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BCE-061

DIPLOMA IN CIVIL ENGINEERING
DCLE(G)
Term-End Examination
December, 2014

00915

BCE-061 : IRRIGATION ENGINEERING

Time : 2 hours *Maximum Marks : 70*

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

1. Select the most appropriate answer from the given options. *14×1=14*

(a) The proportion of sodium ions present in the soils is generally measured by a factor called

(i) SAR value

(ii) pH value

(iii) electrical conductivity

(iv) None of the above

(b) Which of the following is ***not*** a fibre crop ?

(i) Jute

(ii) Cotton

(iii) Rice

(iv) Sugarcane

(c) 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

(d) The amount of rainfall and the amount of run-off are ***not*** equal because of

(i) losses

(ii) heavy rainfall

(iii) low rainfall

(iv) None of the above

(e) The flow velocity is given by Darcy's law which is expressed as

(i) $V = \frac{K}{I}$

(ii) $VK = I$

(iii) $V = KI$

(iv) None of the above

(f) In the design of unlined canal, Lacey's formula includes an additional factor known as

(i) silt factor

(ii) sand factor

(iii) clay factor

(iv) gravel factor

(g) The annual rainfall in India in Mha-m is approximately

(i) 100

(ii) 200

(iii) 300

(iv) 400

(h) The size of a Parshall flume is given by

(i) throat width

(ii) head height

(iii) X-sectional area

(iv) overall height

(i) Unit of duty is

(i) ha/cumec

(ii) cumec/ha

(iii) rupees

(iv) hour

(j) Which of the following is ***not*** a hydraulic structure :

(i) Drops and fall

(ii) Cross regulators

(iii) Grass water ways

(iv) Escapes

(k) An aquifuge is

(i) porous and permeable.

(ii) porous but not permeable.

(iii) not porous but permeable.

(iv) neither porous nor permeable.

(l) Nagarjuna Sagar dam is an example of _____ reservoir.

(i) distribution

(ii) multipurpose

(iii) flood control

(iv) power

(m) Which of the following is (are) the method(s) of canal lining :

(i) Concrete

(ii) Shot concrete

(iii) Brick

(iv) All of the above

(n) Formula for calculating discharge from a V-notch is

(i) $0{\cdot}0138\ H^{5/2}$

(ii) $0{\cdot}0186\ LH^{3/2}$

(iii) $0{\cdot}0138\ H^{3/2}$

(iv) $0{\cdot}0184\ LH^{3/2}$

2. (a) Why is irrigation necessary ? Discuss the ill-effects of irrigation. 7

(b) A drainage basin having an area of 10,000 km^2 is located in North Indian plains. Estimate the maximum flood discharge from the basin (Use Dicken's formula, C = 6). 7

3. (a) Write the functions of irrigation water. What are the factors on which the total water requirements of crops depend ? 7

(b) Calculate the Delta for Kharif Jawar having duty as 2600 ha/cumec. 7

4. (a) Describe in detail with a neat sketch the storage irrigation scheme. 7

(b) Design a trapezoidal lined canal to carry a discharge of 120 cumecs. The velocity of flow may be taken as 2 m/s. Take the side slope as 1 : 1. Assume n = 0·018 and bed slope as 1 in 3,000. 7

5. (a) Explain with neat sketches the function of following hydraulic structures :

canal drop, canal regulators and canal escape. 7

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

6. (a) Discuss the cavity type tube-well giving a neat sketch. 7

(b) Calculate the discharge from a fully penetrating confined well of 300 mm diameter if the thickness of the aquifer is 20 m, drawdown is 5 m, permeability of the aquifer is 20 mm/min and the radius of influence is 450 metres. 7

7. (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

8. (a) What is the SAR value of irrigation water having the characteristics as concentration of Na, Ca and Mg are 22, 3 and 1·5 milliequivalents/litre, respectively ? 7

(b) A drainage channel discharges 0·5 cubic metres of water per second and drains 300 hectares. What is the drainage coefficient of this land ? 7