

POSTAL Book Package

2021

CIVIL ENGINEERING

Railway, Airport, Dock, Harbour & Tunnel Engineering

Objective Practice Sets

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Q.1 Two important constituents in the composition of steel used for rail are

- (a) carbon and silicon
- (b) manganese and phosphorus
- (c) carbon and manganese
- (d) carbon and sulphur

Q.2 Rail section first designed in the Indian railways, was

- (a) double headed
- (b) bull headed
- (c) flat footed
- (d) (a) and (b) simultaneously

Q.3 A welded rail joint is generally

- (a) supported on sleeper
- (b) supported on a metal plate
- (c) suspended
- (d) None of these

Q.4 On Indian Railways, the approximate weight of a rail section is determined from the formula

(a) $\frac{\text{Weight of the rail}}{\text{Axial load of locomotive}} = \frac{1}{310}$

(b) $\frac{\text{Weight of the rail}}{\text{Axial load of locomotive}} = \frac{1}{10}$

(c) $\frac{\text{Weight of the rail}}{\text{Axial load of locomotive}} = \frac{1}{510}$

(d) $\frac{\text{Weight of the rail}}{\text{Axial load of locomotive}} = \frac{1}{610}$

Q.5 Match **List-I** with **List-II** and select the correct answer using the codes given below the lists:

List-I

- A** Corrugated rails
- B** Burrs
- C** Wear of rails
- D** Flange bitten rails

List-II

- 1. The top surface gets worn out
- 2. The projection of rail on gauge side
- 3. The top surface develops alternate ridges and hollows
- 4. Inner side of outer rail on the curve.

Codes:

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

Q.6 Match **List-I** with **List-II** and select the correct answer using the codes given below the lists:

List-I

- A.** Chairs
- B.** Check rails
- C.** Guard rails
- D.** Bearing

List-II

- 1. Used on inner side of lower rail on sharp curves
- 2. Used for holding double headed and bull headed rails
- 3. Used on long span bridges
- 4. Used in between sleeper plates and flat footed rails

Codes:

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

Q.7 The maximum formation pressure in railway track depends on which of the following factors:

- (i) Live wheel load
- (ii) Sleeper spacing
- (iii) Modulus of elasticity

- (iv) Track modulus
- (v) Depth of ballast
- (a) (i), (ii) and (iii) only
- (b) (i), (ii), (iii) and (iv) only
- (c) (i) and (ii) only
- (d) All of the above

Q.8 A rail which is tapered to a toe at one end and has a heel at the other end is called as

- (a) Stock rail (b) Tongue rail
- (c) Wing rail (d) Lead rail

Q.9 Stretcher bar is provided

- (a) to permit lateral movement of the tongue rail
- (b) to maintain the two tongue rails at the exact distance
- (c) to ensure exact gauge at the toe of the switch as well as the nose of crossing
- (d) to prevent any vertical movement between the wing rail & nose of crossing

Q.10 Maximum permissible wear on the top of rail is

- (a) 2% of the weight of rail
- (b) 3% of the weight of rail
- (c) 4% of the weight of rail
- (d) 5% of the weight of rail

Q.11 Consider the following statements:

1. Rails should be manufactured by open hearth or duplex process.
 2. Width of the foot does not depend on stability criteria such as overturning.
 3. Minimum tensile strength of rail should be 72 kg/mm².
 4. Rail specimen are tested by falling weight test.
- (a) Statement 1 and 2 are correct
 - (b) Only 1 is correct
 - (c) 1, 3 and 4 are correct
 - (d) All are correct

Q.12 Buckling of rail may occur:

- (a) Due to inadequate expansion joint
- (b) Due to excessive creep
- (c) Due to both (a) and (b)
- (d) None of these

Q.13 Consider the following statement:

1. Welded rails satisfies the condition of a perfect joint and hence increase the life of the rail.

2. Welded rail also reduces creep.
3. It does not prevent the requirement of extension joint.

Which of the statement is/are correct?

- (a) Only 1 (b) 1 and 3
- (c) 1 and 2 (d) All of these

Q.14 A "Roaring rail" has which one of the following defects?

- (a) Split on head of rail
- (b) Minute depression and waves on the surface of rails
- (c) Split on web portions of rails
- (d) Square cracks on the surface of rail

Q.15 Weight of the rail depends on

- (a) gauge of the tracks.
- (b) speed of trains.
- (c) spacing of sleepers.
- (d) All of these

Q.16 Kinks on rail forms due to

- (a) Battering action of wheels
- (b) Due to loose packing of joint at end
- (c) Due to improper ballast material
- (d) Use of fish plate at joint

Q.17 Match **List-I** with **List-II** and select the correct answer using the code given below the lists:

List-I

- A. Broad gauge (BG)
- B. Meter Gauge (MG)
- C. Narrow Gauge (NG)
- D. Standard Gauge (SG)

List-II

1. 1.435 m
2. 0.762 m
3. 1.676 m
4. 1 m

Codes:

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

Q.18 Minimum length of long welded rail for BG track is

- (a) 150 m (b) 200 m
- (c) 300 m (d) 500 m

4. (c)
Ratio of weight of rails to weight of locomotive (axles load) is 1 : 510.

5. (d)
Corrugated rails: The top surface develops alternate ridges and hollows.
Burrs: The projection of rail on gauge side.
Wear of rails: The top surface gets worn out.
Flange bitten rails: Inner side of outer rail on the curve.

6. (c)
Chairs: Used for holding double headed and bull headed rails.

7. (d)
$$f_{\max} = \frac{2WS}{\pi DL} \times \left(\frac{\mu}{64EI} \right)^{1/4} \text{ where}$$

All above factors are included in the formulae.

8. (b)
Stock Rail: The position of the straight alignment against which the tongue rail fits is known as the stock rail.

Wing Rails: Wing rails help in channelising the wheels in their proper routes and direction meant for their movement. These rails guide the wheel path for movement of trains.

Tongue Rail: A tongue rail is tapered having toe at one end and heel at the other end. It is fixed at heel end and can move or rotate about this point.

Lead Rails: In a turnout, lead rails are the length of rails from the heel of the tongue rail to the toe of the crossing. These rails are of the normal rail sections.

9. (b)
To permit lateral movement of the tongue rail — Slide Chair.
To ensure exact gauge at the toe of the switch as well as the nose of the crossing — The plates.

10. (d)
When wear of head exceeds 5% of total weight the rail must be replaced.

11. (c)
Foot should be wide enough so that rails are stable against overturning, especially on curves.

12. (c)
 - If sufficient gap/expansion joint is not available, the thermal expansion would not be accommodated within the expansion joint which will create thermal stresses in the rail and rail will buckle.
 - It also occurs due to excessive creep.

13. (c)
 - In case of welded rail the length of rail gets increased and the performance of welded joint is also high, so creep gets reduced in welded rails.
 - Welded rails have very few expansion joints.

14. (b)
 - The corrugation of rail consists of minute depression on the surface of the rails.
 - When train passes over it "roaring sounds" occurs.

15. (d)
 - Weight of the rail depends on
 - Gauge of the tracks
 - Speed of trains
 - Spacing of sleepers etc.

16. (b)
 - When ends of adjoining rails, move slightly out of position kinks are formed at joints.
 - This occurs due to loose packing of joints and uneven wear of rail head.

17. (c)
A. Broad gauge (BG) : 1.676 m
B. Meter Gauge (MG): 1 m
C. Narrow Gauge (NG) : 0.762 m
D. Standard Gauge (SG): 1.435 m

18. (b)
 - If minimum rail length of 200 m (BG) or 300 m (for MG) is welded at the both ends. The rail is known as long welded rail.
 - The maximum LWR length allowed is 1000 m.

19. 22.95 (22 to 23)
As per Indian railways the approximate weight of axle load and rail section is determined by following formula:

$$\frac{\text{Weight of the rail section}}{\text{Axle load of locomotive}} = \frac{1}{510}$$