10 CHAPTER

Erosion and Reservoir Sedimentation

Q.1 In a reservoir the capacity is 20 cm and the annual inflow is estimated to be 25 cm. The trap efficiency of this reservoir under normal operating conditions is about
(a) 10% (b) 45%
(c) 75% (d) 100%

Q.2 In a reservoir the sediment deposit is found to be made up of only sand and the deposit is always found to be submerged. The unit weight of this sediment deposit at any time T years after the commencement of operation of the reservoir is about
(a) 1500 kg/m^3
(b) $1500 + B\,Ln\,T$ kg/m^3 where B is a positive non-zero coefficient
(c) 750 kg/m^3
(d) $750 + B\,Ln\,T$ kg/m^3 where B is a positive non-zero coefficient

Q.3 Borland & Miller's classification of reservoirs for distribution of sediments in the reservoir is based on a parameter m. The reservoir is classified as
(a) Type I if m is an the range 2.5 to 3.5
(b) Type II if m is in the range 1.0 to 1.5
(c) Type III if m is in the range 1.5 to 2.5
(d) Type IV if m is greater than 3.5

Q.4 A reservoir had an original capacity of 720 ha-m. The drainage area of the reservoir is 100 sq.km and has a sediment delivery rate of 0.10 ha-m/sq.km. If the reservoir has a trap efficiency of 80% the annual percentage loss of original capacity is
(a) 1.39% (b) 1.11%
(c) 1.74% (d) 0.28%

Q.5 The sediment delivery ratio (SDR) of a watershed is related to watershed area (A), relief (R) and watershed length (L) as
(a) SDR = $KA^m (R/L)^n$
(b) SDR = $KA^{-m} (R/L)^{-n}$
(c) SDR = $KA^{-m} (R/L)^n$
(d) SDR = $KA^m (R/L)^{-n}$

Q.6 If erosion in a watershed is estimated as 30 tonnes/ha/year, this watershed is in erosion class designated as
(a) severe (b) very high
(c) high (d) moderate

Q.7 The suspended sediment concentration C_s in ppm is determined from a sample of suspended sediment mixture as
(a) $C_s = \dfrac{[\text{Weight of sediment in sample}]}{[\text{Weight of water in sample}]} \times 10^6$
(b) $C_s = \dfrac{[\text{Weight of sediment in sample}]}{[\text{Weight of (sediment + water) in sample}]} \times 10^6$
(c) $C_s = \dfrac{[\text{Volume of sediment in sample}]}{[\text{Volume of (sediment + water) in sample}]} \times 10^6$
(d) $C_s = \dfrac{[\text{Weight of (sediment + water) in sample}]}{[\text{Volume of (sediment + water) in sample}]} \times 10^6$

Q.8 The current CWC practice in design of reservoirs adopts minimum drawdown level (MDDL) based on the bed elevation that will be reached in the reservoir after N years of sedimentation, where N is equal to
(a) 25 years (b) 50 years
(c) 100 years (d) 500 years

Q.9 The present CWC practice in design of reservoirs adopts are – capacity – elevation curves expected after *M* years of sediment for working table studies and checking for the performance of the project. In this M is equal to

(a) 25 years
(b) 50 years
(c) 100 years
(d) 500 years

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Answers Erosion and Reservoir Sedimentation

1. (d) 2. (a) 3. (c) 4. (b) 5. (c) 6. (b) 7. (b) 8. (c) 9. (b)

Explanations Erosion and Reservoir Sedimentation

1. (d)

$$\frac{\text{Capacity}}{\text{Inflow}} = \frac{20}{25} = 0.8 > 0.7$$

$\therefore \quad \eta = 100\%$

4. (b)

$$= \frac{0.10 \times 100 \times 0.8}{720} \times 100 = 1.11\%$$

6. (b)

Range (tonnes/ha/year)	Erosion Class
0 – 5	Slight
5 – 10	Moderate
10 – 20	High
20 – 40	Very high
40 – 80	Severe
>80	Very severe

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