Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2023

CE3CO24 Hydraulic Engineering

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. The Reynolds number for a flow in a channel is 1000. What type of flow is it? **1**

(a) Laminar (b) Turbulent (c) Transition (d) Steady

ii. The Froude's number for a flow in a channel section is 1. What type of flow is it? **1**

(a) Sub Critical (b) Critical

(c) Supercritical (d) Tranquil

iii. What is the angle made by the sloping side when the Trapezoidal section has a maximum discharge? **1**

(a) 30^o (b) 60^o (c) 90^o (d) 75^o

iv. For a channel section to be most economical, which of the following paraments should be minimum- **1**

(a) Wetted perimeter (b) Wetted Area

(c) Section Factor (d) Hydraulic Depth

v. Classical jump occurs when _____. **1**

(a) Temperature changes

(b) Pressure changes

(c) Supercritical to subcritical change

(d) Volumetric changes

vi. Eddy viscosity is the turbulent transformation of- **1**

(a) Fluid (b) Heat (c) Momentum (d) Pressure

vii. Presence of tail-water in a gravity dam _____. **1**

(a) Increases the principal stress and decreases the shear stress

(b) Increases both the principal stress and the shear stress

(c) Decreases the principal stress and increases the shear stress

(d) Decreases both the principal stress and the shear stress

P.T.O.

viii. The spillway which can be called an overflow spillway is essentially _____. **1**

(a) An ogee spillway (b) A shaft spillway
(c) A chute spillway (d) A syphon spillway

ix. Which of the following statements is correct regarding earthen dams? **1**

(a) These dams are very costly compared to other types
(b) They are less susceptible to failure as compared to rigid dams
(c) These dams are suitable for construction on almost every type of foundation
(d) Highly skilled labour is generally not required

x. The process of laying and compacting earth in layers by power rollers under OMC for the construction of earthen dams is known as _____. **1**

(a) Rolled fill method
(b) Hydraulic fill method
(c) OMC method
(d) Compaction

Q.2 i. Draw the velocity distribution curve in open channel flow. **3**

ii. Derive and explain Chezy's formula for open channel flow. **7**

OR iii. Explain the most economical channel section in open channel flow. **7**

Q.3 i. Draw a well-labelled specific energy curve. **4**

ii. Explain the classification of the channel bottom slope. **6**

OR iii. Derive the dynamic equation of gradually varied flow. **6**

Q.4 i. Explain the concept of boundary layer theory. **2**

ii. Explain the theory of the Hydraulic Jump. Also, explain its elements. Derive the expression for hydraulic jump. **8**

OR iii. Explain the following: **8**

(a) Energy dissipaters and their uses
(b) Boundary layer separation and its control

Q.5 i. Draw and explain the elementary profile and practical profile of gravity dam. **4**

ii. What are the various forces acting on a gravity dam? What are the various IS load combinations? **6**

OR iii. What is the purpose of providing spillways? Explain different types of spillways with neat sketches. **6**

Q.6 Attempt any two:

i. Draw a well-labelled diagram of a typical section of earth dam. Also, explain the concept of phreatic line. **5**

ii. Explain the causes of the failure of the earth dam in detail. **5**

iii. How is the stability of the slope of the earth dam analysed? Explain any one method in detail. **5**

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Marking Scheme

CE3CO24[T] Hydraulic Engineering

Q.1	i)	The Reynolds number for a flow in a channel is 1000. What type of flow is it? **c) Transition**	**1**
	ii)	The Froude's number for a flow in a channel section is 1. What type of flow is it? **b) Critical**	**1**
	iii)	What is the angle made by the sloping side when the Trapezoidal section has a maximum discharge? **b) 60 º**	**1**
	iv)	For a canal section to be most economical, which of the following paraments should be minimum- **a) wetted perimeter**	**1**
	v)	Classical jump occurs when_____ **c) Supercritical to subcritical change**	**1**
	vi)	Eddy viscosity is the turbulent transformation of **c) momentum**	**1**
	vii)	Presence of tail-water in a gravity dam _____ **d) decreases both the principal stress and the shear stress**	**1**
	viii)	The spillway which can be called an overflow spillway is essentially _____ **a) an ogee spillway**	**1**
	ix)	Which of the following statements is correct regarding earthen dams? **c) These dams are suitable for construction on almost every type of foundation**	**1**
	x)	The process of laying and compacting earth in layers by power rollers under OMC for the construction of earthen dams is known as _____ **a) Rolled fill method**	**1**
Q.2	i.	Draw the velocity distribution curve in open channel flow.	**3**
	ii.	Derive and explain Chezy's formulae for open channel flow.	**7**
OR	iii.	Explain the most economical canal section in open channel flow	**7**
Q.3	i.	Draw a well-labelled Specific Energy curve.	**4**
	ii.	Explain the classification of the channel bottom slope.	**6**

OR	iii.	Derive dynamic equation of GVF	**6**
Q.4	i.	Explain the Concept of boundary layer theory.	**2**
	ii.	Explain the Theory of the Hydraulic Jump. Also, explain its elements And Expression.	**2** **6**
OR	iii.	Explain - a) Energy Dissipaters and their uses. b) boundary layer separation and its control	**4** **4**
Q.5	i.	Draw and explain the elementary Profile of Gravity Dam Draw and Explain the Practical Profile of Gravity Dam	**2** **2**
	ii.	What are the Various forces acting on a gravity dam? What are the various IS load combinations?	**3** **3**
OR	iii.	What is the purpose of Providing Spillways? Explain different types of spillways with neat sketches.	**2** **4**
Q.6		Attempt any two:	
	i.	Draw a well-labelled diagram of a typical section of Earth dam. Also, explain the concept of phreatic line.	**3** **2**
	ii.	Explain the Causes of the failure of the Earth Dam in detail.	**5**
	iii.	How is the stability of the Slope of the Earth dam analysed? Explain any one method in Detail.	**3** **2**

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