

"Heaven's Light is Our Guide"

Rajshahi University of Engineering & Technology

Department of Civil Engineering

4th year 7th semester examination 2016



CE-421

IRRIGATION AND FLOOD ENGINEERING

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CE-120003

SEC: A

Irrigation

1. Define irrigation. Write scopes of irrigation. Describe engineering scope of irrigation. **14,12,08**
2. What are the requirements for the success of an irrigation project? How an irrigation project planned? **11,07**
3. Explain the necessity of irrigation in a tropical country like Bangladesh. Compare inundation irrigation with perennial irrigation. **13,11,09,07**
4. What are the purposes which is served by the application of irrigation water to the soil? **05**
5. What are the various types of irrigation? Discuss merits and demerits of each type. **09**
6. Compare well irrigation & canal irrigation. **12**
7. Loam is the ideal soil for irrigation-why? Discuss the statement. **14**
8. What are the purpose of irrigation water? Write briefly. **14**
9. What are the different forms of soil moisture? Show with diagram and describe them briefly. **14**
10. Draw a neat sketch showing the extraction pattern of moisture from soil by plant roots. **10**
11. What are the different forms of soil water? Show with diagram and describe them in brief. **07,05**
12. Discuss the effect of soil texture and soil structure on the soil moisture content. **12**
13. Write short notes on: **13,11,05**
 - i. Field capacity, Wilting coefficient, Moisture holding capacity of a soil. **13,11**
 - ii. Soil texture and soil structure **11**
 - iii. Pusta, irrigation efficiency. **10**
 - iv. Paleo irrigation and kor water depth. **10,08**
 - v. Permanent wilting point, Readily available soil moisture, crop ratio. **09,08,07**
 - vi. Time factor, capacity factor, outlet factor, overlap allowances. **08**
 - vii. Root zoned depth, cash crop, soil moisture deficiency. **07,06**
14. What do you mean by duty of water? How duty of water can be improved, describe briefly. **14,13**
15. "All the water are not fit for irrigation crops"-explain critically the above statement. **09,08,07,06**
16. What is meant by duty and delta of canal water? Derive a relationship between duty and delta for a given base period. **10,06**
17. What do you mean by optimum utilization of irrigation water & water distribution efficiency? **14,08**
18. What is permeability? Why is it necessary that a good irrigation soil be permeable? How is permeability determine? **11**
19. What are the objectives of command area development? How are these achieved through command area development program? **07**
20. What are the methods used for estimating consumptive use of water for a particular crop at a particular place? Explain in details the one which is most widely used in our country and the reasons for preferring that particular method. **13**
21. Write the factors that affecting the consumptive use of water. **06**
22. What is meant by crop-rotation? Write the advantages of crop rotation. **12**

23. Why gram is frequently used in crop rotation? **05**
24. Give the factors which should be considered while planning crop rotation. **05**
25. List the different crop rotations which are commonly practiced with wheat and rice. **05**
26. Define irrigation. What are the factors that affecting the choice of the method of irrigation. **10,06**
27. What are the essential requirements for a successful sub-surface irrigation? Compare drip irrigation and buried irrigation. **09,05**
28. Write down the factors which are very essential for the proper selection of the method of irrigation. **10**
29. Enumerate the conditions which are favorable for the adoption of sprinkler irrigation in Bangladesh. **13,09**
30. "The sprinkler system of irrigation is excellent method but not used in our country"- discuss in brief. **08**
31. Enumerate the limitations of sprinkler irrigation. **10**
32. What are the main component parts of sprinkler irrigation? Give a brief account them. **05**
33. Draw neat sketches to illustrate the following methods:
- i. Furrow irrigation.
 - ii. Free flooding.
 - iii. Check flooding.
 - iv. Check method, corrugation irrigation. **09**
 - v. Border irrigation, Basin irrigation. **05**
- State under what circumstances you will recommend their use.
34. What is furrow irrigation? Show with diagram and write its advantages & disadvantages. **14**
35. Point out the advantages of Border irrigation method. **06**
36. Name the methods of water distribution adopted for the following crops and describe them with sketch- **07**
- i. Potato,
 - ii. Orchard,
 - iii. Paddy.
37. What are water lifting devices for low lift and without using any power or machineries? Describe any one devices with diagram. **14**
38. Describe trickle method of irrigation. What are the advantages & disadvantages of using this method in Bangladesh? **14**
39. Difference between furrow and sprinkler irrigation. **06**
40. What methods of irrigation will you select where irrigation water is saline, scarcity of water in there and is hill backs? Discuss them in brief. **07**
41. Which methods of irrigation is suitable in the hilly region? Describe in brief. **08**
42. 'Lift irrigation is a costly irrigation system' - Explain. Discuss the salient features of lift irrigation. Compare lift irrigation and gravity irrigation. **11,09**
43. Difference between lift irrigation and flow irrigation. **07**
44. What are water balance parameters? Describe briefly the water balance formulae for crop water requirement. **12**
45. What do you understand by potential evapotranspiration? How does it differ from actual evapotranspiration? **08**

46. What risk do you consider in case of wastewater irrigation? What are the advantages and disadvantages of using this method in Bangladesh? **08**
47. What is meant by water logging? What are the causes of water logging? What steps will you take to improve an already water logged tract? **14,10,09,07,06**
48. How irrigated land may become waterlogged? **10,07**
49. What do you know by leaching requirement? **07**
50. What are the principal causes of water-logging in a canal irrigation tract? **11**
51. What is meant by interference between tube wells? What is the ideal distance between two adjacent tube wells? **11**
52. How will you determine yield of tube well? **11**
53. Well irrigation is an anti-water logging measure explain. **11,07,06**
54. How will you broadly classify the anti-water logging measures? How percolation from rainfall can be reduced to prevent water logging conditions. **05**
55. What do you mean by $C_2 - S_2$ water? Discuss its usefulness for irrigating fine textured soil. **14,08,06**
56. What is meant by saline & alkaline soil? How you will proceed to reclaim saline land. **14,11,06**
57. Write down the name of impurities which make water unfit for irrigation. **10,08,07**
58. What is SAR? Discuss the effects of salts on plant growth. **12,10,07**
59. Discuss the effect of SAR on the irrigation water. **08**
60. What are the process of land reclamation? Discuss the different land reclamation processes. **05**

Flood Engineering

Flood, Flood management & Flood assessment

1. What are the causes of flood? Describe them in light of flood in Bangladesh. **14,13,11,07**
2. What do you mean by flood control, flood mitigation, flood management & flood protection? **11,10,06**
3. Write a short notes on:
 - i. Flood forecasting and warning system. **14,13,12**
 - ii. Flood control by the construction of levees. **13**
 - iii. Flood plain zoning, flood proofing, emergency evacuation. **12,10**
 - iv. Repelling groyne. **10**
 - v. Return period, concentration time, critical intensity. **05**
4. Explain the direct and indirect benefits of flood management. **14**
5. What is meant by design flood? What is its importance? **11,08,07,06**
6. Discuss briefly the tangible and intangible benefits of flood. **12**
7. Describe briefly the structural measures for flood management. **14**
8. Explain what do you understand by the return period? Give few formula which are used to determine the return period. **13,09**
9. Discuss the validity of Probability method of flood estimation. List the demerits if any. **08**
10. What are floodways? What are the advantages and disadvantages? **07**
11. Discuss the various methods for the flood plain management. **07**

12. Enumerate the various methods which can be used for estimating design flood discharge from a certain catchment and discuss one of these methods in details. **10,08,06**
13. What are the limitations of method of estimating design flood? **08**
14. What is concentration time? How is it estimated? **08**
15. Write down the procedure to estimate the design flood for any return period using Gumbel's distribution. **14,09**
16. How do you justify the Gumbel's extreme value distribution to describe the annual peak flood discharge? **13**
17. Enumerate the name of different institutions responsible for flood management of Bangladesh and briefly discuss their responsibilities. **12,11**
18. Is land management effective to flood control? Discuss in brief. **08**
19. What are the various methods employed for the management of floods and for reducing the damage caused by them. **13**
20. Briefly discuss about the flood management and mitigation strategies of Bangladesh. **11**
21. Explain the direct and indirect tangible losses due to floods. **13**
22. Random variable. How is it obtained from frequency analysis? **09**

Sediment Transport

23. Describe the importance of sediment transport in designing earthen irrigation canals. **14**
24. Write short notes on the following: **06**
 - i. Sediment hazards of irrigation water.
 - ii. Salt concentration in irrigation water and their utility in irrigation.

Channel design

25. State and explain Kennedy's theory. Describe the design procedure of regime channel by adopting Kennedy's theory. **14,08**
26. Describe Kennedy's theory for the design of irrigation channel in alluvial soil. **08**
27. "Channel improvement by deepening is preferred to widening"- explain by comparing two channel after improvement. **14**
28. "Lacy's theory is an improvement over Kennedy's theory"- explain. **07,06**
29. Enumerate the two recognized silt theories. Explain how one theory is an improvement over the other. (Kennedy and Lacy) **12,11**
30. Show that the silt carrying capacity of a canal is proportional to $V_0^{2.5}$ in accordance with Kennedy's theory. Where, V_0 is the critical velocity of flow. **10**
31. Write short notes on: **14,13**
 - i. Berms, Borrow pits, Counter Berms & Balancing depth. **(give suitable diagrams)**
 - ii. Alluvial canal and non-alluvial canal, Initial regime & Final regime. **13**
 - iii. Berm width, Spoil Bank, Pusta, counter berm. **07,06**
32. Describe different indirect protection methods used to protect the embankment of a river. **13**
33. What is economical section? What is the condition of economical section? **08**
34. What are the causes of bank recession? What are the different types of bank protection? Explain briefly the indirect bank protection techniques. **12,09**
35. What is meant by regime? Differentiate between regime in natural rivers and in artificial channels. **09**
36. Differentiate between 'Initial regime & Final regime'. **12**

37. Define berm. What are the various purposes served by berm? How much berm width is provided in an earthen canal under the following conditions- **09**
- Canal bed level is above natural surface level.
 - Canal is in balancing depth.
 - Canal is in deep cutting.

Assessment of Irrigation water

38. Write the name of the methods for the assessment of irrigation water supply. Compare area method with the volumetric method assessment of irrigation water supply. **14,12**
39. What are the different methods of assessment of irrigation water? Which method do you think best and why? **13**
40. Define consumptive use of water. What are the factors which influence consumptive use of water for any crop and how consumptive use is related in the total requirement of water for the crop? **09**
41. How does consumptive use of water differ from evapotranspiration and duty of water?
42. Why irrigation water assessment is necessary? How you will assess the irrigation water if you are the irrigation engineer in an irrigation project? **07**
43. Write six numbers of factors affecting consumptive use of irrigation water.
44. According to Dorenbos and pruilt what are the limitations of Blancy Criddle formula for estimating consumptive use of water. **12**
45. Write short notes on: **12**
- Water storage efficiency.
 - Net irrigation requirement.
 - Leaching requirement.
46. Why is it necessary to collect the charges for irrigation water supplied to the cultivator? Explain. **11**
47. Discuss volumetric sale of water versus sale on basis of area. **09**
48. Discuss the assessment of irrigation water charges on area basis. Write down the drawbacks of this method. **10**

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