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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2026

B.Tech-VI Semester (CSE/IT/BT/ECE/CE)

COURSE CODE (CREDITS):18B1WCE639 MAX. MARKS: 25

COURSE NAME: Open Channel Flow and Hydraulic Machine

COURSE INSTRUCTORS: Ashish Kumar MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems, Notation has its usual meaning.

(c) Use of calculator is allowed

<table>
<tr><th>Q.No</th><th>Question</th><th>CO</th><th>Marks</th></tr>
<tr><td>Q1 (a)</td><td>Explain the phenomenon of hydraulic jump in open channel flow by considering the Froude Number. Where it occurs in channel flow?</td><td>2</td><td>2</td></tr>
<tr><td>Q1 (b)</td><td>The depth of flow of water, at a certain section of a rectangular channel of 4 m wide, is 0.1 m. The discharge through the channel is 16 m^3/s. State whether hydraulic jump will occur if so, find its height and loss of energy in hydraulic jump.</td><td>2</td><td>5</td></tr>
<tr><td>Q2</td><td>What do you understand by conveyance of the channel. State the significance of it. A discharge of 20 m^3/s flows in a rectangular channel 10 m wide set to a slope of 10^{-4}. Find normal depth of flow if value of Manning roughness coefficient (n) = 0.012.</td><td>2</td><td>1+4</td></tr>
<tr><td>Q3</td><td>How current meter is used to compute the velocity in a stream? The following observation were recorded while calibrating the current meter. Generate the function relationship stating boundary condition for computation of velocity through current meter.
<table>
<tr><td>N (No. of revolution)</td><td>100</td><td>175</td><td>280</td><td>495</td><td>1080</td><td>1430</td><td>2080</td></tr>
<tr><td>t (time sec))</td><td>20</td><td>25</td><td>35</td><td>45</td><td>60</td><td>65</td><td>80</td></tr>
<tr><td>V (Velocity-cm/sec)</td><td>9.1</td><td>12.2</td><td>15.5</td><td>18</td><td>24.5</td><td>30</td><td>35</td></tr>
</table></td><td>3</td><td>6</td></tr>
<tr><td>Q4</td><td>Why ventilation in the weir is provided? Determine the height of a rectangular weir of length 6 m to be built across a rectangular channel. The maximum depth of water on the upstream side of the weir is 1.8 m and discharge is 2 m^3/sec. Take C_d = 0.6 and neglect end contraction.</td><td>3</td><td>2+2</td></tr>
<tr><td>Q5</td><td>How is reaction turbine different from Impulse turbine? Differentiate between inward flow and outward flow reaction turbine.</td><td>4</td><td>3</td></tr>
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