**Ministry of Higher Education**
**Giza Higher Institute of Engineering & Technology**
**Civil Engineering Department**
Course Name: **Theory of Structures (2)A**
Course Code: **CIV 211** Date: **21 / 11 / 2021**

Academic Year: **2021/2022**
Semester: **First**
Level: **2nd Civil**
Time: **1½ Hours**
Examiner: ***Dr. M. Abdel-Kader***

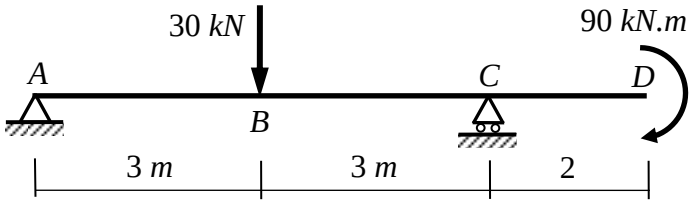
# Mid-Term Exam

Total Marks: **15** No. of Questions: **20** (Attempt all questions)

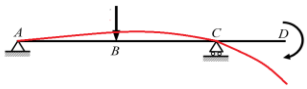
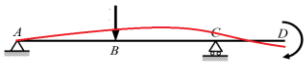
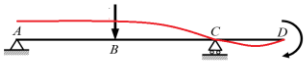
## Choose the nearest answer.

For the shown beam, it is required to determine the deflections at ***B*** and ***D*** and the slopes at ***A*** and ***D*** by using the **double integration method**.

$EI = 1\times10^4\ kN.m^2$




1. The vertical reaction at the roller support ***C*** is:
   (A) 30 *kN* ↑ (B) 15 *kN* ↓ (C) 15 *kN* ↑ (D) zero
2. The vertical reaction at the hinged support ***A*** is:
   (A) zero (B) 40 *kN* ↓ (C) 15 *kN* ↑ (D) 15 *kN* ↓
3. The bending moment equation ($M$) in the last part ***CD*** is:
   (A) 30 $(x-3)$ - 30 $(x-6)$ (B) -30 $(x-3)$ + 30 $(x-6)$ (C) -3 $(x-6)$ + 30 $(x-8)$ (D) 30 $(x+3)$ + 30 $(x+6)$
4. $EIy' =$ ……
   (A) -30 $(x-3)^2$ +30 $(x-6)^2+C_1$ (B) -15 $(x-3)^2$ +15 $(x-6)^2+C_1$ (C) -1.5 $(x-6)^2$ +15 $(x-8)^2$ (D) 15 $(x+3)^2$ +15 $(x+6)^2+C_1$
5. $EIy =$ ……
   (A)-5 $(x-3)^3$+5 $(x-6)^3$ (B)-5 $(x)^3$+5 $(x)^3+C_1x+C_2$ (C)-5 $(x-3)^3$+5 $(x-6)^3+C_1x+C_2$ (D)5 $(x)^3$+5 $(x+6)^3+C_1+C_2$
6. Boundary Conditions are:
   (A) At $x=3$, $y=0$ & at $x=6$, $y=0$ (B) At $x=0$, $y=0$ & at $x=8$, $y'=0$ (C) At $x=0$, $y=0$ & at $x=6$, $y=0$
7. $C_1$ and $C_2$ are:
   (A) $C_1$=0 and $C_2$=22.5 (B) $C_1$=-22.5 and $C_2$=10 (C) $C_1$=2.5 and $C_2$=10 (D) $C_1$=22.5 and $C_2$=0
8. The deflection at ***B***, $y_B$ is:
   (A) 11.2 *mm* ↑ (B) 6.75 *mm* ↑ (C) zero (D) 11.2 *mm* ↓
9. The deflection at ***D***, $y_D$ is:
   (A) 11.2 *mm* ↑ (B) 10.1 *mm* ↑ (C) zero (D) 40.5 *mm* ↓
10. The value of slope at ***A***, $\theta_A = y'_A$ is:
    (A) 0.00225 rad (B) 0.702 rad (C) 0.012 rad (D) 0.055 rad
11. The value of slope at ***D***, $\theta_D = y'_D$ is:
    (A) 0.02925 rad (B) 0.702 rad (C) 0.055 rad (D) 0.041 rad
12. The nearest elastic curve of the shown beam is:

(A) 
(B) 
(C) 
(D) 

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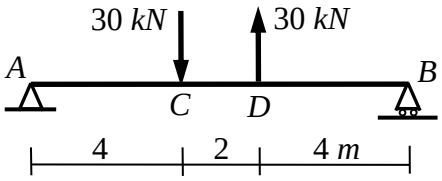
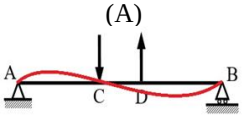
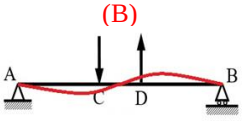
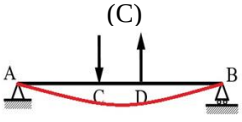
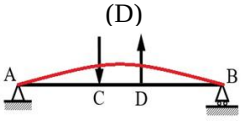
For the shown beam, it is required to determine the slope at ***A*** and the deflection at ***C*** by using the **moment-area method**.

$EI = 2.5\times10^3\ kN.m^2$




13. The vertical reaction at the hinged support ***A*** is:
    (A) 60 *kN* ↑ (B) 60 *kN* ↓ (C) 6 *kN* ↑ (D) 6 *kN* ↓
14. The vertical reaction at the roller support ***B*** is:
    (A) 60 *kN* ↑ (B) 60 *kN* ↓ (C) 6 *kN* ↑ (D) 6 *kN* ↓
15. The bending moment at ***C*** is:
    (A) 32 *kN.m* (B) -16 *kN.m* (C) 24 *kN.m* (D) 60 *kN.m*
16. The bending moment at ***D*** is:
    (A) -24 *kN.m* (B) -60 *kN.m* (C) 40 *kN.m* (D) -16 *kN.m*
17. The deviation of ***B*** relative to the tangent of the elastic curve at ***A***, $t_{B/A}$ is:
    (A) 0.032 *m* (B) 0.016 *m* (C) 0.048 *m* (D) 0.096 *m*
18. The slope of the tangent of the elastic curve at ***A***, $\theta_A$ is:
    (A) 0.0032 rad ↻ (B) 0.0096 rad ↻ (C) 0.0016 rad ↻ (D) 0.0048 rad ↺
19. The deflection at ***C***, $\delta_C$ is:
    (A) 12.8 *mm* ↓ (B) 5.5 *mm* ↑ (C) zero (D) 4.6 *mm* ↓
20. The nearest elastic curve of the shown beam is:

(A) 
(B) 
(C) 
(D) 

*With my best wishes*
***Dr. M. Abdel-Kader***