

[01 – 4221]

IV/IV B.E. DEGREE EXAMINATION.

Second Semester

Civil Engineering

WATER RESOURCES ENGINEERING –II

(Common with Civil Environmental Engineering and  
Dual Degree program in Civil Engineering)

(Effective from the admitted batch of 2006–2007)

Time : Three hours

Maximum : 70 marks

Question No. 1 is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

1. (a) What are the purposes of drainage galleries?
- (b) What is hydraulic jump? State its significance.
- (c) Differentiate between syphon aqueduct and super passage.
- (d) What is meant by economic diameter of a penstock?
- (e) Differentiate between radial gates and crest gates.

- (f) Compute the discharge over an ogee spillway with a coefficient of discharge  $C_d = 2.5$  at a head of 4 m. The effective length of spillway is 100 m. Neglect the velocity of approach.
- (g) Enumerate the important considerations in the locations of canal falls.
2. (a) What is an elementary profile of gravity dam? Derive the expression for base width based on
- (i) No tension criterion
  - (ii) No sliding criterion.
- (b) Discuss the various causes of failure of weir and their remedies.
3. (a) What do you understand by piping? What measures may be taken to ensure safety of an earth dam against the failure due to piping?
- (b) Explain the methods of energy dissipation at the toe of a spillway.
4. (a) Explain the design features of an ogee spillway.
- (b) Discuss briefly how the following are decided in the design of a canal fall :
- (i) Fluming ratio
  - (ii) Crest level of breast wall
  - (iii) Length and shape of down stream wing wall

5. (a) What are different types of Cross drainage works? State the functions of head regulator.  
(b) What is a Surge Tank? Explain its types and design consideration.
6. (a) Explain how river flow is controlled using following Structures
  - (i) Spurs
  - (ii) Guide banks  
(b) Explain Khosla's method of independent variables. How are the corrections applied for the following?
  - (i) Thickness of floor
  - (ii) Inclination of floor
  - (iii) Interference of piles
7. (a) Explain briefly the functions and construction of intake structure in Hydroelectric installations.  
(b) Briefly outline the design principle of type I aqueduct with neat sketches.
8. Write short notes on any THREE of the following:
  - (a) USBR and IS standard basins
  - (b) Water hammer pressure.
  - (c) Factors governing selection of a dam.
  - (d) Criteria for safe design of earth dam.
  - (e) Sarada fall design criteria.