# <u>GOVERNMENT POLYTECHNIC SHEOHAR</u> <u>DEPT. OF CIVIL ENGINEERING</u>

#### **SUB-WATER RESOURCES ENGINEERING**

#### **UNIT-I**

- Q.1 Define Hydrology and explain the hydrological cycle with the help of a neat sketch.
- Q.2 Define the following terms: (i) Rainfall (ii) Rainfall intensity (iii) Rain Gauge (iv) Precipitation (v) Evapo transpiration (vi) Isohyte
- Q.3 Discuss about the various forms of precipitation.
- Q.4 Explan with sketch non-automatic / non recording type (Symon's rain gauge) of rain gauge.
- Q.5 Explain with neat sketch automatic rain gauge / recording type rain gauge.
- Q.6 Explain briefly the various methods of estimating average rainfall over a catchment.
- Q.7 Explain Isohyetal method for computing average rainfall over basin.
- Q.8 Explain Thiessen's polygon method for calculating the average rainfall.
- Q.9 Define runoff? State the various factors affecting runoff.
- Q.10 What are the methods of computing run-off from a catchment area?
- Q.11 Explain empirical and rational methods of determining flood discharge in a stream.
- Q.12 State Inglis formula and Dicken's formula for Maximum Flood Discharge.

## UNIT -II

- Q.1 Define irrigation. Also write its advantages and disadvantages.
- Q.2 State necessity of irrigation in india.
- Q.3 Elaborate the various types of irrigation.
- Q.4 Discuss briefly the various techniques used for distributing water in the farms.
- **Q.5** What is meant by 'Duty' and 'Delta' of canal water? Derive a relationship between duty and delta for a given base period.
- **Q.6** What are the factors on which duty depends?
- **Q.7** Write short notes on:

(i) Base period	(ii) Crop period	(iii) Crop season	(iv) Cash crops
(v) Crop rotation	(vi) Crop ratio	(vii) Paleo irrigation	(viii) Kor-watering
(ix) Kor water depth	(x) Kor period	(xi) Time Factor	(xii) Capacity Factor

- (xiii) Gross Command Area (G.C.A.)
- (xv) Intensity of Irrigation

- (xiv) Culturable Command Area (C.C.A)
- (xvi) Outlet factor
- **Q.8** Define and explain the following terms:
  - (i) Saturation capacity (ii) Field capacity
- (iii) Available moisture

(vi) Permanent Wilting Point

- (iv) Optimum water (v) Soil moisture deficiency
- (vii) Frequency of irrigation
- Q.9 Draw the area capacity curve and state its significance.

## UNIT-III

- Q.1 What is the selection criteria for suitable type of dam?
- Q.2 What is meant by a "dam and a reservoir"? What are the types of dam?
- Q.3 What are 'earthen dams'? Draw a typical cross-section of an earthen dam and show its components. Explain the functions of each component.
- **Q.4** Explain the various measures to control Seepage through the embankment and their foundation in earthen dams.
- Q.5 Describe the methods of construction of earthen dam.
- **Q.6** Explain in brief the various types of failure of earthen dams and its remedial measures.
- Q.7 Illustrate with neat sketches the following parts of an earthen dam and state their functions briefly:
  - (i) Rock toe (ii) horizontal drainage blanket (iii) cut-off (iv) Rip-rap
- Q.8 Differentiate between Earthen dam and Gravity dam.
- Q.9 State the factors affecting selection of site for gravity dam.
- Q.10 What do you understand by gravity dam? Mention the various types of forces acting on a gravity dam.
- Q.11 Discuss in brief various modes of failure of a gravity dam.
- Q.12 Differentiate between theoretical / elementary and practical profile of gravity dam.
- Q.13 What is meant by elementary profile of a gravity dam and how is it deduced?
- **Q.14** Find the expressions for stresses (normal, principal and shear) developed in the elementary profile of a gravity dam.

Q.15 Describe with sketches types of joints used in Gravity dam.

- **Q.16** Explain drainage gallery. Sketch uplift pressure at the base of a gravity dam, when (i) there is no drainage gallery and no tail water depth; (ii) there is drainage gallery and no tail water depth; (iii) both drainage gallery and tail water are present.
- Q.17 What are various types of galleries in gravity dam? State the function of each type with neat sketch.
- Q.18 Differentiate between a 'low gravity dam' and a 'high gravity dam'.
- Q.19 What is a spillway and what are its function and enumerate various types of spillway?
- Q.20 What is an ogee spillway and how is it designed?
- Q.21 What is meant by an 'energy dissipator'? Discuss the various methods used for energy dissipation below spillways.

## UNIT –IV

- **Q.1** Explain drip irrigation. What are the advantages and disadvantages of this type of irrigation?
- Q.2 Explain the need of drip irrigation. Also draw layout and show component parts.
- **Q.3** Describe the sprinkler irrigation method. Discuss the relative merits and demerits of sprinkler irrigation.
- Q.4 Draw layout of Sprinklers irrigation system and show its components. also write its necessity.
- **Q.5** What is percolation tank? State various points governing the site selection for a percolation tank.
- **Q.6** Describe necessity and importance of percolation tank.
- Q.7 What are advantages and disadvantages of percolation tank?
- Q.8 Explain Well irrigation. What are the advantages and disadvantages of well irrigation?
- Q.9 Describe various types of tube wells.
- Q.10 Define the following terms: (i) Aquifer (ii) Aquiclude (iii) Aquifuge (iv) Specific yield
- Q.11 Write notes on the following: (i) Storage coefficient (ii) Coefficient of Transmissibility (iii) Specific capacity of well (iv) Well loss
- Q.12 Derive an expression for discharge from a well fully penetrating a confined aquifer.
- Q.13 Derive an expression for discharge from a well fully penetrating a unconfined aquifer.
- Q.14 What is lift irrigation? What are the advantages and disadvantages of lift irrigation?
- Q.15 Draw a layout of lift irrigation scheme. Show all components.
- Q.16 Write the components and their function of a lift irrigation scheme.
- Q.17 What is bandhara irrigation? Draw a layout of bandhara irrigation scheme and showing different components.
- Q.18 What are the advantages and disadvantages of Bandhara irrigation.

#### UNIT -V

- Q.1 Write the differences between weir and barrage.
- Q.2 What are different types of weirs? Explain with neat sketches, circumstances under which each type is adopted.
- Q.3 Explain the procedure for the design of a vertical drop weir.
- Q.4 Name the component parts of the weir and state their functions.
- Q.5 Discuss in brief various causes of failure of weirs and their remedies.
- **Q.6** Draw a layout of typical barrage and show all component part of it and state their functions.
- Q.7 Enumerate the causes of failure of a barrage on permeable foundation.
- **Q.8** Draw a neat layout of a diversion headwork and indicate its various components. Briefly indicate the function of each component.
- **Q.9** Write short notes on the following:
  - (i) Fish ladder (ii) Divide wall (iii) Under sluices
- **Q.10** Differentiate between silt excluders and silt ejectors?
- Q.11 Explain various types of canals, according to various classification systems.
- Q.12 Classify the canals according to alignment and position in canal network. Show location plan of each.
- Q.13 Compare between contour canal and ridge canal.
- Q.14 Draw sketches to show the section of canal,
  - (a) partly in cutting and partly in filling (b) wholly in cutting, (c) wholly in filling
- Q.15 What do you understand by the balancing depth? Derive an expression for the same.
- Q.16 What is canal lining? Explain the necessity and types of canal lining.
- Q.17 What are advantages and disadvantages of canal lining?
- Q.18 Enlist the common materials used for canal lining.
- Q.19 State the properties of good lining material.
- Q.20 State advantages and disadvantages of canal lining.
- Q.21 What is meant by a "Cross-Drainage Works"? Write a note on selection of suitable type of cross-drainage works.

- **Q.22** What are the different types of cross drainage works that are necessary on a canal alignment? State briefly the conditions under which each one is used?
- Q.23 Differentiate between
  - (i) syphon aqueduct and canal siphon, (ii) aqueduct and super passage.
- Q.24 Differentiate between head regulator and cross regulator.
- Q.25 What do you understand by a head regulator? State functions of a distributary head regulator and a cross-regulator.
- Q.26 Write notes on any three of the following:
  - (a) Exit gradient and its importance (b) Canal escapes (c) Modules
- Q.27 What is a canal fall and why it is necessary and where are they located? Mention various types of canal falls.
- **Q.28** Explain why trapezoidal notches are preferred to rectangular notches in the design of canal drops.
- Q.29 Write a note on Notch type fall.
- Q.30 Explain the procedure of designing Sarda type fall.
- Q.31 Explain the procedure of designing Straight glacis fall.
- Q.32 Write a note on Montagu type fall? How does it differ from glacis fall?
- Q.33 What is an outlet? Write down the requirements that an outlet should fulfill.
- Q.34 What is the function of an outlet and where it is provided? Write in brief.
- Q.35 Distinguish clearly between non-modular and semi-modular outlets. Give Examples.
- Q.36 What do you understand by a rigid module? Describe the working of Gibb's module.
- Q.37 What do you know about Kennedy's gauge outlet and explain the use of it.
- Q.38 What do you understand by flexibility of an outlet? Derive an expression for the same.
- **Q.39** Define proportionality of an outlet. Distinguish between a hyper-proportional outlet and a sub-proportional outlet. Find out expressions for the setting of both the types.
- Q.40 Define sensitivity of an outlet. Find the relation between sensitivity and flexibility of an outlet.