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BCE-061

Diploma in Civil Engineering

01282

Term-End Examination

June, 2010

BCE-061: IRRIGATION ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Question number **1** is **compulsory**. Attempt **any four** more questions from the remaining questions.*

1. (a) The salinity of water for irrigation purpose is measured by : **14x1=14**

(i) SAR value

(ii) pH value

(iii) Electrical conductivity

(iv) None of the above

(b) Which of the following is not the cash crop :

(i) Jute (ii) Tea

(iii) Rice (iv) Sugarcane

(c) The water which can be utilised by the crops from the soil is known as :

(i) Hygroscopic water

(ii) Field capacity

(iii) Capillary water

(iv) None of these

(d) If the water applied to a field penetrates uniformly throughout then the water distribution efficiency is :

(i) zero (ii) 0.5

(iii) 1.0 (iv) 1.5

(e) The amount of rainfall and the amount of runoff are not equal because of :

(i) losses

(ii) heavy rainfall

(iii) low rainfall

(iv) none of these

(f) The hydraulic mean depth of a canal section with following data is equal to :

(Area = $10m^2$, Perimeter = 5 m, Depth = 1.5 m)

(i) 2 m (ii) 5 m

(iii) 1.5 m (iv) 7.5 m

(g) Energy is required in the utilisation of :

(i) Ground water

(ii) Surface water

(iii) Both (i) and (ii)

(iv) None of these

(h) The coefficient of permeability (K) and coefficient of transmissibility (T) for an aquifer of depth d is given by :

(i) $T = Kd$ (ii) $K = Td$

(iii) $d = KT$ (iv) None of these

(i) The confined aquifer is also known as :

(i) artificial aquifer

(ii) gravity aquifer

(iii) both (i) and (ii)

(iv) None of these

(j) Earthen dams are :

(i) rigid dams

(ii) non-rigid dams

(iii) overflow dams

(iv) diversion dams

(k) The structural efficiency of gravity dam is _____ that of arch dam.

(i) more than

(ii) less than

(iii) equal to

(iv) not comparable with

(l) Critical velocity is known as :

(i) Non silting velocity

(ii) Non scouring velocity

(iii) Both of the above

(iv) None of the above

(m) The area of cross section of a trapezoidal channel is 8 m^2, if the critical velocity of water flowing in the channel is 1 m/sec. The discharge in the channel will be :

(i) 0.8 m^3/sec (ii) 1.8 m^3/sec

(iii) 8 m^3/sec (iv) 1 m^3/sec

(n) The maximum flood discharge given by Ryve's formula is $Q = CA^n$ Where n is :

(i) 1/2 (ii) 3/4

(iii) 2/3 (iv) 4/3

2. (a) What are the various methods for the estimation of runoff ? Explain any one in detail. 10

(b) Name the factors affecting duty. 4

3. (a) Name the various types of irrigation structures. 5

(b) Design a triangular section of a concrete lined canal to carry a discharge of 45 m^3./sec at a slope of $\perp$ in 10,000. The side of canal is $1\frac{1}{4}$: 1 and Manning's coefficient is 0.018. 9

4. (a) An artesian tube well has a diameter of 20 cm. The thickness of aquifer is 30 m and its hydraulic conductivity (K) is 4.2×10^{-4} m/sec. Find its yield under a drawdown (S) of 4 m at the well face. The radius of influence is given by $R = 3000\ S\sqrt{K}$. 10

(b) Differentiate between shallow well and deep well ; open well and tube well; confined aquifer and unconfined aquifer. 4

5. (a) Explain with neat sketches the function of following hydraulic structures canal drop, canal regulators, canal escape. 7

(b) Why a spillway is provided in a dam ? Explain the function of spillway as energy dissipator. 7

6. (a) What are the various components of sprinkler irrigation system ? What are the advantages of this system ? 7

(b) Explain the suitability and limitation of drip irrigation. Compare the performance of conventional irrigation with drip irrigation. 7

7. (a) What are the impurities present in water which make it unsuitable for irrigation ? List the methods for the measurement of impurities in water. 7

(b) Explain the effects of water logging. Discuss in brief the types of drainage system adopted to check this problem. 7