

**Objective Questions:-**

- 1 Examples of channel transitions are
  - a) contractions
  - b) expansions
  - c) bends
  - d) All of the above
- 2 Flow developed due to sudden transition is
  - a) Gradually varied flow
  - b) Spatially varied flow
  - c) Rapidly varied flow
  - d) Uniform flow
- 3 Following factors affect the flow through culvert
  - a) Geometry
  - b) Bottom slope
  - c) Tail water conditions
  - d) All of the above
- 4 Flow through culvert is
  - a) Upstream controlled
  - b) Downstream controlled
  - c) Both
  - d) None of the above
- 5 When the culvert is partially full, the flow will be
  - a) Subcritical
  - b) Supercritical
  - c) Critical
  - d) Uniform

6 At a bridge site the flow will not choke if

a)  $z_{BB} + E_{BB} = z_{BB} + E_{crit}$

b)  $z_{BB} + E_{BB} < z_{BB} + E_{crit}$

c)  $z_{BB} + E_{BB} > z_{BB} + E_{crit}$

d) All of the above

Where BB is the bridge section.

**Answers:-**

1(d)

2(c)

3(d)

4(c)

5(a)

6(c)

**Subjective Questions**

- 1 What do you mean by sudden transition in an open channel explain with sketch.
- 2 What are Culverts. What they are used for.
- 3 Differentiate between inlet controlled and outlet controlled culverts.
- 4 Write down the difference between the flow through obstructions and flow through bridge.
- 5 A 2m wide rectangular channel carries a discharge of 15 cumec at a depth of 2.5m. There is a step rise of 0.1m in the channel bottom. Assuming there is no losses in the transition; determine the flow depth downstream of the bottom step. (*Ans. 1.41m and 2.31m*).
- 6 A discharge of 2.0 cumec flows through a rectangular box culvert having  $D=1.5\text{m}$ ,  $b=1.0\text{m}$ ,  $L=40\text{m}$ ,  $n=0.013$ , and  $S=0.002$ . Outlet of the culvert is submerged with the tail water head of 1.5m. Determine the headwater depth. Take  $k_e=0.5$ . (*Ans. 1.795m*)

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