

GUJARAT TECHNOLOGICAL UNIVERSITY

BE-7 SEMESTER – OLD PAPER – S22 TO S25 – QUESTION BANK

Subject Name & Code:

Irrigation Engineering- 3170609

Unit 1: Introduction, Water Requirements of Crops & Soil-Water Relationship

Repeated Questions:

1. **Discuss the scope of Irrigation Engineering.**
 - Appeared in: S22 (Q1c, 07 marks), W23 (Q1c, 07 marks), S24 (Q1b, 04 marks), S25 (Q1c, 07 marks)
2. **Define duty and delta. Derive a relationship between duty and delta for a given base period.**
 - Appeared in: W22 (Q1b, 04 marks), S23 (Q1c, 07 marks), W23 (Q3c, 07 marks), S25 (Q3b, 04 marks)
3. **What are the benefits and ill-effects of irrigation?**
 - Appeared in: W23 (Q2b, 04 marks), S25 (Q1c, 07 marks), W24 (Q1c, 07 marks)
4. **Define/Explain: Field Capacity, Permanent Wilting Point.**
 - Appeared in: S24 (Q2a, 03 marks), W22 (Q1a, 03 marks), W23 (Q3a, 03 marks), S22 (Q3a, 03 marks), W24 (Q1a, 03 marks)
5. **What are the advantages and disadvantages of canal lining?**
 - Appeared in: W22 (Q3a, 03 marks), W23 (Q1b, 04 marks), S22 (Q1b, 04 marks), S25 (Q1b, 04 marks), W24 (Q2a, 03 marks)
6. **What is water logging? What are the ill effects of water logging?**
 - Appeared in: S23 (Q2a, 03 marks), S24 (Q1a, 03 marks), W24 (Q5a & Q5b, 03+04 marks)

Other Important Questions:

1. **Differentiate between a weir and a barrage.**
 - Appeared in: S22 (Q1a, 03 marks), W24 (Q2c, 07 marks), S25 (Q5b, 04 marks)
2. **Enlist various methods of irrigation. Also explain methods of controlled flooding in detail.**
 - Appeared in: S24 (Q1c, 07 marks)
3. **How is water requirement of crops measured?**
 - Appeared in: S23 (Q1c, 07 marks)
4. **Define: Base Period, Kor Period, Paleo, G.C.A., C.C.A.**
 - Appeared in: W22 (Q1a, 03 marks), S25 (Q3b, 04 marks)
5. **Explain irrigation efficiency.**
 - Appeared in: S23 (Q4a, 03 marks), W23 (Q5b, 04 marks)
6. **After how many days will you supply water to soil...? (Numerical on Irrigation Frequency)**
 - Appeared in: W22 (Q1c, 07 marks)

7. **Differentiate between Saturation Capacity and Field Capacity.**
 - Appeared in: S25 (Q1a, 03 marks)
8. **Elaborate the benefits that can be accrued from Irrigation projects.**
 - Appeared in: S25 (Q2b, 04 marks)
9. **Explain the need of Irrigation in India and describe its development in the country. / Write a brief note on history of irrigation development in India.**
 - Appeared in: S25 (Q2c, 07 marks), W24 (Q1b, 04 marks)
10. **Enumerate the different terms by which duty can be improved. / Enumerate the different factors affecting duty.**
 - Appeared in: S25 (Q3a, 03 marks)
11. **Explain the following terms: (a) Cash crops (b) Paleo (c) Kor watering (d) Crop ratio.**
 - Appeared in: S25 (Q3b, 04 marks)
12. **Explain how will you proceed for determining the field irrigation requirement (FIR) for an important crop like wheat?**
 - Appeared in: S25 (Q3c, 07 marks)
13. **A crop requires 900 mm of water for a base period of 120 days. Find the duty of water. (Numerical on Duty-Delta)**
 - Appeared in: W24 (Q2b, 04 marks)

Unit 2: Diversion Headworks and Storage Works (Dams)

Repeated Questions:

1. **Explain Khosla's theory for the design of weirs on permeable foundation.**
 - Appeared in: S23 (Q3a, 03 marks), S24 (Q2c-OR, 07 marks), W23 (Q3c, 07 marks), S25 (Q5c, 07 marks)
2. **How does Lane's weighted creep theory differ from Bligh's creep theory?**
 - Appeared in: S23 (Q2b, 04 marks), S25 (Q5b, 04 marks), W24 (Q3c, 07 marks)
3. **Describe Bligh's creep theory for the design of weir over pervious foundation.**
 - Appeared in: W23 (Q2c, 07 marks), W24 (Q3c, 07 marks)
4. **Enlist factors to be considered while selecting site for a dam.**
 - Appeared in: S23 (Q3a-OR, 03 marks), W23 (Q3b-OR, 04 marks), S22 (Q3b-OR, 04 marks)
5. **What are the modes of failure of a gravity dam? / Describe various modes of failure of gravity dam.**
 - Appeared in: S23 (Q3c, 07 marks), S24 (Q3c, 07 marks)
6. **Enumerate various forces acting on a gravity dam. Discuss with a neat sketch.**
 - Appeared in: W22 (Q4c-OR, 07 marks), W23 (Q3b, 04 marks), S22 (Q5c, 07 marks)
7. **What is water logging? What are the causes and preventive measures?**
 - Appeared in: S23 (Q4b, 04 marks), W23 (Q5b, 04 marks), S22 (Q5c-OR, 07 marks), W24 (Q5a & Q5b, 03+04 marks)

Other Important Questions:

1. **What is the necessity of diversion head work? State different types.**
 - Appeared in: S23 (Q1a, 03 marks), S24 (Q4b, 04 marks)
2. **What are Khosla's observations in design of permeable foundations?**
 - Appeared in: S23 (Q3a, 03 marks)
3. **Explain Khosla's method of independent variables.**
 - Appeared in: S22 (Q3c, 07 marks)
4. **Explain Khosla's exit gradient concept.**
 - Appeared in: S25 (Q5a, 03 marks)
5. **A gravity dam 60.00 m high... Calculate self weight and moment @ toe. (Numerical on Gravity Dam)**
 - Appeared in: S23 (Q2c, 07 marks)
6. **A gravity dam stores 70 m of water... Draw uplift pressure diagram and calculate total uplift force and its moment about toe. (Numerical on Uplift Pressure)**
 - Appeared in: S23 (Q2c-OR, 07 marks)
7. **Weir is constructed to store 5 m of water... Calculate floor thickness and uplift pressure... Adopt Bligh's theory. (Numerical on Weir Design)**

- Appeared in: S23 (Q4c, 07 marks)
- 8. **An impervious floor of a weir... calculate the uplift pressures... by using Khosla's theory.** (Numerical on Khosla's Theory)
 - Appeared in: W22 (Q3c, 07 marks)
- 9. **What is meant by limiting height of a gravity dam? Determine limiting height...** (Theoretical/Numerical on Limiting Height)
 - Appeared in: S23 (Q4b, 04 marks)
- 10. **Discuss the effect of earthquake on a gravity dam. How to determine inertia force and hydrodynamic force.**
 - Appeared in: S23 (Q5c, 07 marks)
- 11. **Give classification of dams. / Write a note on classification of dam.**
 - Appeared in: W22 (Q2b, 04 marks), W24 (Q3a, 03 marks)
- 12. **Explain phreatic line in an earthen dam.**
 - Appeared in: W22 (Q4a, 03 marks)
- 13. **What are the modes of failure of an earthen dam? / Discuss the causes of failure of earthen dam.**
 - Appeared in: S23 (Q3c, 07 marks), W22 (Q4c, 07 marks), W23 (Q4c, 07 marks)
- 14. **Explain rolled fill method of construction of an earthen dam.**
 - Appeared in: W22 (Q4a-OR, 03 marks)
- 15. **Draw a typical section of an earthen dam of 26 m height indicating the various parts of the dam.**
 - Appeared in: S23 (Q5b-OR, 04 marks)
- 16. **What is Spillway and explain Ogee Spillway.**
 - Appeared in: W24 (Q3a-OR, 03 marks)
- 17. **Explain Stability Requirement of gravity dam.**
 - Appeared in: W24 (Q3c-OR, 07 marks)
- 18. **Sketch the layout of a typical diversion headwork and describe briefly the function of the various components.**
 - Appeared in: W24 (Q2c-OR, 07 marks), S25 (Q5c, 07 marks)
- 19. **Discuss following components of diversion head works briefly: (a) Divide wall (b) Fish ladder.**
 - Appeared in: S24 (Q5a, 03 marks)

Unit 3: Distribution Works (Canals)

Repeated Questions:

1. **Explain Kennedy's theory for the design of irrigation channels in alluvial soil.**
 - Appeared in: S23 (Q5a-OR, 03 marks), W22 (Q2c-OR, 07 marks), W23 (Q4c-OR, 07 marks), S22 (Q4c-OR, 07 marks), S25 (Q4c, 07 marks), W24 (Q4c-OR, 07 marks)
2. **Explain/Describe the procedure of designing a channel using Lacey's theory.**
 - Appeared in: W22 (Q2c-OR, 07 marks), S23 (Q3c-OR, 07 marks)
3. **What are the factors that affect alignment of a canal? / Discuss canal alignment.**
 - Appeared in: S23 (Q3b-OR, 04 marks), S24 (Q4b, 04 marks), W22 (Q5b-OR, 04 marks), W24 (Q3b-OR, 04 marks)
4. **Write a short note on balancing depth of a canal. / Explain Balancing depth and how it is determined?**
 - Appeared in: S23 (Q4b, 04 marks), S25 (Q5a, 03 marks)
5. **Why canal fall is provided? Enlist different types of canal fall.**
 - Appeared in: S23 (Q1b, 04 marks), S22 (Q2a, 03 marks), W24 (Q4a & Q4b, 03+04 marks)

Other Important Questions:

1. **Design a trapezoidal canal to carry a 5 m³/sec of water using Lacey's theory.** (Numerical - Lacey's Theory)
 - Appeared in: S23 (Q3c-OR, 07 marks)
2. **Design an irrigation canal to carry discharge 5 cumecs. Take $m=1.0$, $N=0.0225$, and B/D ratio = 4.40.** (Numerical - Kennedy's Theory)
 - Appeared in: W23 (Q2c-OR, 07 marks)
3. **Design trapezoidal concrete canal for following data: Design discharge 225 m³/sec...** (Numerical - Lined Canal)
 - Appeared in: S23 (Q5c, 07 marks)
4. **Design a lined concrete channel, trapezoidal in section to carry a discharge of 300 cumecs...** (Numerical - Lined Canal)
 - Appeared in: S24 (Q2c, 07 marks)
5. **Design lined trapezoidal shaped concrete canal... to carry a discharge of 350 cumec...** (Numerical - Lined Canal)
 - Appeared in: S22 (Q2c-OR, 07 marks)
6. **Calculate the balancing depth of a channel section having bed width equal to 12 m...** (Numerical - Balancing Depth)
 - Appeared in: S23 (Q3b, 04 marks)
7. **Give classification of irrigation canals.**

- Appeared in: W22 (Q2a, 03 marks), W24 (Q4c, 07 marks)
- 8. **Discuss salient features of Kennedy's theory for design of canal.**
 - Appeared in: S23 (Q5a, 03 marks)
- 9. **What are the drawbacks of Lacey's silt theory?**
 - Appeared in: W24 (Q3b, 04 marks)
- 10. **An earthen channel with a base 3m wide... Estimate the discharge.** (Numerical - Manning's Formula)
 - Appeared in: S25 (Q4b, 04 marks)
- 11. **A trapezoidal channel has side slope 1:2... Find the dimensions and discharge of most economical section...** (Numerical - Most Economic Section)
 - Appeared in: S25 (Q4b-OR, 04 marks)
- 12. **Explain Lacey's concept of initial, final, and permanent regime.**
 - Appeared in: S25 (Q4a-OR, 03 marks)
- 13. **Discuss Canal. With the help of a neat sketch, illustrate the classification of canals based on their alignment.**
 - Appeared in: S25 (Q4c, 07 marks)
- 14. **Explain with a neat sketch the layout of a modern canal system...**
 - Appeared in: S25 (Q3c, 07 marks)

Unit 4: Regulating and Cross Drainage Works

Repeated Questions:

1. **What is a cross drainage work? Where it is provided? Enlist different types and its suitability.**
 - Appeared in: S23 (Q4c, 07 marks), S24 (Q5c, 07 marks), W24 (Q5c, 07 marks)
2. **Differentiate between: Aqueduct and Super Passage.**
 - Appeared in: W22 (Q5b, 04 marks), S22 (Q5b-OR, 04 marks), S24 (Q4a, 03 marks)
3. **Write functions of cross regulator. / What is cross regulator and explain its function.**
 - Appeared in: W22 (Q5a, 03 marks), W23 (Q5a, 03 marks), S22 (Q5a, 03 marks), W24 (Q4a-OR, 03 marks)
4. **Define canal outlet. Write a brief note on any one type of canal outlet.**
 - Appeared in: W23 (Q3a-OR, 03 marks), S22 (Q3a-OR, 03 marks)
5. **Differentiate between non-modular and semi-modular outlet.**
 - Appeared in: W22 (Q3a, 03 marks), W23 (Q4a, 03 marks)

Other Important Questions:

1. **Explain vertical drop weir with a neat sketch.**
 - Appeared in: W22 (Q3b, 04 marks)
2. **Explain notch type fall.**
 - Appeared in: W22 (Q4b, 04 marks)
3. **Write a note on canal escape.**
 - Appeared in: W22 (Q4b-OR, 04 marks), W23 (Q5c-OR, 07 marks)
4. **What are requirements of a good canal outlet?**
 - Appeared in: S24 (Q5b, 04 marks)
5. **List out various devices used to reduce silt entry onto off-taking channel. Discuss King's vanes and Gibb's groyne wall in detail.**
 - Appeared in: S24 (Q4c, 07 marks)
6. **State function of following canal regulatory works: (1) King's vanes (2) Curved wings (3) Bed bars**
 - Appeared in: S22 (Q4a-OR, 03 marks)
7. **Give functions of distributary head regulator.**
 - Appeared in: S24 (Q3a-OR, 03 marks)
8. **Write down functions of distributary head regulator and cross regulator.**
 - Appeared in: W22 (Q5a, 03 marks)
9. **Discuss various Regulation Work on Canal.**

- Appeared in: W24 (Q4b-OR, 04 marks)

10. Write a brief note on parshall flume.

- Appeared in: S22 (Q5a-OR, 03 marks)

11. Differentiate between: (1) canal syphon and syphon aqueduct.

- Appeared in: W22 (Q5b, 04 marks), S22 (Q5b-OR, 04 marks)

12. Explain Aqueduct and Syphon aqueduct with Sketches.

- Appeared in: W24 (Q5c-OR, 07 marks)

Unit 5: Water Logging, Land Reclamation & Miscellaneous

Repeated Questions:

1. **Write a note on land reclamation. / Define land reclamation. Explain measures adopted for land reclamation.**
 - Appeared in: W22 (Q5c, 07 marks), S24 (Q3c-OR, 07 marks), W23 (Q5c, 07 marks), W24 (Q5b-OR, 04 marks)
2. **Discuss the causes and preventive measures of water logging.**
 - Appeared in: S23 (Q4b, 04 marks), S22 (Q5c-OR, 07 marks)

Other Important Questions:

1. **Discuss various methods of assessment of irrigation water charges.**
 - Appeared in: S23 (Q5b, 04 marks)
2. **Enlist various methods of assessment of irrigation water. Explain any one of them in detail.**
 - Appeared in: S24 (Q4a, 03 marks)
3. **Write a note on losses in canal.**
 - Appeared in: W22 (Q5a-OR, 03 marks)
4. **Discuss various drainage systems used for effective control of water logging. / What are the various drainage system? Give advantage of open drains.**
 - Appeared in: S22 (Q5b, 04 marks), W24 (Q5a-OR, 03 marks)
5. **Write a brief note on silt ejector.**
 - Appeared in: S24 (Q5a, 03 marks)
6. **Describe various seepage control measures of water through embankment and its foundation.**
 - Appeared in: S24 (Q4c, 07 marks)
7. **Discuss the objectives of command area development?**
 - Appeared in: S25 (Q2c-OR, 07 marks)
8. **Enumerate the sign of bad drainage condition of an area.**
 - Appeared in: S25 (Q2a, 03 marks)
