6 CHAPTER

Highway Construction and Maintenance

Q.1 In retaining and breast walls, weep holes are provided at
(a) 50 cm vertical height and 50 cm centre to centre horizontally
(b) 100 cm vertical height and 100 cm centre to centre horizontally
(c) 100 cm vertical height and 120 cm centre to centre horizontally
(d) 120 cm vertical height and 100 cm centre to centre horizontally

Q.2 Along a hill road, a side drain is provided on
(a) outer side of a spur curve
(b) inner side of re-entrant curve
(c) outer side of both (a) and (b)
(d) inner side of both (a) and (b)

Q.3 Stability of hill slopes depend on
(a) nature of the slope
(b) angle of the slope
(c) geological conditions
(d) All of the above

Q.4 The most commonly used bituminous mix design methods are
1. Marshall test method
2. Hveem test method
3. Hubbard-field method

The correct answer is
(a) Both 1 and 2 (b) Both 1 and 3
(c) Both 2 and 3 (d) 1, 2 and 3

Q.5 In highway construction, rolling starts from
(a) sides and proceed to centre
(b) centre and proceed to sides
(c) one side and proceed to other side
(d) any of the above

Q.6 The corrected characteristic rebound deflection on a pavement, using Benkelman beam study is 2 mm. The equivalent granular overlay thickness required for an allowable deflection of 1 mm as per original IRC guidelines is
(a) 33 m (b) 66 m
(c) 133 mm (d) 166 mm

Q.7 Congestion cost is a part of the
(a) maintenance cost
(b) depreciation and overhead cost
(c) social cost, which is widely borne and shared by the society
(d) operating cost

Q.8 Match List-I (Pavement deficiency) with List-II (Explanation) and select the correct answer using the codes given below the lists:

List-I
A. Bird baths
B. Pot holes
C. Ravelling
D. Subsidence

List-II
1. A step-sided, bowl shaped cavity caused by loss of surfacing as well as base course erosion.
2. Deformations which may be caused by localized or variable subgrade failure
3. Irregular deformation which may be the result of differential settlement.
4. Removal of larger surface aggregates leaving craters.
5. Abrupt lowering of the road surface due to poor drainage

Codes:

	A	B	C	D
(a)	1	4	5	3
(b)	2	1	3	5
(c)	5	2	4	3
(d)	2	1	4	5

Q.9 On a National Highway pavement section, mean value of Benkelman beam deflection was obtained as 1.45 mm with standard deviation σ of 0.107cm. Pavement temperature measured was 37°C and moisture correction was obtained as 1.6. What is the value of characteristic deflection considering the value of 2σ?
(a) 1.94 mm (b) 2.64 mm
(c) 2.72 mm (d) 2.69 mm

Q.10 The most common type of failure that occurs on a flexible pavement is
(a) Alligator (map) cracking
(b) Reflection cracking
(c) Shear failure
(d) Longitudinal cracking

Q.11 For sandy soils, the most common method of stabilization is
(a) soil cement stabilization
(b) mechanical stabilization
(c) soil lime stabilization
(d) soil bitumen stabilization

Q.12 The main function of prime coat is to
(a) provide bond between old and new surfacing
(b) improving riding quality of pavement
(c) provide bond between the existing base and surfacing of new construction
(d) control dust nuisance

Q.13 Which of the following causes ravelling in bituminous pavement?
(a) Use of soft bitumen
(b) Excessive bitumen content
(c) Flexible overlay on rigid pavement
(d) Rigid overlay on flexible pavement

Q.14 In a bituminous pavement, alligator cracking is mainly due to
(a) inadequate wearing course
(b) inadequate thickness of subbase course of pavement
(c) use of excessive bituminous material
(d) fatigue arising from repeated stress applications

Q.15 One of the probable causes of rutting on flexible pavement is
(a) excessive stripping of binder material from the wearing course
(b) use of flaky aggregates in the wearing course
(c) inadequate compaction of pavement layers
(d) high wind speeds

Q.16 Mud pumping is commonly associated with
(a) bituminous penetration macadam construction
(b) cement concrete pavement on granular sub-grade
(c) premixed bituminous construction
(d) cement concrete pavement on clay sub-grade

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Answers **Highway Construction and Maintenance**

1. (c) 2. (d) 3. (d) 4. (d) 5. (a) 6. (d) 7. (b) 8. (d) 9. (b) 10. (a)
11. (d) 12. (c) 13. (b) 14. (b) 15. (c) 16. (a)

Explanations **Highway Construction and Maintenance**

6. (d)
The IRC suggests the following formula for the design of overlay thickness

$$h_b = 550\log_{10}\frac{D_c}{D_a}$$

$$= 550\log_{10}\left(\frac{2}{1}\right)$$

$$= 166\text{ mm}$$

9. (b)

$\bar{D} = 1.45$ mm

$\bar{\sigma} = 0.107$ mm

$D_c = \bar{D} + 2\bar{\sigma}$

$= 1.45 + 2 \times 0.107$

$= 1.664$ mm

Deflection after temperature correction

$= 1.664 - 0.0065 \times (37 - 35)$

$= 1.65$ mm

Corrected deflection for subgrade moisture

$= 1.65 \times 1.6 = 2.64$ mm

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