Total No. of Questions: 22

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

CE3CO24 Hydraulic Engineering

Programme	:	B.Tech.	**Branch/Specialisation**	:	CE
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

		Marks	CO	BL
Q1.	The equation used to compute uniform flow in open channels is- ○ Darcy-Weisbach equation ◉ Chezy's equation ○ Euler's equation ○ Reynolds equation	1	1	1
Q2.	Critical depth in an open channel is determined using- ○ Energy equation ○ Momentum equation ◉ Specific energy equation ○ Continuity equation	1	2	2
Q3.	Specific energy curve is useful in analyzing- ◉ Subcritical and supercritical flow ○ Turbulent and laminar flow ○ Uniform and non-uniform flow ○ Steady and unsteady flow	1	1	1
Q4.	Gradually varied flow occurs due to- ○ Sudden changes in flow conditions ○ Presence of hydraulic jump ◉ Change in energy gradient ○ Water hammer effect	1	2	2
Q5.	Hydraulic jump is caused by- ○ Flow acceleration ○ Flow retardation ◉ Change from supercritical to subcritical flow ○ Change from subcritical to supercritical flow	1	1	1
Q6.	The displacement thickness in boundary layer theory is used to- ○ Determine velocity profile ○ Estimate shear stress ○ Estimate energy loss ◉ Account for mass flow deficit	1	2	2
Q7.	The main force acting on a gravity dam is- ○ Wind force ○ Earthquake force ◉ Water pressure ○ Thermal force	1	1	1
Q8.	The primary purpose of an Ogee spillway is to- ○ Store excess water ◉ Control flood discharge ○ Generate electricity ○ Prevent sedimentation	1	2	2
Q9.	Seepage through an earth dam is controlled by- ○ Increasing dam height ◉ Providing a core wall ○ Reducing spillway capacity ○ Increasing dam slope	1	1	1
Q10.	Rockfill dams are most suitable when- ◉ Foundation conditions are poor ○ Water storage is temporary ○ Seepage is unimportant ○ Large flood discharges are expected	1	2	2

Section 2 (Answer all question(s))

Marks CO BL

Q11. Differentiate between critical slope and normal slope. **2 2 2**

Rubric	Marks
2 points	2

Q12. (a) Derive Chezy's formula for open channel flow and assess its practical applications. **8 3 1**

Rubric	Marks
derivation	6
applications	2

(OR)

(b) Explain the significance of velocity distribution in open channel flow. Also evaluate the impact of velocity distribution in an open channel on hydraulic design.

Rubric	Marks
significance of velocity distribution	2
evaluation the impact of velocity distribution in an open channel	6

Section 3 (Answer all question(s))

Marks CO BL

Q13. Explain the significance of specific energy in open channel flow. **2 2 2**

Rubric	Marks
2 points	2

Q14. Explain the concept of critical flow and analyze its impact on hydraulic structures. **3 2 2**

Rubric	Marks
concept	1
Analysis	2

Q15. (a) Compute the critical depth for a rectangular channel with given flow conditions. **5 1 1**

Rubric	Marks
derivation	5

(OR)

(b) Derive the dynamic equations of gradually varied flow profiles.

Rubric	Marks
complete answer	5

Section 4 (Answer all question(s))

Marks CO BL

Q16. Explain the different types of hydraulic jumps and their characteristics. **3 3 3**

Rubric	Marks
types	1
2 Characteristics	2

Q17. (a) Derive an expression for the sequent depth of a hydraulic jump and evaluate its energy dissipation efficiency. **7 4 1**

Rubric	Marks
derivation	4
evaluation	3

(OR)

(b) Evaluate the role of boundary layer separation in hydraulic structure performance.

Rubric	Marks
correct answer	7

Section 5 (Answer all question(s))

Marks CO BL

Q18. Explain the elementary profile of a gravity dam and its significance in structural stability. **4 2 2**

Rubric	Marks
explanation	2
Significance	2

Q19. (a) Derive the stability condition for a low gravity dam and analyze its structural limitations. **6 3 1**

Rubric	Marks
derivation	4
limitation	2

(OR)

(b) Evaluate the design approaches for ogee spillways considering hydraulic efficiency.

Rubric	Marks
6 points	6

Section 6 (Answer any 2 question(s))

Marks CO BL

Q20. Discuss the major causes of failure in earth dams and their preventive measures. **5 2 2**

Rubric	Marks
5 points	5

Q21. Discuss the seepage control methods in earth dams and evaluate their effectiveness. **5 4 4**

Rubric	Marks
5 points	5

Q22. Assess the types and merits and demerits of rockfill dams. **5 5 5**

Rubric	Marks
types	2
merits and demerits	3

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