

# 2020

## **RANK** *Improvement* **WORKBOOK**



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

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**Civil Engineering**  
Design of Steel Structures



**MADE EASY**  
Publications

**LEVEL 1** Objective Questions

1. (a)
2. (a)
3. (c)
4. (24.71)
5. (a)
6. (a)
7. (b)
8. (b)
9. (b)
10. (d)
11. (117)
12. (104.8)

**LEVEL 3** Conventional Questions

13. (c)
14. (a)
15. (c)
16. (c)
17. (d)
18. (90)
19. (45.27)
20. (90.54)
21. (a)

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22. (c)

23. (b)

24. (b)

25. (b)

26. (c)

**LEVEL 3** Conventional Questions**Solution :**

90.52 kN, 30.66%

**Solution :**

174 kN

**Solution :**

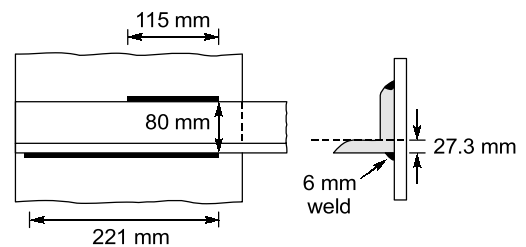
Yes, 1.875%

**Solution : 4**

length = 750 mm

width = 250 mm

thickness = 12 mm

**Solution : 5** $V_C = 37.45 \text{ kN}, \quad V_G = 13.45 \text{ kN}$ **Solution : 7****Solution : 7** $I_{w1} = 180.91 \approx 181 \text{ mm}$  $I_{w2} = 256 - 181 = 75 \text{ mm}$ **Solution : 10**

232.9 kN

**Solution : 11**

8.84 mm

**LEVEL 1** Objective Questions

1. (2736)
2. 1039.23 (1037.00 to 1042.00)
3. (a)
4. (c)
5. (a)
6. (c)
7. (a)
8. (c)
9. (a)

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**LEVEL 2** Objective Questions

10. 460.51
11. (c)
12. (c)
13. (b)
14. 1036.31
15. 406.50
16. (b)
17. 324.72
18. 295.2

**LEVEL 3** Conventional Questions

**Solution : 2**  
172.7 kN

■■■■

**LEVEL 1** Objective Questions

1. (b)
2. (d)
3. (c)
4. (50)
5. (a)
6. (d)
7. (a)
8. (21.21)
9. (b)
10. (c)

**LEVEL 2** Objective Questions

11. (d)
12. (a)

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13. (c)

14. (a)

15. (19.6)

16. (c)

17. (c)

18. (c)

**LEVEL 3** Conventional Questions**Solution : 1**

273.1 kN

**Solution : 2**

0.0108%

**Solution : 3** $P = 33.58 \text{ kN}$ **Solution : 4**

1046.4 kN

**Solution : 5**

378.6 kN

■■■■

**LEVEL 1** Objective Questions

1. (c)
2. (295.235)
3. (43.3)
4. (1760)
5. 62.5

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**LEVEL 2** Objective Questions

6. (c)
7. (75.01)
8. (121.22)
9. (31.43)
10. (d)
11. (d)

**LEVEL 3** Conventional Questions

**Solution : 2**

Section is safe against bending and shear.

**Solution : 3**

193.43 kNm

■■■■

**LEVEL 1** Objective Questions

1. (b)
2. (c)
3. (b)
4. (a)
5. (a)
6. (c)
7. (20)
8. (c)

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**LEVEL 2** Objective Questions

9. (d)
10. (62.5)
11. (a)
12. (c)
13. (d)
14. (b)
15. (a)
16. (a)

# 6

## Plastic Analysis

### LEVEL 1 Objective Questions

1. (2.03)
2. (40.05)
3. (b)
4. (d)
5. (a)
6. (1.78)
7. (b)
8. (1.33)
9. (3.33)
10. 1.529
11. (30)

### LEVEL 2 Objective Questions

12. (b)
13. (d)
14. (c)
15. (c)
16. (a)
17. (b)
18. (a)
19. (c)
20. (250)
21. (a)

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22. (2)

23. (a)

24. (b)

25. (0.75)

### LEVEL 3 Conventional Questions

**Solution : 1**

3.73 kNm

**Solution : 2**

33.75 kNm

**Solution : 3**

$0.6 P_u a, 1.2 P_u a$

**Solution : 4**

1.707

**Solution : 5**

Collapse load =  $\frac{5M_P}{L}$

**Solution : 6**

1.5

**Solution : 7**

8

**Solution : 8**

$12.75 M_p/L$

**Solution : 9**

$213320 \text{ mm}^3$

**Solution : 10**

55 kN, 60 kN

**Solution : 11**

$14.22 M_p/L$

**Solution : 12**

$\frac{15 M_p}{4 L}$

**Solution : 13**

68.9 kNm

■■■■