*Total number of printed pages: 1* **PG/1st Semester/ PCEW102**

**2024 (back)**

**Open Channel Flow**

*Full Marks : 100*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer **any five** questions.*

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|---|---|---|---|
| 1. | a) | If $y_1$ and $y_2$ are alternate depths in a triangular channel and $y_c$ is critical depth then show that $$\frac{2y_1^2 y_2^2}{(y_1 + y_2)} = y_c^3$$ | 10 |
| | b) | In a rectangular channel $F_1$ and $F_2$ are the Froude numbers corresponding to alternate depths of a certain discharge. Show that $$\left(\frac{F_2}{F_1}\right)^{2/3} = \frac{2 + F_2^2}{2 + F_1^2}$$ | 10 |
| 2 | a) | The velocity distribution of a rectangular channel of width B and depth of flow y was approximated as $v=ky^{4/3}$ in which k is constant. Calculate the average velocity for the cross section and the correction coefficients α and β. | 10 |
| | b) | Derive the condition for critical flow. Also derive the equation for minimum specific energy for the rectangular section and trapezoidal section. | 10 |
| 3 | | What are the 12 water surface profiles exist in gradually varied flow. Sketch them with real life examples. | 20 |
| 4 | | Write short notes on:<br>a) Types of Channels<br>b) Types of hydraulic Jump<br>c) Classification of flow profiles<br>d) Classification of flow in open channel. | 4 x 5 =20 |
| 5 | | (a) What is prismatic and non-prismatic channel?<br>(b) What is spatially varied flow? Give Example.<br>(c) What are the different kinds of slopes in channel section?<br>(d) What are different types of rapidly varied unsteady flow? | 4 x 5 =20 |

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