FACULTY OF ENGINEERING
B.E. 4/4 (Civil) I – Semester (New) (Suppl.) Examination, July 2014

Subject: Water Resources Engineering – II

Time: 3 Hours   **Max.Marks: 75**

Note: 1) Answer all questions from Part A. Answer any five questions from Part B.
2) Assume any Data Missing suitably.
PART – A (25 Marks)

1   Distinguish between Valley Storage and Bank Storage.   2

2   Define useful life of reservoir.   3

3   A gravity dam is proposed to be designed as low dam. Compute the limiting height
    to be designed, when the maximum permissible stress in the material is limited to
    260 N/mm^2 (26 kg/cm^2) taking specific gravity of the material as 2.40.   3

4   State what you understand by middle third rule in gravity dam analysis.   2

5   State the Terzaghi's criteria for design of filters in Earthen dams.   3

6   Define phreatic line in earthen dams.   2

7   List out the functions of spillway.   3

8   List the reasons for creation of hydraulic jump at the downstream side of spillway.   2

9   A power plant is working under a load between 50 MW to 110 MW. It has two units
    each is of 80 MW. Compute the load factor and plant factor.   3

10 List out the functions of Trash racks in hydel projects.   2

PART – B (50 Marks)

11 a) The runoff data at site of reservoir is given below. What is the maximum
        demand that can meet from this reservoir? What is the minimum initial storage
        required? When does the reservoir become empty?   6

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Flow in m^{3}x10^6	120	25	30	35	20	56	190	230	120	80	60	36

    b) Explain the zones of storage for a reservoir.   4

12 A masonry dam 15 m height is trapezoidal in section with top width 2.0 m and
    bottom width 16 m. The face exposed to water has a slope of 1:10. Test the
    stability of the dam. Compute the principle stresses at the toe and heel of dam.
    Assume unit weight of masonry as 2300 kg/m^3. The permissible stress of joint is 16
    kg/m^2. Assume no free board. Consider reservoir full and reservoir empty condition.   10

13 a) Explain the suitability of soils for the construction of core of earth dam.   4

    b) Explain the criteria for the safe design of earth dam.   6

14 a) Compute the effective length and height of water above the spillway which has a D/S slope of 0.7 H:IV. The design discharge is 6000 cumecs. The average bed level is 200.0 m and spillway level is 280.0 m. The spillway comprises of 6 spans of 10 m each. Consider the thickness of each pier as 2.0 m. Also design the D/S profile of spillway. 6

b) Explain the procedure of constructing Tail Water Curve and Jump Height Curve. 4

15 a) A run off river plant has installed capacity of 30000 kW operates at 32% load factor when it serves as peak load station. 5

    i) What should be the minimum discharge in the stream, so that it may serve as base load station? Assume plant efficiency of 85%, when working under head of 22m.

    ii) Also calculate the maximum load factor of the plant, when the discharge in the stream is 55 cumecs.

b) Explain briefly various classifications of hydropower plants 5

16 a) With relevant equations and figures, explain various forces acting on gravity dams. 6

b) Explain various failures of Earthen dams. 4

17 Write short note on the following: 10

    a) Selection of site for reservoir

    b) Drainage criteria of earthen dams

    c) Intake structures of hydropower plants.

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