

2020

RANK Improvement **WORKBOOK**



**Answer key and Hint of
Objective & Conventional Questions**

Civil Engineering

Railway, Airport, Dock,
Harbour & Tunnelling Engg.



MADE EASY
Publications

1

Railway Track, Rails, Sleepers, Ballast and Formation

LEVEL 1 Objective Questions

1. (a)

2. (b)

3. (c)

4. (a)

5. (a)

LEVEL 2 Objective Questions

6. (a)

7. (c)

8. (d)

9. (b)

10. (d)

11. (b)

12. (c)

LEVEL 3 Conventional Questions

Solution : 1

- (i) Length of track required to overcome temperature stress = 63.5 km
- (ii) To prevent creep for equilibrium, the length of welded track = 127 km

Solution : 2

Number of sleeper required for 640 m length

$$= \frac{17.8}{12.8} \times 640 = 890 \text{ sleepers}$$

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2

Station Yard Layout and Equipment Train Resistance and Power of a Locomotive, Signals and Interlocking

LEVEL 1 Objective Questions

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

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LEVEL 2 Objective Questions

9. (d)
10. (b)
11. (b)
12. (b)
13. (c)
14. (b)
15. (d)
16. (b)
17. (c)

LEVEL 3 Conventional Questions

Solution : 1

Steepest gradient permissible is 1 in 60.

Solution : 6

Gradient of BG track is 1 in 170.45.

■■■■

3

Geometric Design

LEVEL 1 Objective Questions

1. (d)

2. (b)

3. (c)

4. (b)

5. (c)

LEVEL 2 Objective Questions

6. (357)

7. (c)

8. (c)

9. (a)

10. (c)

11. (a)

12. (d)

LEVEL 3 Conventional Questions

Solution : 1

The restricted speed on main track = 67.4 kmph
say 65 kmph.

Solution : 2

Permissible speed, $V_{\max} = 55.78 \text{ km/hr}$

Solution : 3

Maximum permissible speed is given as 96 kmph.

Solution : 4

Maximum permissible value of cant deficiency
is 7.6 cm.

Solution : 5

Length of transition curve = 47.52 m

Solution : 6

- (i) Radius of curvaure = 595.5 m
- (ii) Degree of curvature = 2.88
- (iii) Super-elevation = 14.6 cm
- (iv) Length of transition = 106.38 m

Solution : 7

$x(\text{m})$	0	30	60	90	100.8
$y(\text{hr})$	0	0.09	0.71	2.41	3.39

Solution : 8

- (b) (i) Super-elevation = 7.4 cm
- (ii) Speed on the branch = 43.8 km/hr

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LEVEL 1 Objective Questions

1. (d)

2. (b)

3. (a)

4. (c)

LEVEL 2 Objective Questions

5. (d)

6. (a)

7. (b)

8. (a)

9. (b)

LEVEL 3 Conventional Questions

Solution : 1

1. Curve lead = 28.49 m
2. Radius = 243.85 m
3. Switch lead = 7.45 m
4. Lead = 21.04 m

Solution : 2

- (i) The intermediate straight distance = 13.91 m
- (ii) The overall length of cross-over = 70.894 m

Solution : 3

- (i) Number of sleeper required for 1 km of railway track = 1385
- (ii) Number of rail required = 153.84 say 154 rails

Number of pandrol/Elastic rail clip required = 5540 nos. clips

Number of fish plates required = 304 plates.

Number of nut and bolts = 608 nos.

Solution : 4

Crossing, $AB = 16.845$ m

Distance, $DF = 16.762$ m

Diagonal, $AC = 33.649$ m

Diagonal, $BD = 1.678$ m

Solution : 5

Straight distance of track/crossover, $S = 19.71$ m

Total length of crossover, $L = 100.16$ m

Solution : 6

1. Curve lead, $CL = 40.224$ m
2. Radius, $R_0 = 484.364$ m
3. $\Delta L = 10.51$ m
4. Lead, $L = 29.715$ m

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LEVEL 1 Objective Questions

1. (a)

2. (d)

3. (c)

4. (a)

5. (a)

6. (a)

7. (d)

8. (b)

9. (d)

10. (a)

11. (d)

12. (c)

13. (c)

14. (c)

15. (d)

LEVEL 2 Objective Questions

16. (d)

17. (d)

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18. (c)

19. (a)

20. (c)

21. (a)

22. (b)

23. (a)

24. (d)

25. (a)

26. (d)

27. (b)

28. (b)

29. (b)

LEVEL 3 Conventional Questions**Solution : 1**

Corrected runway length is 2150 m.

Solution : 2

Effective gradient of runway = 0.35 percent

Solution : 3

The design runway length = 2870 m

Solution : 4Turning radius, $R = 62.66$ m

The turning radius to be actually provided = 120 m.

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6

Port, Harbour, Dock and Tunnel

LEVEL 1 Objective Questions

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

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LEVEL 2 Objective Questions

14. (b)
15. (c)
16. (c)
17. (a)
18. (d)
19. (d)
20. (b)
21. (b)
22. (b)
23. (d)
24. (b)
25. (a)

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