

ZAIRE-III (CBCS - 2015 COURSE) : WINTER 2016
SUBJECT : ELECTIVE-II – (A) WATER POWER ENGINEERING

Day : Friday
Date : 16-12-2016

Time : 11.00 A.M. To 2.00 P.M.
Max. Marks : 60.

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate full marks.
- 3) Draw neat labeled diagrams **WHEREVER** necessary.
- 4) Answers to the two sections should be written in **SEPARATE** answer books.

SECTION-I

- Q.1** Compare and Briefly explain the differences in (a) High head Diversion Plants – (10)
Run of the river Plants – Valley Dam Plants (b) Single Purpose – Multi Purpose
Plants.

OR

Briefly explain the differences in the following terms: (a) Daily Load curve -
Annual Load Curve (b) Capacity Factor – Power Factor – Load Factor.

- Q.2** List out the different methods used for the estimation of run-off. Elaborate the same (10)
with a short note on the use of mathematical models for this purpose.

OR

Explain and compare the Phenomenon of (i) Air entrainment and (ii) Aeration
requirement at the Intake Structures. Use sketches for the explanation.

- Q.3** Discuss and compare the typical characteristics of fully buried and fully exposed (10)
penstock pipes. Draw a typical sketch of fully buried penstock to show important
components provided for stability and protection.

OR

List out the different forces acting on an Anchor block. Briefly explain the
important component forces with the help of sketch.

SECTION-II

- Q.4** Briefly explain the concepts of water hammer as per (i) Rigid water column and (ii) (10)
Elastic water column theory. Draw neat sketches wherever required. Discuss their
advantages and limitations of the two theories.

OR

Discuss the problems caused in the hydraulic system in absence of surge tanks, and
explain how the provision of surge tank helps to overcome the same.

- Q.5** List out the different classifications of turbines. Discuss and compare the (10)
characteristics of Impulse and reaction turbines with the help of neat sketches.

OR

Discuss the function of draft tube. Define and explain the term “Efficiency of draft
tube”. Draw typical elbow type draft tube showing important components, and
discuss its merits and demerits.

- Q.6** Discuss and compare the merits and demerits of the Power Houses located (10)
underground against Power Stations Located on Ground. Draw overall layout of
typical underground stations from the storage Dam to tailrace outfall showing
important components.

OR

Write a note on “Enhancing the capabilities of small Hydro-electric Projects by
standardization and other technical means.”

ZAIRE – III (2015 COURSE) (CBCS): WINTER – 2016
SUBJECT : ELECTIVE – I: COASTAL ENGINEERING

Day : *Wednesday*
Date : *14-12-2016*

Time : *11.00 A.M. To 2.00 P.M.*
Max. Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the section should be written in **SEPARATE** answer books.
- 4) Assume suitable data if necessary.

SECTION – I

- Q.1** Write short notes on **ANY THREE** of the following: **[10]**
- a) Normalized wave spectrum
 - b) Methods for estimation of Longshore Transport
 - c) Wave breaking criteria
 - d) Cell circulation

OR

- Q.1** a) What are the various methods of wave data collection? State the applicability and limitations if any. **[05]**
- b) What are the methods of wave data analysis? Explain the procedure for computation of design wave height for various return period. **[05]**
- Q.2** List the different wave theories. State the assumptions made in the development of Airy's (linear) wave theory. What is the significance of dispersion equation? **[10]**

OR

- Q.2** Explain the phenomena of refraction and diffraction of waves with sketches and their significance in the various coastal processes of sediment transport and wave energy distribution. **[10]**
- Q.3** Explain the various types of dredgers used for coastal dredging activities and the criteria for selection of dredgers. **[10]**

OR

- Q.3** Explain the effect of various sediment processes on erosion / accretion phenomena and criteria for stability of beach profiles. **[10]**

P.T.O.

SECTION – II

Q.4 Write short notes on **ANY THREE** of the following: **[10]**

- a) Modern port facilities and their advantages
- b) Factors affecting Coastal Pollution
- c) Criteria for sand trap design
- d) Design of industrial waste out fall in the sea

OR

Q.4 a) List the various types of offshore structures and explain criteria for design of oil platform. **[05]**

b) Explain the effect of harbor oscillation in the dock arm and measures to be taken. **[05]**

Q.5 Explain the modes of vibration and measures to control with reference to spacing of vertical pile in the platform. **[10]**

OR

Q.5 Elaborate factors affecting the growth and development of the port. **[10]**

Q.6 What is the concept of port cost analysis? Elaborate the various factors affecting the minimum cost / ton for the operation of port. **[10]**

OR

Q.6 What are the Environment aspects of coastal zone management and measures to be taken for sustainable developments in coastal region? **[10]**

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ZAIRE-III (CBCS) (2011 COURSE): ~~WINTER~~-2016

SUBJECT: ELECTIVE-II a) HYDRAULIC MODELING AND HYDROPOWER STRUCTURES

Day: Friday

Time: 11:00AM-TO 2:00 P.M.

Date: 16-12-2016

Max. Marks: 60

N.B:

- 1) All questions are COMPULSORY.
- 2) Figures to the right indicate FULL marks.
- 3) Both the sections should be written in the SEPARATE answer books.
- 4) Assume suitable data, if necessary.

SECTION-I

Q.1 Evolve the factors for converting the following quantities from FPS to MKS Units: Discharge, Momentum, Energy (i.e. Work done) (10)

OR

Q.1 Explain the term homogeneity in dimensional analysis. Use Manning's equation for velocity as an example for the explanation. (10)

Q.2 Model spillway is constructed to a scale of 1:40. Length of the spillway is 40 m, head over spillway 3 m. and discharge 360 m³/s. Estimate the corresponding parameters in the model. Derive the scale ratios for each quantity before use. (10)

OR

Q.2 A model is proposed for conducting hydraulic studies for a Bridge, in alluvium; for the studies of its training/ protection works. What type of model do you propose? List out the data requirements for the model. List out the instruments required for the studies. (10)

Q.3 Explain briefly in 8-10 lines the following : Hot film anemometer, Water tunnel. (10)

OR

Q.3 What is the role of instruments in hydraulic models? Explain the following terms used for instruments: Repeatability, Sensitivity, Precision, error, Spurious errors. (10)

SECTION-II

Q.4 List out and briefly discuss the different outlets from a dam structure. (10)

OR

Q.4 What is meant by aeration? Discuss with neat sketch the purpose and functioning of aeration in sluices for the intake structures. (10)

Q.5 What are trash racks in a dam? What is racking of trash rack? List out categories of material handled by racking of trash racks. (10)

OR

Q.5 List out the classifications of penstocks indicating their advantages and disadvantages. (10)

Q.6 List out different classifications of Power Houses, indicating the conditions of their use, their merits and demerits if any. (10)

OR

Q.6 What is a draft tube? Draw a sketch explaining its design criteria and functions. (10)

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