8 CHAPTER

River Training and Cross Drainage Works

Q.1 In curved reach of a meandering river, both deposition of sediments and erosion of bank occur. Which one of the following statement is true in this regard?

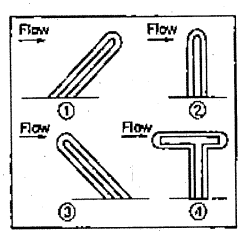
(a) Deposition of sediments occurs in the inner bank while the outer bank is subjected to erosion.

(b) Deposition of sediments occurs in the outer bank while the inner bank is subjected to erosion.

(c) In the direction of flow, the outer bank undergoes erosion first and the sediment is later deposited on the outer bank ownstream.

(d) In the direction of flow, the inner bank undergoes erosion first and the sediments are subsequently deposited on the inner bank downstream.

Q.2 Match List-I with List-II and select the correct answer using the codes given below the lists:



List-I	List-II
A. Attracting groyne	1. (1)
B. Repelling groyne	2. (2)
C. Deflecting groyne	3. (3)
D. Denehey's groyne	4. (4)

Codes:

	A	B	C	D
(a)	3	1	2	4
(b)	1	3	4	2
(c)	1	2	3	4
(d)	4	3	2	1

Q.3 Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I

A. Launching apron
B. Groyne
C. Guide bunds
D. Marginal bunds

List-II

1. Earthen embankment to confine flood waters.
2. Flow diversion for bank protection.
3. Prevention of progressive damage of toe of a protected slope due to scouring.
4. To confine river flow to a preselected waterway.

Codes:

	A	B	C	D
(a)	3	2	4	1
(b)	3	4	2	1
(c)	3	2	1	4
(d)	2	3	4	1

Q.4 Ghaggar river which appears and disappears in Rajasthan State of India, can be classified as a

(a) meandering river
(b) deltaic river
(c) virgin river
(d) none of these

Q.5 Consider the statements given below:
1. The quantum of river discharge which is large enough in magnitude as well as in frequency, so as to cause controlling effect on the river course and cross-section, is known as dominant discharge.
2. The ratio of dominant discharge to the peak discharge for a river is of the order of 9/16.

Which of the above statements is/are correct?
(a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) None of these

Q.6 Assertion (A): Turtuosity of a meandering river is greater than one.
Reason (R): The ratio of 'arcaul channel length' to 'direct axial length' is turtuosity.
(a) both A and R are true and R is the correct explanation of A
(b) both A and R are true but R is not a correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Q.7 In a meandering river reach, the deepest river portions will be available at
(a) the crossings
(b) the inner edges of meander loops
(c) the outer edges of meander loops
(d) None of them

Q.8 The rivers in flood plains can be classified as
(i) aggravating
(ii) degrading
(iii) stable
(iv) deltaic
The correct answer is
(a) both (i) and (iv)
(b) both (ii) and (iii)
(c) (i), (ii) and (iii)
(d) (i), (ii), (iii) and (iv)

Q.9 Aggrading rivers are
(a) silting rivers (b) rivers in regime
(c) scouring rivers (d) meandering rivers

Q.10 The repelling groynes which are largely constructed projecting from river embankments, as anti-erosion works, are
(a) pointing upstream.
(b) pointing downstream.
(c) perpendicular to the bank.
(d) none of these.

Q.11 Spacing of groynes is governed by
(i) type of bank
(ii) width of the river
(iii) type of groyne
The correct answer is
(a) only (ii)
(b) both (i) and (iii)
(c) both (ii) and (iii)
(d) (i), (ii) and (iii)

Q.12 The T-shaped groynes are generally spaced at
(a) 600 m apart
(b) 1200 m apart
(c) 500 m apart
(d) 1800 m apart

Q.13 The river training works required on a canal headworks are
(i) guide banks
(ii) marginal bunds
(iii) spurs
The correct answer is
(a) both (i) and (ii)
(b) both (i) and (iii)
(c) both (ii) and (iii)
(d) (i), (ii) and (iii)

Q.14 For a meandering alluvial river in flood plain, the meander length is about
(a) 3 (b) 1/3
(c) 1 (d) 1/3 to 3

Q.15 Permeable spurs are best suitable for rivers, which
(a) carry heavy suspended load.
(b) carry large bed load, but light suspended load.
(c) need permanent protection to dykes.
(d) need attracting the river current, for providing deeper channel.

Q.16 The meandering process is governed by
(i) valley slope.
(ii) silt grade and charge.
(iii) discharge.
(iv) bed and side materials and their susceptibility to erosion.
The correct answer is
(a) both (i) and (iv)
(b) (i), (ii) and (iii)
(c) (ii), (iii) and (iv)
(d) (i), (ii), (iii) and (iv)

Q.17 The meander length of an alluvial river is a function of the dominant discharge Q_0, and it varies as
(a) Q_0 (b) $(Q_0)^{1/6}$
(c) $(Q_0)^{-0.5}$ (d) $(Q_0)^{0.5}$

Q.18 Which of the following effect produced by a cut-off in an alluvial river, is not an advantage to navigation?
(a) Shortened route and elimination of sharp bends.
(b) Shortened travel time, particularly at low and moderate river stage.
(c) Increasing water depth at low river stages.
(d) Lowering of flood stages and flood periods.

Q.19 Donehey's spur is
(a) a hockey-shaped earthen spur
(b) a T-shaped stone spur, as used in Australia
(c) a T-shaped earthen spur, as used in India
(d) a type of a balli spur, especially developed for Indian rivers

Q.20 The upstream angle of inclination of a repelling groyne with normal to the bank line is of the order of
(a) 5° to 10° (b) 10° to 30°
(c) 30° to 50° (d) 70° to 90°

Q.21 The canal alignment involving maximum cross-drainage work is a
(a) ridge canal.
(b) contour canal
(c) slide slope canal.
(d) All of the above.

Q.22 The following data pertains to a natural drain crossing an irrigation canal:

Item	Canal data	Drainage data
Flow (m^3/s)	5	500
Bed level (m)	120	116
Depth of flow (m)	0.8	10

Which one of the following types of cross-drainage should be recommended in this case?
(a) Aqueduct (b) Syphon aqueduct
(c) Syphon (d) Superpassage

Q.23 Match List-I (Relative Position of Canal and Drainage Channel) with List-II (Type of Cross Drainage Work) and select the correct answer using the code given below the lists:

List-I
A. Canal taken above the drainage channel at its grade.
B. Drainage channel taken above the canal at its bed slope.
C. Canal taken below the drainage channel.
D. Drainage channel taken below the canal.

List-II
1. Canal siphon
2. Drainage siphon
3. Aqueduct
4. Super passage

Codes:

	A	B	C	D
(a)	2	4	1	3
(b)	3	1	4	2
(c)	2	1	4	3
(d)	3	4	1	2

Q.24 The following data is available at the proposed site of a canal crossing

Item	Drain	Canal
Bed level (m)	252.2	248.0
FSL/HFL (m)	253.2	253.0
Discharge (m^3/s)	2.0	400.0

The most appropriate and economical cross-drainage work at the above site will be:

(a) an aqueduct
(b) a super passage
(c) a syphon aqueduct
(d) a shphon

Q.25 Point out the incorrect statement:
(a) Aqueducts and super passages are usually not provided with pucca bottom floors.
(b) Aqueduct syphons and canal syphons are usually provided with pucca bottom floors.
(c) In a level crossing, a cross regulator is provided on the canal below the crossing.
(d) Canals or drainage channels are usually flumed to affect economy at the sites of crossings, wherein the contraction transitions are not to be steeper than $22\frac{1}{2}^{\circ}$ and the expansion transitions not to be steeper than 30°.

Q.26 In a syphon adequate, the worst condition of uplift on the roof occurs when,
(a) canal and drainage are flowing full.
(b) canal flowing full and no drainage discharge.
(c) canal is empty and drainage is flowing full.
(d) None of the above.

■■■■

Answers River Training and Cross Drainage Works

1. (c)	2. (c)	3. (a)	4. (d)	5. (c)	6. (a)	7. (c)	8. (d)	9. (a)	10. (a)
11. (d)	12. (a)	13. (d)	14. (d)	15. (a)	16. (d)	17. (d)	18. (d)	19. (c)	20. (b)
21. (b)	22. (d)	23. (a)	24. (d)	25. (c)	26. (c)				

Explanations River Training and Cross Drainage Works

17. (d)
For Rivers in flood plains,
Meandering length (M_L) = 53.6 $Q_0^{1/2}$
Meandering width M_B = 153.5 $Q^{1/2}$
where Q_0 = Dominant Discharge

■■■■