percolation pond'? What are its uses / advantages? (4)

(iii) What is meant by 'participatory irrigation management'? Explain the concept briefly. Highlight the relative merits of 'participatory irrigation management' vis-a-vis that of a 'conventional management approach' adopted in Engineering. (8)
