

## Diploma in Civil Engineering

Term-End Examination

December, 2011

01052

### BCE-061: IRRIGATION ENGINEERING

Time : 2 hours

Maximum Marks : 70

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**Note :** Question No. 1 is *compulsory*. Attempt *any four* questions from the remaining.

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1. (A) Select the correct answer from the four given options. 1x7=7
- (a) The annual rainfall in India in M ha-m is :
- (i) 100                      (ii) 200
- (iii) 300                    (iv) 400
- (b) The Symon's rain gauge is :
- (i) recording type
- (ii) non recording type
- (iii) automatic
- (iv) continuous

- (c) The size of a Par shall flume is given by :
- (i) throat width
  - (ii) head height
  - (iii) X-sectional area
  - (iv) overall height
- (d) Nagarjun Sagar dam is an example of \_\_\_\_\_ reservoir.
- (i) multipurpose
  - (ii) storage
  - (iii) distribution
  - (iv) conservation
- (e) Base period is duration between pre sowing irrigation to \_\_\_\_\_ .
- (i) crop maturity
  - (ii) crop harvesting
  - (iii) crop germination
  - (iv) last watering
- (f) Unit of duty is :
- (i) ha/cumec
  - (ii) cumec/ha
  - (iii) Rupees
  - (iv) hour

- (g) In the design of unlined canal silt factor ( $f$ ) used in Lacey's formula is correlated with silt grade ( $m$ ) given in mm by the equation :

(i)  $f = 0.76\sqrt{m}$

(ii)  $f = 1.76\sqrt{m}$

(iii)  $f = 1.67\sqrt{m}$

(iv)  $f = 1.86\sqrt{m}$

- (B) State "true" or "false". 1x7=7

- (a) According to U.S. soil conservation service the value of drainage coefficient for organic soil is 1 to 1.25
- (b) For reducing SAR, addition of gypsum to the water or to the soil work well.
- (c) The maximum non-erosive flow rate in furrow system can be estimated if length of furrow is known.
- (d) An aquifuge is formation which is porous but not permeable.
- (e) From open wells, the discharge is limited to 1 to 5 litre/second.
- (f) Spillways help releasing surplus water to the downstream of a dam.
- (g) Waxy-ripe is a stage of grain formation in crop production.

2. (a) Discuss rainfall pattern in India and thus, the necessity of irrigation. 7
- (b) Discuss comparative advantages and disadvantages of different types of rain gauges. 7
3. (a) Discuss prevailing crop seasons in India and their relevance w.r.t. irrigation. 7
- (b) Calculate net amount of irrigation water for a field with the following information. 7
- I.C. = 16% ; moisture content  
before irrigation = 10% ; root zone  
depth = 30 cm ; Bulk density = 1.35 g/cc
4. (a) Explain the importance of different irrigation efficiencies. Differentiate between efficiency of water storage and water distribution. 7
- (b) Differentiate between duty and delta. Calculate duty for (a) Paddy crop with base period 123 days. The total water supplied to crop was 120 cm. 7
5. (a) Draw a typical labelled layout of storage irrigation scheme in incorporating a dam with a barrage. Explain its suitability and utility. 7
- (b) Briefly explain two most efficient methods of field water application. 7

6. Differentiate between weir and barrage. Explain different types of dams. **4+10=14**
7. Write short notes on the following : **3½x4=14**
- (a) Animal powered water lifting devices
  - (b) Canal lining
  - (c) Advantages of sprinkler irrigation
  - (d) Energy dissipators
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