D 42515   (Pages : 2)   Name.................................

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SEVENTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, DECEMBER 2007

Civil Engineering

CE 04 702—DESIGN OF HYDRAULIC STRUCTURES

(2004 Admissions)

Time : Three Hours   Maximum : 100 Marks

Answer **all** *questions.*
Each question carries 5 marks.

1. (a) Sketch the practical profile of a low and high gravity dam, giving details of various parameters like top width, bottom width etc.

   (b) With a neat sketch, explain the working of a Hooded Type Syphon spillway.

   (c) Write brief note on the requirements to fulfilled by a canal outlet.

   (d) Explain with a neat sketch the plug hole arrangement working in a tower head sluice.

   (e) With a neat sketch briefly outline the design of a syphon well drop.

   (f) Discuss briefly about the causes of a weir constructed across a river as a part of diversion head work.

   (g) Discuss briefly about the selection of a suitable type of cross drainage work.

   (h) Explain with neat sketches (i) Level crossing ; (ii) Inlets and outlets.

                                                             (8 × 5 = 40 marks)

Answer any **one** *question from* **each** *main question.*
Each question carries 15 marks.

2. (a) Discuss in detail the effect of providing a top width and a free board to get a practical profile of a gravity down from the elementary profile.

                                   Or

   (b) A masonry dam 10 m. high in trapezoidal in section with 1 m. top width and 8 m. base width. The U/S face is provided with 1 : 8 batter. Test the stability of the dam. Unit weight of masonry = 2,240 kgf./m.^{3} Permissible shear stress = 14 kgf./cm.^{2} Calculate the stresses at Toe and Heel of dam.

3. (a) Design a vertical drop horizontal floor tank surplus weir with the following data and draw a neat free hand sketch indicating the various designed dimensions :

Combined catchment	=	30 sq.km.
Intercepted catchment	=	25 sq.km.
Maximum water level	=	+ 7.00 m.
Full tank level	=	+ 6.00 m.
General ground level	=	+ 5.00 m.
Tank bund level	=	+ 8.10 m.
Slope of tank bund	=	2 : 1 (both sides)
Ryve's coeff. for combined catchment	=	9.0
Ryve's coeff. for intercepted catchment	=	1.8

   Assume any other data required suitably.

                                   Or

                                                             Turn over

(b) Discuss with neat sketches various types of canal outlets.

4. (a) Design a notch type canal drop for a canal whose bed level drops by 2 m., with the following particulars :

Full supply discharge = 5 cumecs
Bed width = 6.0 m.
Full supply depth = 1.8 m.
Half supply depth = 1.2 m.

Assume any other data required suitably. Draw a sketch showing design features of the longitudinal section along the canal.

Or

(b) Draw a neat sketch and explain the functions of various parts of a canal regulator with road bridge. Highlight the design criteria of the regulator.

5. (a) Design a suitable cross drainage work based on the following data :—

Canal

Full supply discharge = 25 cumecs
Full supply level = + 214 m.
Canal bed level = + 212.5 m.
Canal bed width = 16 m.

Drainage

High flood discharge = 150 cumecs
High flood level = + 211.5 m.
High flood depth = 2.0 m.
General ground level = + 213.0 m.

Or

(b) Design a syphon aqueduct based on following data at the crossing of a canal and a drainage:—

Canal

Full supply discharge = 40 cumecs
Bed width = 30 m.
Full supply depth = 1.8 m.
Bed level = − 206.0 m.

Drainage

High flood discharge = 450 cumecs
High flood level = + 207.0 m.
Bed level of drainage = + 204.0 m.

(4 × 15 = 60 *r*