B. Tech.
(SEM. VIII) EXAMINATION, 2006-07
WATER RESOURCES ENGINEERING - II

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt all questions
(2) Each question carries equal marks
(3) Be precise in your answer
(4) Assume missing data suitably, if any

1 Attempt any four parts of the following: 5x4=20

(a) Using Khosla’s curves, determine the following for the apron shown in Figure P-1(a)
   (i) Uplift pressures at points E, D, C, E₁ and D₁
   (ii) Exit gradient
   Neglect the effect of thickness of floor.

Fig. P1 (a)

V-0045] 1 [Contd...
(b) What do you understand by a fall in a canal? Why is it necessary? How do you select its location?

(c) Explain the procedure of designing Sarda type fall.

(d) What do you understand by a head regulator? State functions of a distributory head regulator and a cross regulator.

(e) Write a short note on canal escape.

(f) What are the functions of regulators and falls on a main canal? How are these works made safe against failure by (a) piping (b) bed scour?

2 Attempt any two parts of the following: 10×2=20

(a) (i) Describe with the help of sketches various types of cross-drainage works. What do you understand by level crossing?

(ii) Differentiate between: Syphon aqueduct and canal syphon; Aqueduct and super passage.

(b) Enumerate the step by step procedure of designing a syphon Aqueduct.

(c) (i) Differentiate between a weir and barrage. Explain with the help of a diagram various components along with their functions of a division head work.

(ii) Explain the procedure for the design of a vertical drop weir.
3 Attempt any **two** parts of the following: 10×2=20

(a) Describe various types of river training and protection works. What do you understand by meandering? What are its causes?

(b) Design a guide bank required for a bridge on a river having the following particulars:
Design flood discharge = 5000 cumics
Silt factor = 1.10
Bed level of river = 130.00 m
High flood level = 140.00 m
Also find the volume of stone required per m length of the guide bank.

(c) What do you understand by demand curve? Explain the method of calculating reservoir capacity for a specified yield from mass inflow curve.

4 Attempt any **two** parts of the following: 10×2=20

(a) Explain various forces that act on a gravity dam. How do you account for earthquake effects in the design of gravity dam. Discuss in brief various modes of failure of a gravity dam.

(b) Distinguish clearly between a low gravity dam and high gravity dam. Determine the critical height of a low gravity dam of concrete, use the following data :

(i) S.G. of concrete = 2.40 and allowable compressive stress = 340 t/m².
(c) Design the practical profile of a gravity dam
of stone masonry, given the following data:
R.L. of the base of dam = 1150 m
R.L. of H.F.L. = 1280 m
S.G. of masonry = 2.4
Safe compressive stress of masonry of
dam = 120 t/m².

5 Attempt any two parts of the following:  \(10 \times 2 = 20\)

(a) What is the spillway? What are its function?
Enumerate various types of spillways and
explain any one of them with neat sketch.

(b) Compute the discharge over an ogee spillway
with the coefficient of discharge \(C = 2.5\) at
a head of 4.0 m. The effective length of the
spillway is 100 m. Neglect the velocity of
approach.

(c) Differentiate between the following related to
a hydro-power
(i) Firm and Secondary Power
(ii) Load factor, utilization factor, and plant
factor
(iii) Installed and dependable capacity of a
power house
(iv) Design head, rated head, gross head,
operating head and effective head.