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**Diploma in Civil Engineering DCLE(G)****Term-End Examination****December, 2012****BCE-061 : IRRIGATION ENGINEERING***Time : 2 hours**Maximum Marks : 70*

*Note : Question number 1 is compulsory. Attempt any four questions from remaining questions. Use of scientific calculator is permitted.*

1. (a) If P, R and L are the Rainfall, Runoff and losses of water in cm, respectively then which of the following relation is true.  $2 \times 7 = 14$
- (i)  $P=R-L$
- (ii)  $R=P-L$
- (iii)  $L=P+R$
- (iv)  $L=P/R$
- (b) A drainage basin having an area 10,000 square km is located in North India Plain. The maximum flood discharge in  $m^3/sec.$  will be (Take  $C=6$ ) :
- (i) 60                      (ii) 600
- (iii) 6000                      (iv) 60000

- (c) Kharif period is considered as
- (i) 15th June--14th Oct.
  - (ii) 15th Oct.--14th Feb.
  - (iii) 15th Feb.-- 14th June
  - (iv) 15th June--14th Feb.
- (d) The net amount of irrigation required for a field is 64 mm, if the efficiency is 80%, the gross amount of water required will be
- (i) 64 mm
  - (ii) 80 mm
  - (iii) 51.2 mm
  - (iv) None of the above
- (e) The hydraulic radius of a triangular lined canal is 2m, the depth of water in the canal will be (Take the central angle equal =  $90^\circ$ ).
- (i) 2m
  - (ii) 3m
  - (iii) 4m
  - (iv)  $4\sqrt{2}$  m
- (f) In which of the following dam in maximum seepage will occur through dam body- **1x7=7**
- (i) Concrete dam
  - (ii) Timber dam
  - (iii) Earthen dam
  - (iv) Steel dam

(g) The concentration of sodium, calcium and magnesium ions in water is 22, 6 and 2 meq per litre respectively. The SAR value of water will be :

(i) 22                      (ii) 11

(iii) 6                      (iv) 2

2. (a) What is runoff ? Discuss the factors affecting it. Explain any one empirical relation to estimate the runoff. 7

(b) Write a note on irrigation scheduling. 7

3. (a) Define GCA, CCA and intensity of irrigation. At an experimental station on paddy growth, it was observed that in 100 days, in Kharif season, the depth of water supplied was 110 cm. Determine the duty. 7

(b) Describe the canal layout with neat sketches. 3+4=7

4. (a) What are the advantages of canal lining ? 7.  
Design a trapezoidal lined canal to carry a discharge of 100 m<sup>3</sup>/sec. Take BID ratio as 6, n=0.015, side slope 1.5 H : IV and bed slope as  $\perp$  in 5000.

(b) Discuss any three types of canal lining. 7

5. (a) Explain earth and rockfill dams with neat sketches. What are the advantages and disadvantages of earth dam ? 7
- (b) Explain the following hydraulic structures with neat sketches. 7
- Aqueduct
  - Canal Outlet
  - Silt vanes
6. (a) Define : Aquifer, Aquitard, Aquiclude and Aquifuge. What are the characteristics of confined aquifer ? 4+3=7
- (b) How is the yield of open well estimated ? 7
- Calculate the discharge from a fully penetrating confined well of 300 mm diameter, if the thickness of aquifer is 30 m, draw down is 3 m, permeability is 30 mm/min and radius of influence is 300 m.
7. (a) Write the criteria for the selection of irrigation system. 7
- (b) Explain various types of drainage system. 7
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