March 2023

WATER RESOURCE ENGINEERING

Time Allowed: 2.5 Hours *Full Marks: 60*

Answer to Question No. 1 of Group A is compulsory and to be answered first. This answer is to be made in separate loose script(s) provided for the purpose. Maximum time allowed is 30 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering theremaining part of the question will be provided. On early submission of answer scripts of Question No. 1, a student will get the remaining script earlier.
Answer any Five (05) Questions from Group B.

Group A

1. Choose the correct answer from the given alternatives (any twenty): 1x20

i. The time required by rain water to reach the outlet of drainage basin, is generally called-a) Time of concentration, b) Time of overland flow, c) Concentration time of overland flow, d)Duration of the rainfall

ii. A hyetograph is a graphical representation of-a) Rainfall intensity and time, b) Rainfall depth and time, c) Discharge and time, d) Cumulative rainfall and time

iii. As compared to gravity dams, earthen dams are-a) costlier, b) less susceptible to failure, c) required sound rock foundations, d) required less skilled labour

iv. Rain gauge is used for _____, a) Hydrological survey, b) Measuring precipitation, c) Marine survey, d) River survey

v. Direct runoff is made up of a) surface runoff, prompt interflow and channel precipitation, b) surface run off, infiltration and evapotranspiration, c) overland flow only, d) rainfall and evaporation

vi. The area of land draining into a stream or a water course at a given location is known as a) Catchment area, b) Water shed area c) Precipitation area, d) Drainage area

vii. Drop size is between 0.5 to 6 mm in dia is called a) Drizzle, b) Sleet, c) Rain, d) Hail

viii. Which one is the correct: a) Isohyetal Method > Thiessen Polygon Method > Arithmetic or Station Average Method, b) Thiessen Polygon Method > Arithmetic or Station Average Method> Isohyetal Method, c) Thiessen Polygon Method> Isohyetal Method > Arithmetic or Station Average Method, d) Isohyetal Method > Thiessen Polygon Method < Arithmetic or Station Average Method

ix. The shape of recession limb of a hydrograph depends upon a) basin characteristics only, b) storm characteristics only, c) both (a) and (b), d) none of the above

x. The first step in soil preparation before sowing of seeds is- a) Paleo, b) Kor c) Delta d) Flooding

xi. Silting of reservoir a) Reduces efficiency of dam, b) Reduces storage capacity, c) Raises reservoir water level, d) None of these

xii. The following earth dam is suitable only on impervious foundation_____a) Zoned embankment type, b) Homogenous embankment type, c) Non-homogenous type, d) Diaphragm type

xiii. During the construction of an earthen dam by hydraulic fill method, development of pore pressure becomes important in the _____ a) central impervious core, b) pervious outer shell, c) transition zone, d) both central core and outer shell

xiv. The axis of a gravity dam is the _____ a) line of the crown of the dam on the downstream side, b) line of the crown of the dam on the upstream side, c) centre-line of the top width of the dam, d) line joining mid-points of the base

xv. The safety valve of a dam is its a) drainage gallery, b) inspection gallery, c) spillway, d) outlet sluices

xvi. The storage created on the upstream side of a smaller stream by the construction of low earthen bunds is technically known as a) a reservoir, b) a tank, c) a lake, d) a pond

xvii. In case of lift irrigation, the water is lifted by the help of a) Man power, b) Animal power, c) Mechanical power, d) All of these

xviii. The efficiency of drip irrigation a) Efficiency of drip system is as high as 50-60%, b) Efficiency of drip system is as high as 90-95%, c) Efficiency of drip system is as high as 60-75%, d) Efficiency of drip system is as high as 95-100%

xix. The Irrigation efficiency is a) The percentage of applied water in the soil and made available for consumptive use by crop, b) The percentage of applied water in the soil and made available for consumptive use by soil, c) Either a or b, d) None of the above

xx. Micro-irrigation is also called: a) Nano-irrigation, b) Petite irrigation, c) Localized irrigation, d) Flood irrigation

xxi. Triangular weir is also called: a) Trigonometric, b) Ogee, c) V-notch, d) Isolated

xxii. The name of the device which is placed in front of head regulator for silt removal, is: a) Weir, b) Silt Extractor, c) Silt Excluder, d) Barrage

xxiii. The type of losses can be mainly avoided by lining the canals, is: a) Evaporation Losses, b) Seepage Losses, c) Erosion of Canal Bed, d) Discharge Losses at Branch Canals

xxiv. A Super passage is the reverse of _____ a) syphon, b) aqueduct, c) inlets and outlets, d) syphon Aqueduct

xxv. The discharge value of water in a canal is controlled by a) Hydraulic Jump, b) Falls, c) Regulators, d) Velocity of the flow

Group B

2. a) Define the Hydrology.
   b) Draw the neat sketch of Hydrological cyclewith briefdiscussion terms related to it. 2+6

3. a) List any four factors affecting the Run off.
   b) Establish the relationship among base period, duty and delta. 4+4

4. a) A watercourse has a culturable commanded area of 1200 hectares. The intensity of irrigation for crop A is 40% and for B is 35%, both the crops being Rabi crops. Crop A has kor period of 20 days and crop B has a kor period of 15 days. Calculate the discharge of the watercourse if the kor depth for crop A is 10 cm and for crop B is 16 cm.
   b) Write any two methods for improving duties. 6+2

5. a) What are the causes of failure of gravity dam?
   b) List the situations suitable for earthen dams.
   c) Distinguish between low dam and high dam. 3+2+3

6. a) State different types of spillways.
   b) Describe various Components and their functions of Lift irrigation Scheme. 3+5

7. Explain with neat sketch (a) super passage and (b) syphon aqueduct. (c)Level crossing (d) Aqueduct 2+2+2+2

8. a) Write any two of advantages and disadvantages of well irrigation.
   b) List any two needs of Sprinkler Irrigation.
   c) Differentiate between weir and Barrage. 2+2+2+2

9. a) State the need for canal lining.
   b) State the advantages of canal lining.
   c) Explain briefly different types of canal lining. 3+3+2

10. a) Describe the yield of wells.
    b) Explain drainage gallery.
    c) Define Paleo irrigation & Capacity factor. 2+2+2+2
