Code No: 07A60104 **R07** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
WATER RESOURCES ENGINEERING-II
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) How do you classify dams according to use, hydraulic design and materials for construction?
   (b) Explain the following in relation to a reservoir:
      i. Surcharge storage,
      ii. valley storage
      iii. safe yield,
      iv. secondary yield,
      v. mass inflow curve. [6+10]

2. (a) Describe the procedure for the design of a straight glacis fall when it is
      i. Unflumed and non-metered
      ii. Flumed and metered.
   (b) How would you select a suitable type of fall at a particular location. [8+8]

3. (a) Define outlet. What are the essential requirements of a good outlet.
   (b) Draw neat sketches illustrating each of the following types of canal outlets.
      i. Non-modular outlet
      ii. semi-modular outlet and
      iii. rigid module. [8+8]

4. A canal syphon has the following data
   (a) Canal Particulars
      Full supply discharge = 110.00 cumecs
      Full supply level = 203.00
      Bed level = 200 m
      Bed width = 25.0 m
   (b) Drainage Particulars
      High flood discharge = 100 cumecs
      Bed level = 202.00
      High flood level = 204.00
   Assume other suitable data. Design draunage and cannel waterway, levels and roof barrel for the structure. [16]

5. (a) Discuss the reasons for structural failures of earthen dams with the help of neat sketches.
   (b) Explain the component parts and functions of a rockfill dam. [10+6]

6. Explain the procedure of stability analysis of a gravity dam for reservoir full condition and reservoir empty condition. [16]

7. (a) Draw a neat sketch of a volute siphon spillway. Also evaluate its merits and demerits.

   (b) Classify spillways stating the conditions favourable for each type. [10+6]

8. Describe with the help of suitable sketches Bligh's creep theory for the safe design of apron in an irrigation work. [16]

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Code No: 07A60104 **R07** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
WATER RESOURCES ENGINEERING-II
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) How do you decide the section of a zoned earth dam if the following materials are available:
   i. Only silty clay is available.
   ii. Only fine gravel or coarse sand is available.
   (b) Explain the necessity of slope protection in earthen dams. How do you protect upstream and downstream slopes of an earthen dam? [8+8]

2. (a) Discuss briefly how will you decide the following in the design of a canal fall
   i. Fluming ratio
   ii. Crest level of breast wall
   iii. Length and shape of downstream expansive transition.
   (b) Explain briefly various devices commonly used for dissipation of energy below a canal fall with illustrative sketches. [8+8]

3. (a) Describe various steps for the design of a syphon-aqueduct.
   (b) Distinguish between,
   i. Aqueduct and syphon-aqueduct
   ii. Syphon and superpassage and
   iii. Level crossing and inlet. [8+8]

4. (a) State briefly how you will fix up the location and capacity of canal outlet.
   (b) State requirements for an ideal outlet.Distinguish between a modular, a non-modular and a semi-modular outlet. Give examples of each type. [8+8]

5. Write short notes on:
   (a) Straight drop spillway
   (b) Side channel spillway
   (c) Ogee spillway
   (d) Priming devices for siphon spillways. [16]

6. (a) Discuss the limitations and anomalies of Bligh's method.
   (b) Briefly explain Khosla's theory and how it is used in the design of weir on permeable foundations. [8+8]

7. (a) What are the merits and limitations of arch dams?

(b) What is a buttress dam? Explain the different types with neat sketches. [8+8]

8. Calculate the principal and shear stresses at the toe of a gravity dam profile whose details are given below. Consider full reservoir condition with no tail water. Consider forces due to weight of dam, water pressure and uplift pressure only. Assume that all drainage holes are blocked and take into account the maximum uplift. Free board is zero.
Total base width = 24 m
Total height = 30 m
Top width = 4 m
Uniform upstream slope = 6V:1H
Uniform downstream slope = 2V:1H
Friction co-efficient = 0.7
Permissible shear stress = 1370 KN/m^2
Unit weight of dam material = 23.5 KN/m^3
Unit weight of water = 9.8 KN/m^3
Make suitable assumpations wherever necessary. [16]

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Code No: 07A60104 **R07** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
WATER RESOURCES ENGINEERING-II
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give the expression for the uplift pressures at salient points for the following cases.
   i. Impervious floor with a d/s pile
   ii. Impervious floor with an u/s pile
   iii. Impervious floor with an intermediate pile.
   (b) How would you design the inverted filter of a weir. What is the function of concrete blocks over it. [8+8]
2. (a) What are the functions of the canal outlets. What are the requirements of a good outlet.
   (b) Explain the working of a non-modular outlet. What are the advantages and disadvantages of this type of outlet. [8+8]
3. (a) List any eight qualities of a good siphon.
   (b) Draw the neat sketch of USBR drum gate. Mention its salient features. [8+8]
4. (a) What points will you consider while selecting the site of a cross-drainage work.
   (b) Discuss the methods for the estimation of the design discharge and waterway for a drainage at an aqueduct. [8+8]
5. Write short notes on:
   (a) Hydraulic failures of earthen dams
   (b) Significance of pore pressure in relation to earthen dam construction
   (c) Slope protection in earthen dams
   (d) Filters in earthen dams. [16]
6. Explain the mass curve method that can be used for determining:
   (a) Reservoir capacity for fulfilling given demand?
   (b) Demand rate from a reservoir of a given capacity [16]
7. (a) Explain the functions of drainage gallery and construction joints in gravity dams with the help of neat sketches.
   (b) Discuss the evolution of the final profile of a gravity dam from its elementary triangular profile and explain the main principles of its design. [8+8]

8. Following data refers to a canal fall site.

Item	Upstream	Downstream
Full supply discharge	50 cumecs	50 cumecs
Bed width	30 m	30 m
Full supply level	270.00	268.50 m
Bed level	268.00 m	266.50 m

Recommend the fall to be used. Design and sketch the following elements of the fall.

(a) Length and RL of crest

(b) Length and RL of cistern. [16]

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Code No: 07A60104 **R07** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
WATER RESOURCES ENGINEERING-II
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Mention different types of spillways. Also mention different types of gates used on spillways.
   (b) Discuss the salient features that affect the hydraulic design of an Ogee spillway with the help of relevant sketches. [6+10]
2. (a) What are the different types of canal outlets. Give one example of each. What are the criteria for selection of the outlet capacity.
   (b) Define the flexibility and sensitivity of an outlet, and derive a relation between them. [8+8]
3. (a) What is the purpose of providing a fish ladder? Discuss the general considerations for its design.
   (b) What do you understand by critical gradient? What will happen if the critical Gradient is exceeded? What is Khosla's safe exit gradient? [8+8]
4. Explain the method of the design of an aqueduct. How does this design differ from that of a super passage. Draw a neat sketch. [16]
5. (a) Explain the significance of mass curve in the estimation of storage capacity of a reservoir.
   (b) Write advantages of buttress dam and Arched Buttress dam. [8+8]
6. (a) Define elementary profile of dam and derive the base width of elementary profile based on stress and sliding criteria. Consider the full reservoir condition.
   (b) Write detailed notes on:
      i. Uplift force
      ii. Earthquake forces on gravity dams. [8+8]
7. (a) What is phreatic line? Explain its significance in earthen dams.
   (b) Describe the procedure of determining phreatic line through homogeneous earthen dams provided
      i. with a horizontal filter
      ii. without a horizontal filter. [6+10]
8. (a) Why do we provide a fall on canal.Enumerate different types of falls.

(b) Data refer to fall site, full supply discharge us/ds = 50 cumecs, bed width u/s/d/s = 28.0 m, full supply level u/s/d/s = 150.00/148.50, bed level u/s/d/s = 148.00/146.50 m. What type of fall would you recommend for this canal? Design cistern of fall. [8+8]

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