

**Objective questions:-**

1. In most economical rectangular section of a channel, depth is kept equal to
  - a. One-fourth of the width
  - b. Three times the hydraulic radius
  - c. Hydraulic mean depth
  - d. Half the width
  
2. In a hydraulically most efficient trapezoidal channel section the hydraulic radius  $R=$ 
  - a.  $y/2$
  - b.  $y/4$
  - c.  $2y$
  - d.  $4y$
  
3. Most efficient channel section, is
  - a. Trapezoidal
  - b. Rectangular
  - c. Circular
  - d. Half hexagon in the form of trapezoid
  
4. Most economical section of a triangular channel is
  - a. Equilateral triangle
  - b. Right angled triangle
  - c. Isosceles triangle having vertex angle equal to  $45^\circ$
  - d. Right angled triangle with equal sides
  
5. In a hydraulically most efficient trapezoidal channel section the ratio of the bed width to depth is
  - a. 1.155
  - b. 0.50

c. 0.707

d. 1.10

6. Most economical section of a circular channel for maximum velocity, is if

a. Depth of water = 0.81 diameter

b. Hydraulic mean depth = 0.304 diameter

c. Wetted perimeter = 2.245 diameter

d. All the above.

Answers:-

1(d)

2(a)

3(d)

4(d)

5(a)

6(d)

**Subjective questions:-**

- 1 What do you mean by uniform flow? What are the characteristics of uniform flow?
- 2 Enlist the factors affecting the Manning's roughness coefficient.
- 3 Explain what you mean by the 'most economical' section of a channel. Develop the criterion for the most economical trapezoidal section of a channel if the side slopes are fixed.
- 4 Show that top width is equal to the length of sloping side for the most economical trapezoidal section.
- 5 Develop the criterion for the most economical trapezoidal section of a channel if the side slopes are fixed.
- 6 A circular channel is proposed to lay on a slope of 1 in 2000 and is required to carry 1.5cumec. What size of circular channel should be used if it has to flow half-full take  $n=0.015$ . (Ans. 2.1m)
- 7 A circular sewer of diameter 1m carries storm water to a depth of 0.75m. Compute the hydraulic radius, hydraulic depth and section factor. (Ans. 0.198m, 0.479 and 0.287)
- 8 A triangular channel with an apex angle of  $90^\circ$  carries a flow of 0.7cumec at a depth of 0.6m. If bed slope is 1 in 100. Find the Manning's roughness of channel. (Ans. 0.0147)
- 9 A trapezoidal channel is 15m wide and has a side slope 1H: 1V. Bottom slope is 1 in 2500. The channel is lined with smooth concrete having  $n=0.015$ . Compute discharge and velocity for the depth of 3.6m. (Ans. 171.42 cumec)
- 10 In the above example, find the bed slope, if it carries 76 cumec of flow at 3.6m. (Ans. 1 in 12709)
- 11 The rate of flow of water through a circular channel of diameter 0.5m is 10  $\frac{\text{lit}}{\text{sec}}$  and the slope of bed of the channel for maximum velocity. Assume  $C = 50$ . (Ans. 1 in 1058.43)
- 12 Determine the dimensions for the economical section of a trapezoidal channel having discharge area  $7\text{m}^2$ . Take the side slope of the channel as 2 vertical to 1 horizontal. (Ans. 2.48m)
- 13 Determine the maximum discharge of water through a circular channel of diameter 1.2m, when the bed slope of the channel is 1 in 1500. Assume  $C=50$ . (Ans. 0.839cumec)
- 14 A trapezoidal channel of most efficient section has side slopes of 1:1. It is required to carry

- a discharge of 15 cumec with a slope of 1 in 1500. Design the section if  $n=0.0135$ . (Ans.  $B=1.7m$ ,  $H=2.05m$ )
- 15 A circular channel conveys 3.25 cumecs of water when  $\frac{3}{4}$  of vertical diameter is immersed. The slope of the channel is 0.2m per kilometre. Determine the diameter of channel, using Manning's formula. Take  $C = 87.5$ . (Ans.  $D = 1.9m$ )
- 16 Find the bed slope of trapezoidal channel of bed width 2.5m, depth of water 1.2m and side slope of 2H to 3V, when the discharge through the channel is 10 cumecs. assume Manning's  $n=0.03$ . (Ans. 1 in 90.91)

**References:-**

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