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NCE-035

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2295023 Roll No. | | | | | | | | | |

B.TECH.

Regular Theory Examination (Odd Sem-VII), 2016-17

ENGINEERING HYDROLOGY

Time : 3 Hours *Max. Marks : 100*

Note : Attempt all Section. If require any missing data; then choose suitably.

SECTION-A

1. Attempt all question in brief. (10×2=20)

a) Define depression storage.

b) What do you mean by permanent welting point?

c) What is subsurface runoff?

d) Write the different forms of precipitation.

e) What is specific capacity?

f) Write down Inglis formula

g) Define synthetic unit hydrograph

h) Distinguish between water table and piezometric surface

i) What do you mean by rain water harvesting?

j) What is the well loss?

SECTION - B

2. Attempt any three of the following : (3×10=30)

a) Define the Hydrology and discuss critically the statement "Knowledge of Hydrology is a must for any water resource planning".

b) The following are the rates of rainfall for successive 20 minutes period of a 140 minutes storm : 2.5, 2.5, 10.0, 7.5, 1.25, 1.25, 5.0 cm/hr. Taking the value of π index as 3.2 cm/ hr, find out the net runoff in cm, the total rainfall and value of Windex.

c) Explain with the help of neat sketches, the flow duration curve method and mass curve method to measure the runoff.

d) What do you mean by design flood? What are the factors affecting the flood hydrograph? Explain the procedure of using a unit hydrograph to develop the flood hydrograph due to a storm in a catchment.

e) Write short notes on any **four** of the following :

(i) Well losses

(ii) Specific capacity and specific yield of an aquifer

(iii) Rain water harvesting

(iv) Aquifer and aquiclude

(v) Radius of influence and cone of depression.

SECTION - C

3. Attempt any one part of the following : (1×10=10)

a) What is meant by hydrological cycle? How can the parameters of the cycle be written in an equation form? Draw a neat diagram to illustrate your answer.

b) Explain briefly the types of rain gauges.

A one-day rainfall of 100 mm at a station was found to have a return period of 50 years. Determine the probability that a one-day rainfall of this or larger magnitude will occur atleast once in 20 successive years.

4. Attempt any one part of the following : (1×10=10)

a) Define evaporation. Discuss the factors that affect the evaporation from a water body.

b) Distinguish between :

(i) Infiltration capacity and Infiltration rate

(ii) Actual and Potential evapotranspiration

(iii) Field Capacity and permanent wilting point

(iv) Depression storage and interception.

5. Attempt any one part of the following : (1×10=10)

a) Write in brief the SCS-CN method for estimating the runoff volume. The peak of flood hydrograph due to a 3-h duration isolated storm in a catchment is 270 m^3/s. The total depth of rainfall is 5.9 cm. Assuming an average infiltration loss of 0.3 cm/h and a constant base flow of 20 m^3/s, estimate the peak of the 3-h hydrograph (UH) of this catchment. If the area of the catchment is 567 km^2; determine the base width of the 3-h unit hydrograph by assuming it to be triangular in shape.

b) What is hydrograph? Draw a single peaked hydrograph and explain its components.

6. Attempt any one part of the following : (1×10=10)

a) What do you mean by hydrologic reservoir routing? Describe any two methods of hydrologic reservoir routing.

b) Explain the terms risk, reliability and safety factor. A factory is proposed to be located on the edge of the 50 year flood plain of a river. If design life of factory is 25 years, what is the reliability that it will not be flooded during its design life?

7. Attempt any one part of the following : (1×10=10)

a) Describe various types of tubewells.

b) What are the differences between confined and unconfined aquifers for the determination of discharge with steady flow condition? A well penetrates into an unconfined aquifer having a saturated depth of 100 m. The discharge is 250 litres per minute at 12 m drawdown. Assuming equilibrium flow conditions and a homogeneous aquifer, estimate the discharge at 18 m drawdown. The distance from the well where the drawdown influences are not appreciable may be taken equal for both cases.