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Total number of printed pages – 2

B. Tech
PCCI 4305

Sixth Semester Regular / Back Examination – 2015

IRRIGATION ENGINEERING

BRANCH : CIVIL

QUESTION CODE : J 201

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any five from the rest.
The figures in the right-hand margin indicate marks.*



1. Answer the following questions :

2×10

- (a) Write four limitations of sprinkler irrigation.
- (b) Explain efficiency of water-application in the agriculture field.
- (c) How frequency of irrigation is estimated ?
- (d) What is the effect of sodiumising of clay ?
- (e) How much is the afflux across the syphon aqueduct ?
- (f) In which situation level crossing is provided ?
- (g) Draw the uplift pressure diagram for the foundation of concrete dam with drainage gallery.
- (h) What is piping through porous foundation ?
- (i) What is Critical Velocity Ratio ? On which physical character its value depends ?
- (j) Explain the true regime condition of a canal.

2. Narrate the various design criteria for design of aqueduct.

10

3. Explain the effect of horizontal and vertical acceleration of earthquake on concrete dam.

10

P.T.O.

4. (a) Differentiate sub-surface and basin irrigation. 4
- (b) 800 m^3 of water is applied to a farmer's rice field of 0.6 hectares. When the moisture content in the soil falls to 40% of the available water between the field capacity (36 %) of the soil and permanent wilting point (15%) of the soil crop combination. Determine the field application efficiency. The root zone depth of rice is 60 cm. Assume porosity = 0.4. 6
5. (a) Find the relation among duty, delta and base period. 4
- (b) The culturable commanded area of a watercourse is 1200 hectares. Intensities of sugarcane and wheat crops are 20% and 40% respectively. The duties for the crops at the head of the watercourse are 730 hectares/cumec and 1800 hectares/cumec respectively. Find the discharge required at the head of the watercourse. 6
6. (a) Explain the various pattern of layout of tile drain. 5
- (b) Explain the profile of concrete dam from practical consideration. 5
7. Design a concrete lined channel to carry a discharge of 350 cumecs at a slope of 1 in 6400. The side slopes of the channel may be taken as $1\frac{1}{2} : 1$. The value of n for lining material may be taken as 0.013. Assume limiting water depth of the channel as 4.0 m. 10
8. Write short notes on any **two** : 5×2
- (a) Hydraulic gradient line for a typical water retaining structure with u/s and d/s sheet pile
- (b) u/s slope slide of earthen dam for sudden draw-down
- (c) Justification of lined canal on new project
- (d) Exit gradient.

