| BICE-025 |

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

December, 2017

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BICE-025 : HYDRAULICS AND HYDRAULIC MACHINES

Time : 3 hours   *Maximum Marks : 70*

Note : *Answer any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume missing data, if any.*

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1. (a) Differentiate between open channel flow and pipe flow.   5

    (b) Describe the various types of open channels.   5

2. Describe the specific energy curve with the help of an appropriate diagram. Find the critical depth and critical velocity of water flowing through a rectangular channel of width 5 m, when discharge is 15 m^3/s.   5+5

3. Derive the conditions needed for the most economical rectangular channel. **10**

4. Find the discharge through a trapezoidal channel of width 8 m and side slope of 1 horizontal to 3 vertical. The depth of flow of water is 2·4 m and the value of Chezy's constant, C = 50. The slope of the bed of channel is 1 in 4000. **10**

5. State the assumptions required for the equation of gradually varied flow. Also state the limitations of this equation. **6+4**

6. Derive the expression for depth of hydraulic jump in terms of upstream Froude number. **10**

7. Differentiate between rotodynamic pumps and rotodynamic machines. Also provide neat sketches, wherever needed. **10**

8. (a) Differentiate between Francis and Pelton turbines. **5**

   (b) Explain different types of efficiency of a turbine. **5**

9. Describe the following : $4 \times 2\frac{1}{2} = 10$

   (a) Cavitation

   (b) Surge

   (c) Draft Tube

   (d) Spear Valve