



KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Agrl. Engg.) 2018 Admission

V Semester Final Examination-February 2021

Lwre 3107

Water Harvesting and Soil Conservation Structures (2+1)

Time: 2 hours

I Fill up the following (10x1=10)

1. In farm ponds, commonly used spillways are _____ and _____.
2. In pond, the storage area allowed for silt _____ is called as _____.
3. The roof top harvested water can be used for _____ and _____ purposes.
4. In semicircular bund method of water harvesting the ratio of catchment area to the cultivated area is up to _____.
5. Hydraulic Jump is created when flow changes from _____ to _____.

Match the following

- | | |
|---------------------|--|
| 6. Hydraulic Jump | a. Earthen dams |
| 7. Mid-third Rule | b. Prevention of erosion in stream banks |
| 8. Toe-drain | c. Energy Dissipation |
| 9. Rip-rap | d. Side slope of retaining walls |
| 10. Angle of repose | e. Stability analysis of earth dams |

II Write Short notes on ANY FIVE of the following (5x2=10)

1. Emergency Spillway
2. Percolation pond
3. Check dam
4. Nala bunds
5. Long Term Water Harvesting
6. SAF Stilling Basin
7. Diversions

III Answer ANY FIVE of the following. (5x4=20)

1. What are the different types of farm ponds?
2. Design a drop spill way for a water shed whose drainage area is 50 ha. The drop is 200 cm, the intensity of rainfall to be considered for the watershed is 10 cm/ha in duration equal to time of concentration of watershed and frequency of 25 years. The runoff coefficient is 0.4
3. What are different types of Hydraulic jump?
4. Explain with diagram triangular load diagram for various flow conditions
5. Design a chute spillway for a gully head control with drop of 200cm, having width of conduit as 1.20m, maximum depth at inlet is 0.5m, Slope of conduit as 1.5:1, Peak flow as 0.7m³/sec
6. List the advantages and disadvantages of drop spillway?
7. When is chute spillway required to be constructed and how does it differ from a drop spillway. Why it is so designed? Describe the functions of each of its components.

IV Write an essay on ANY ONE of the following (1x10=10)

1. a) Describe in detail various water harvesting methods with suitable diagrams.
b) Calculate the volume of excavation required to construct a dugout farm pond, if the

depth of pond is 4.75 m, bottom width is 14m, bottom length is 30m and side slope is 2:1

2. Describe in detail different checks for structural design for drop spillway due to overturning, sliding, tension, compression and piping.
