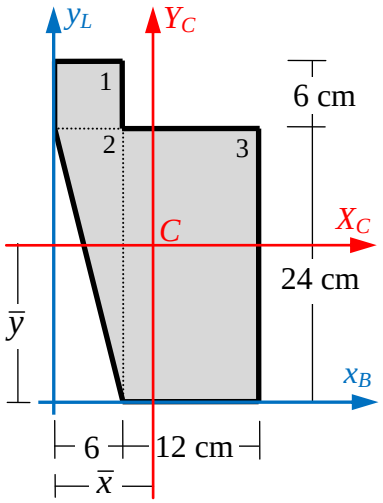
Civil Engineering Department
Theory of Structures (1)B & (2)

Academic Year : **2018–2019**
Semester : **Second**

Name: **Code:**

Quiz: (10 Marks)



Choose the nearest answer.

1. The first moments of areas 1, 2 and 3 about the x_B-axis are:
   (A) 972 cm^3, 1152 cm^3, 3456 cm^3 (B) 972 cm^3, 5211 cm^3, 6543 cm^3 (C) 36 cm^3, 72 cm^3, 288 cm^3 (D) 972 cm^2, 1152 cm^2, 3456 cm^2 (E) 108 cm^3, 288 cm^3, 3456 cm^3
2. The first moments of areas 1, 2 and 3 about the y_L-axis are:
   (A) 108 cm^3, 288 cm^3, 3456 cm^3 (B) 108 cm^3, 882 cm^3, 6543 cm^3 (C) 36 cm^3, 72 cm^3, 288 cm^3 (D) 108 cm^2, 288 cm^2, 3456 cm^2 (E) 972 cm^3, 1152 cm^3, 3456 cm^3

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3. The centroid of the cross-section is at $\bar{x}$ =..... from y_L-axis.
   (A) 9.727 cm (B) 14.09 cm (C) 7.77 cm (D) 11.11 cm (E) 9.727 cm^3
4. The centroid of the cross-section is at $\bar{y}$ =..... from x_B-axis.
   (A) 14.09 cm (B) 9.727 cm (C) 14.09 cm^2 (D) 11.11 cm (E) 14.09 cm^3

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5. The second moments of areas 1, 2 and 3 about their centroidal x_c-axes are:
   (A) 108 cm^4, 2304 cm^4, 13824 cm^4 (B) 108 cm^4, 4032 cm^4, 42831 cm^4 (C) 36 cm^4, 72 cm^4, 288 cm^4 (D) 108 cm^4, 144 cm^4, 3456 cm^4 (E) 108 cm^3, 2304 cm^3, 13824 cm^3
6. The second moments of areas 1, 2 and 3 about the x_B-axis are:
   (A) 324 cm^4, 1152 cm^4, 41472 cm^4 (B) 26352 cm^4, 20736 cm^4, 55296 cm^4 (C) 26244 cm^3, 18432 cm^3, 41472 cm^3 (D) 44262 cm^4, 23481 cm^4, 27414 cm^4 (E) 108 cm^4, 2304 cm^4, 13824 cm^4
7. The second moment of the cross-section about the x_B-axis is:
   (A) 16236 cm^4 (B) 102384 cm^4 (C) 86148 cm^4 (D) 102384 cm^3 (E) 46656 cm^4
8. The second moment of the cross-section about its centroidal X_C-axis is:
   (A) 102384 cm^4 (B) 23756.73 cm^4 (C) 86148 cm^4 (D) 23756.73 cm^3 (E) 9186.55 cm^4

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9. The second moments of areas 1, 2 and 3 about their centroidal y_c-axes are:
   (A) 108 cm^4, 441 cm^4, 6543 cm^4 (B) 108 cm^4, 144 cm^4, 3456 cm^4 (C) 36 cm^4, 72 cm^4, 288 cm^4 (D) 108 cm^4, 2304 cm^4, 13824 cm^4 (E) 108 cm^3, 144 cm^3, 3456 cm^3
10. The second moments of areas 1, 2 and 3 about the y_L-axis are:
    (A) 26244 cm^4, 18432 cm^4, 41472 cm^4 (B) 432 cm^4, 1296 cm^4, 44928 cm^4 (C) 423 cm^4, 2511 cm^4, 27414 cm^4 (D) 423 cm^3, 2511 cm^3, 27414 cm^3 (E) 324 cm^4, 1152 cm^4, 41472 cm^4
11. The second moment of the cross-section about the y_L-axis is:
    (A) 42948 cm^4 (B) 3708 cm^4 (C) 46656 cm^4 (D) 46656 cm^3 (E) 102384 cm^4
12. The second moment of the cross-section about its centroidal Y_C-axis is:
    (A) 42948 cm^4 (B) 46656 cm^4 (C) 9186.55 cm^4 (D) 9186.55 cm^3 (E) 23756.73 cm^4

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13. The product (mixed) moments of areas 1, 2 and 3 about their centroidal x_c and y_c-axes are:
    (A) 0, 0, 0 (B) 36 cm^4, -288 cm^4, 288 cm^4 (C) 0, -288 cm^4, 0 (D) 36 cm^3, -288 cm^3, 288 cm^3 (E) 288 cm^4, 72 cm^4, 144 cm^4
14. The product (mixed) moments of areas 1, 2 and 3 about the X_C and Y_C -axes are:
    (A) 3126.35 cm^4, 787.99 cm^4, 1368.60 cm^4 (B) 0, -288 cm^4, 0 (C) -3126.35 cm^4, -1075.24 cm^4, -1368.60 cm^4 (D) -3126.35 cm^3, -787.99 cm^3, -1368.60 cm^3 (E) 36 cm^4, -288 cm^4, 288 cm^4
15. : The product (mixed) moment of the cross-section about its centroidal X_C and Y_C-axis is:
    (A) -7055.81 cm^4 (B) 5570.18 cm^4 (C) -5570.18 cm^4 (D) 5570.18 cm^3 (E) -557.80 cm^4

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16. The direction of the principal axes is:
    (A) 54.5^o (B) 36.1^o (C) 45.0^o (D) 18.7^o (E) 18.7 cm
17. : The principal moments of inertia are:
    (A) 7301.06 cm^4, 310.76 cm^4 (B) 2564.21 cm^4, 730.06 cm^4 (C) 25642.21 cm^3, 7301.06 cm^3 (D) 25642.21 cm^4, 7301.06 cm^4 (E) -25642.21 cm^4, -7301.06 cm^4

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18. The polar moment of inertia are:
    (A) 7611.82 cm^4 (B) 3294.28 cm^4 (C) 32943.28 cm^3 (D) 32943.28 cm^4 (E) -32943.28 cm^4

19. The radius of gyration for the section about its centroidal X_C-axis is:
(A) 4.82 cm (B) 7.75 cm^4 (C) 60 cm (D) 7.75 cm (E) -7.75cm

20. The radius of gyration for the section about its centroidal Y_C-axis is:
(A) 7.75 cm (B) 4.82 cm^4 (C) 23.2 cm (D) 4.82 cm (E) -4.82 cm

With best wishes
Dr. M. Abdel-Kader

Answer:

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	11.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	12.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	13.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	14.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	15.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	16.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	17.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	18.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	19.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	20.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ