

2020

RANK *Improvement* **WORKBOOK**



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

Civil Engineering
Environmental Engineering



MADE EASY
Publications

1

Water Demand and Quality Characteristics of Water

LEVEL 1 Objective Questions

1. (b)
2. (a)
3. (c)
4. (c)
5. (d)
6. (9.95)
7. (c)
8. (b)
9. (b)
10. (d)

LEVEL 2 Objective Questions

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

© Copyright: Subject matter to MADE EASY Publications, New Delhi. No part of this book may be reproduced or utilised in any form without the written permission.

17. (d)

18. (a)

19. (a)

LEVEL 3 Conventional Questions

Solution : 1

- (a) pH = 9.5
- (b) Alkalinity = 320 mg/l

Solution : 2

- [Mg²⁺] = 24.4 mg/l
- [Na⁺] = 33 mg/l

Solution : 3

77.6%

Solution : 4

233 mg/l, 228 mg/l

Solution : 5

Arithmetic increase method

$$P_{2020} = 52500$$

$$P_{2030} = 58000$$

$$P_{2040} = 63500$$

Geometric increase method

$$P_{2020} = 55084$$

$$P_{2030} = 64558$$

$$P_{2040} = 75662$$

Incremental increase method

$$P_{2020} = 53167$$

$$P_{2030} = 60000$$

$$P_{2040} = 657500$$

■■■■

2

Sources of Water Supply, Distribution System, Well Hydraulic and Design of Sewer

LEVEL 1 Objective Questions

1. (c)
2. (b)
3. (d)
4. (1250)
5. (d)
6. (d)
7. (c)
8. (c)
9. (d)

LEVEL 2 Objective Questions

10. (c)
11. (0.34, 0.83)
12. (b)
13. (4.89)
14. (d)

© Copyright: Subject matter to MADE EASY Publications, New Delhi. No part of this book may be reproduced or utilised in any form without the written permission.

LEVEL 3 Conventional Questions

Solution: 1

$$K = 8.65 \text{ m/day}$$

Solution: 2

- (a) $D = 0.62 \text{ m}$
- (b) $S = 0.00074$
- (c) $d_{\min} = 0.22 \text{ m}$

Solution: 3

$$t = 12 \text{ years}$$

Solution: 4

$$5.52 \text{ million litres}$$

Solution: 5

$$S = 9.90 \text{ m}$$

■■■■

LEVEL 1 Objective Questions

1. (d)
2. (c)
3. (b)
4. (367)
5. (c)
6. (c)
7. (a)
8. (0.5)
9. (d)
10. (b)
11. (a)
12. (d)
13. (d)
14. (c)
15. (d)
16. (a)
17. (b)
18. (d)

© Copyright: Subject matter to MADE EASY Publications, New Delhi. No part of this book may be reproduced or utilised in any form without the written permission.

LEVEL 2 Objective Questions

19. (c)
20. (50.02)
21. (b)
22. (0.80)
23. (c)
24. (c)
25. (57.56%)
26. (2.78)
27. (5.3)
28. (a)
29. (3.9.22)
30. (18.02)
31. (15.40)
32. (10.83)
33. (c)
34. (d)
35. (d)
36. (a)
37. (a)

LEVEL 3 Conventional Questions

Solution: 1

Dimensions are $11.4 \text{ m} \times 0.51 \text{ m} \times 0.76 \text{ m}$.

Solution: 2

$$\text{Length} = 6.3 + 2(4.4) = 15.1 \text{ m}$$

$$\text{Width} = 11 \text{ m}$$

$$\text{Depth} = 4.4 + 0.5 + 0.5 = 5.4 \text{ m}$$

$$\text{Weir length} = 69.44 \text{ m}$$

Solution: 3

(a) $11 \text{ mg/L as CaCO}_3$

(b) 17.6 mg/L

(c) 0.88 mg/L

Solution: 4

$$17.36 \text{ m}^3, \quad 22.07 \text{ hp}$$

Solution: 5

(a) Balanced

(b) Volume of sludge = $697 \text{ m}^3/\text{day}$

Solution: 6

(a) 650 gm

(b) 650 gm

Solution : 7

(ii) $\text{TH} = 379.9 \text{ mg/l}$

$\text{CH} = 245.9 \text{ mg/l}$

$\text{NCH} = 134 \text{ mg/l}$

$\text{Alkalinity} = 245.9 \text{ mg/l}$

(iii) $\text{Lime} = 252 \text{ mg/l}$

$\text{Soda} = 148.72 \text{ mg/l}$

Solution : 9

⇒

Length of tank,

∴

$$B = 18.16 \text{ m}$$

$$L = 54.48 \text{ m}$$

$$T = 0.4748 \text{ hr}$$

■ ■ ■ ■

4

Quality & Characteristics of Waste Water

LEVEL 1 Objective Questions

1. (d)
2. (201)
3. (292.5)
4. (c)
5. (3.5)
6. (4.6)
7. (44.44)
8. (c)
9. (a)

LEVEL 2 Objective Questions

10. (5.19)
11. (85.2)
12. (154.28)
13. (5.52)
14. (17.78)
15. (a)

LEVEL 3 Conventional Questions

Solution: 1

- (a) $t = 3.02$ days, distance = 26.1 km
- (b) $(DO)_{\min} = 1.9$ mg/l

Solution: 2

$$t = 66.45 \text{ days}$$

Solution: 3

$$D_C = 6.67 \text{ mg/l}$$

$$t_C = 2.68 \text{ days}$$

Solution : 4

$$\text{Degree of treatment required} = 29.04\%$$

■■■■

© Copyright: Subject matter to MADE EASY Publications, New Delhi. No part of this book may be reproduced or utilised in any form without the written permission.

5

Treatment of Sewage & Solid Waste Management

LEVEL 1 Objective Questions

1. (92.22)
2. (c)
3. (b)
4. (c)
5. (d)
6. (c)
7. (d)
8. (b)
9. (a)
10. (b)

© Copyright: Subject matter to MADE EASY Publications, New Delhi. No part of this book may be reproduced or utilised in any form without the written permission.

LEVEL 2 Objective Questions

11. (b)
12. (d)
13. (16.94)
14. (0.32)
15. (d)
16. (b)
17. (a)
18. (a)
19. (c)
20. (a)
21. (b)
22. (a)
23. (b)
24. (4)
25. (d)
26. (c)

LEVEL 3 Conventional Questions**Solution: 1**

$$V = 3550 \text{ m}^3$$

Solution: 2

$$A = 14.5 \text{ ha}$$

Solution: 3

$$A = 33 \text{ ha}$$

Solution: 4

$$Q_w = 64 \text{ m}^3/\text{day}$$

Solution: 5

$$(a) \quad [X] = 2900 \text{ mg/l}$$

$$(b) \quad R = 0.40$$

Solution: 6

$$\text{Pond area} = 15 \text{ ha}$$

$$\text{Pond depth} = 1 \text{ m}$$

Solution: 7

$$11.88 \text{ m}^3, \quad 2.91 \text{ m}^3, \quad 17.09\%$$

Solution: 8

$$\text{BOD}_5 = 20.2 \text{ kg/ha.day}, \quad t_0 = 163.4 \text{ days}$$

Solution: 11

$$(i) \quad 24.623 \text{ m}^3$$

$$(ii) \quad 6.0395 \text{ m}^3$$

$$(iii) \quad 4.439 \text{ m}^3$$

$$(v) \quad 0.6829 \text{ m}^3$$

$$(v) \quad 0.25 \text{ m}^3$$

■■■■

6

Air and Noise Pollution

LEVEL 1 Objective Questions

1. (1038.64)
2. (c)
3. (144.74)
4. (d)
5. (0.162)
6. (b)
7. (b)
8. (a)
9. (c)
10. (b)
11. (a)

LEVEL 2 Objective Questions

12. (3870)
13. (b)
14. (a)
15. (b)
16. (a)
17. (67.98)
18. (1)

© Copyright: Subject matter to MADE EASY Publications, New Delhi. No part of this book may be reproduced or utilised in any form without the written permission.

19. (d)

20. (c)

21. (c)

22. (c)

23. (b)

24. (d)

25. (b)

LEVEL 3 Conventional Questions

Solution: 1

$$L_{Aeq} = 64.3 \text{ dBA}$$

Solution: 2

$$A = 1919 \text{ m}^2$$

Solution: 4

$$0.6 \text{ tonne/hour}$$

Solution: 5

$$I = 2.2 \times 10^{-6} \text{ W/m}^2, \quad L_I = 63.42 \text{ dB}$$

$$L_P = 63.42, \quad \Delta p_{rms} = 0.02966 \text{ N/m}^2$$

Solution: 6

$$398 \text{ bags}$$

Solution: 7

$$L_w = 80.7 \text{ dB}$$

Solution: 8

$$L_{eq} = 84.11 \text{ dB}$$

Solution : 10

$$N = 553$$

■■■■