PAPER ID-410928

Subject Code: KCE053

Roll No: | | | | | | | | | | | | | |

B.TECH.

(SEM V) THEORY EXAMINATION 2021-22

OPEN CHANNEL FLOW

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

Q no.	Question	Marks	CO
a.	Define uniform flow.	2	1
b.	Write basic concept of free surface flows.	2	1
c.	Define gradually varied flow.	2	2
d.	Write differential equation of GVF.	2	2
e.	Define energy dissipater..	2	3
f.	Define sluice gate.	2	3
g.	What is specially varied flow?	2	4
h.	What causes gradually varied flow?	2	4
i.	Which factor affect the flow through culvert.	2	5
j.	Why is supercritical bad?	2	5

SECTION B

2. Attempt any *three* of the following:

Q no.	Question	Marks	CO
a.	Differentiate steady and unsteady flow and pipe flow and open channel flow.	10	1
b.	A rectangular channel with a bottom width of 4 m and bottom slope of 0.0008 has a discharge of 1.50 m^3/s . In gradually varies flow in this channel , the depth at certain location is found to be 0.30 m . Assumimg n=0.016 , determine the type of GVF.	10	2
c.	Write the uses of hydraulic jump.	10	3
d.	Explain in detail the 'Modified Hinds Method' used for profile computation in SVF	10	4
e.	What are prismatic and non-prismatic channel sections ? Why most of the channels are non-prismatic?	10	5

SECTION C

3. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Calculate the possible depths of flow which discharge of 26.67 cumec may be carried in a rectangular channel 3.5 m with a specific energy equal to 2.74 m.	10	1
b.	With neat sketches explain velocity distribution circular channel and triangular channel.	10	1

4. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	A rectangular channel of 4.0 m wide has a Manning's Coefficient of 0.025. For a discharge of 0.6 m^3/s in this channel. Identify the possible GVF produced in the following break in grades (i) S_{01} = 0.0004 to S_{02}= 0.015 (ii) S_{01}= 0.005 to S_{02}=0.0004	10	2
b.	Derive the dynamic equation of GVF state its various assumptions.	10	2

5. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	How do waves move differently in deep water VS shallow water?	10	3
b.	In a hydraulic jump occurring in a rectangular cghannel of 3.0 m , the discharge is 7.5 m3/s and the depth before the jump is 0.28 m. Estimate (i) sequent depth (ii) Energy loss in the jump.	10	3

6. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Write the name of various numerical methods for profile computation in SVF with lateral inflow.	10	4
b.	What are the primary differences between the Hardy Cross and Newton Raphson's method for solving the ΔQ equations?	10	4

7. Attempt any *one* part of the following:

Q no.	Question	Marks	CO
a.	Explain briefly the transitions of subcritical and supercritical flow.	10	5
b.	What is the importance of velocities for culvert design? Explain with neat sketch main components of culvert.	10	5