ZAIRE-II (2011 COURSE) (CBS): WINTER- 2016

SUBJECT: WATER IMPOUNDING STRUCTURES

Day: Monday
Date: 28-11-2016

Time: 11:00AM TO 2:00 P.M.
Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate full marks.
3) Both sections should be written in **SEPARATE** answer book.
4) Draw neat and labeled diagram **WHEREVER** necessary.

SECTION-I

Q.1 a) Explain the effect of horizontal acceleration on the stability gravity dam. **(05)**

b) Derive the equation for principal stresses of an elementary profile of a gravity dam. **(05)**

OR

a) Write a note on foundation treatment for gravity dam. **(05)**

b) Explain the distribution of stresses due to opening of galleries in the gravity dam. **(05)**

Q.2 a) Explain the requirement of material for roller compacted concrete dam and state the design criteria and advantages. **(05)**

b) What is uplift pressure? Discuss the USBR criteria for estimation of uplift pressure. **(05)**

OR

What is the necessity of locating phreatic line in an earth dam? Explain the procedure of drawing a phreatic line of the homogenous dam with horizontal drainage blanket. **(10)**

Q.3 What are adverse effect on stability analysis due to sudden draw down and steady seepage on upstream and downstream slope of the dam? **(10)**

OR

What are the various types of failure of an earthen dam and measures to control the failure? **(10)**

SECTION-II

Q.4 a) Explain the procedure for computation of pore pressure in the earth dam using flownet under critical conditions. **(05)**

b) Explain the protective measures for the upstream and down stream slopes of earth dam. **(05)**

OR

a) State the various design criteria for rock fill dams. **(05)**

b) Explain the Swedish slip circle method of stability of slopes for earth dam. Derive the formula to determine factor of safety. **(05)**

Q.5 a) Discuss the factors affecting the coefficient of discharge over on ogee shaped spillway. **(05)**

b) Write a note on bucket type of energy dissipator. **(05)**

OR

a) Explain how the tail water and jump height curve has significance for the design of stilling type of basin with neat sketches. **(05)**

b) What are the USBR criteria for type of stilling basins based on Froude Number? **(05)**

Q.6 a) Write note on: **(05)**

i) Types of various gates

ii) Instrumentation for earthen dam

b) What are the important parameters for monitoring the performance of gravity dam? Discuss any two instruments. **(05)**

OR

a) Describe in details the drum gates provided over spillways. **(05)**

b) What is the role of instrumentation in monitoring the earth dam? Explain any two instruments. **(05)**

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ZAIRE – II (2011 COURSE) (CBS): WINTER- 2016

SUBJECT : SEDIMENT TRANSPORT & RIVER ENGINEERING

Day : Saturday
Date : 26-11-2016

Time : 11:00 AM TO 2:00 P.M.
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non programmable **CALCULATOR** is allowed.
4) Answers to both the sections should be written in the **SEPARATE** answer books.

SECTION – I

Q.1 a) Explain nature of sediment problem with reference to Hydropower plants. **[05]**

b) The fall velocity of 0.2mm sediment particle in clear water at 20^0C is 7.01mm/sec. If the particle is to fall in water having sediment concentration 2% by volume, what would be the fall velocity of this particle? **[05]**

OR

a) List out and explain the bulk properties of sediment. **[05]**

b) Derive the Shield's equation for incipient motion of sediment. State modifications suggested by Yalin and Karahan. **[05]**

Q.2 a) What are typical characteristics of ripples and dunes? Explain with sketches. **[05]**

b) Determine the shear stress at which 1mm diameter sand particles of relative density 2.65 will just begin to move. If the channel is wide its slope is 0.002. What is the corresponding water depth? Use Shield's criteria for estimation. **[05]**

OR

What is the practical significance of bed forms? Explain with sketches. **[10]**

Q.3 What is meant by total load? Explain macroscopic and microscopic methods of measurement of total load. **[10]**

OR

a) Define bed load and suspended load. Explain indirect methods of bed load measurement. **[05]**

b) Explain anyone method to obtain critical tractive stress for non-uniform sediments. **[05]**

SECTION – II

Q.4 Design an irrigation channel to carry discharge $50m^3/s$. Assuming Kennedy's theory. Take S = 1/5000 m = 1, N = 0.02, side slope 0.5H : 1V. **[10]**

OR

What is meant by channel in Regime? Explain briefly theory presented by Lacey for the design of stable channel. **[10]**

Q.5 List out the data required for the estimation of sedimentation in reservoir and life of a reservoir. **[10]**

OR

Draw typical sketch of the flow around a circular pier. Name the important components. **[10]**

Q.6 What is an embankment? What are its functions in river training works? Draw typical components of an embankment. List out the design parameters from River engineering point of view (Not the sediment parameters). **[10]**

OR

A single channel river is flowing in to two channels around an island covering a long length. The two channels are carrying equal discharges. One of the channel is closed and the discharge is diverted to the other channel. Explain the likely immediate and long term / morphological effects on the river parameters in the reach down stream of the island. **[10]**

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