C 17900 (Pages : 2) Name.....

Reg. No.....

SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION JUNE 2011

CE 04 702—DESIGN OF HYDRAULIC STRUCTURES

(2004 admissions)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*
Assume any required data suitably.

Part A

1. (a) Explain limiting height of a gravity dam.
   (b) Explain any one type of spill way.
   (c) Explain the functions of tank sluice and direct sluice.
   (d) What are the requirements of canal outlets ?
   (e) Describe the method of design of solid aprons of a weir on pervious soil.
   (f) Explain how a suitable type of fall is selected at a certain canal location.
   (g) Discuss the conditions favourable for the selection of a syphon aqueduct.
   (h) Differentiate aqueduct, super passage and canal syphon.

(8 × 5 = 40 marks)

Part B

2. (a) A direct sluide taking off from a main canal irrigates 100 hectares of land with a duty of 800.

Hydraulic particulars of main canal :

Full discharge of canal	=	550 cumecs
Bed width	=	26 m
Full supply depth	=	2.90 m
Half supply depth	=	2.0 m
Bed level	=	+ 10.00 m
Ground level	=	+ 12.00 m

Top level of bank = 14.00 m. with a top width of 5 m. There is a berm of 2 m width at ground level inside the canal section. The canal has 1 : 1 side slopes in cutting and 2 : 1 side slopes in embankment.

Hydraulic particulars of distributary :

Bed level of distributary	=	+ 11.50 m
Bed width	=	1 m
F.S.L.	=	+ 12.00 m
Top level of bank	=	+ 12.75 m
Top width	=	1.00 m
Hard soil available at	=	+ 11.50 m.

Turn over

Design :

(i) Vent way of sluice, sluice barrel and head wall.

(ii) Root sab.

(iii) Wing walls and returns.

(3 × 10 = 30 marks)

Draw to a suitable scale :

(i) Longitudinal section of sluice through the central line of barrel. (15 marks)

(ii) Half plan at top and half plan at foundation. (15 marks)

Or

(b) Design a canal drop of 2 m with the following data :

Hydraulic particulars of canal above drop :

Full supply discharge	=	$4m^3/s$
Bed width	=	6.00 m
Bed level	=	+ 10.00 m
Full supply depth	=	1.5 m
F.S.L.	=	11.50 m

Top of bank 2 m wide at level + 12.50 m

Half supply depth	=	1.00 m

Hydraulic particulars of canal below drop :

Full supply discharge	=	$4m^3/s$
Bed width	=	6.00 m
Bed level	=	+ 8.00 m
Full supply depth	=	1.50 m

Top of bank 2.0 m wide at level + 10.50 m. The ground level at site of work is + 10.50. Good soil for foundation is available at + 8.50 m.

Design :

(i) A suitable trapezoidal notch.

(ii) Notches and notch pier.

(iii) Abutment, upstream and downstream wing wall.

(3 × 10 = 30 marks)

Draw to a suitable scale :

(i) The longitudinal section through body wall.

(ii) Half plan at top and half plan at foundation level.

(iii) Half end view from downstream and half longitudinal section along body wall.

(3 × 10 = 30 marks)