Q1   A straight cantilever of uniform cross-section carries as load 'W' distributed evenly over its entire length . If the free end of the cantilever is now propped upto the level of the fixed end the vertical force required at the prop is

    a. 3 / 8 W

    b. 5 / 8 W

    c. 3 / 4 W

    d. W

Q2   A propped cantilever of span 4 m is fixed at A and propped at B. the beam carries a u.d.l. of 1 t/m over the entire span. The reaction at B is

    a. 5 / 2 t

    b. 2 t

    c. 1 t

    d. 3 / 2 t

Q 3   The deflection at the free end of a uniformly loaded cantilever of length 1 m is 7.5 mm. what is the slope at the free end ?

    a. 0.01 radian

    b. 0.015 radian

    c. 0.02 radian

    d. 0.025 radian

Q4   Match List – I(Strain Energy) with List – II (Gradually Applied load) on the basis of analogy and select the correct answer (σ = distance stress, τ = shear stress, M_x = bending moment , E = modulus of elasticity, G = Modulus of rigidity , 1 = area moment of inertia, V = Volume)

List - I	List -II
A. $\frac{\sigma^2 V}{2E}$	1. Axial load
B. $\frac{\tau^2 V}{2G}$	2. Bending load
C. $\frac{\tau^2 V}{4G}$	3. Shear load
D. $\int_0^L \frac{M^2 \times dx}{2EI}$	4. Torsional load

Codes :

a. **A – 2, B – 3, C – 4, D – 1**

b. **A – 1, B – 4, C – 3, D – 2**

c. **A – 2, B – 4, C – 3, D – 1**

d. **A – 1, B – 3, C – 4, D – 2**

Q5 **Match List – I(loading) with List – II (Rotation) and select the correct answer using the code given below the lists**

List - I	List –II
A-Cantilever with concentrated load W at end	1-WL^2 / 16 EI
B-Cantilever with udl (w/unit length)across the complete span (w = wL)	2-WL^2 / 24 EI
C-Simply supported beam with concentrated load W at the centre	3-WL^2 / 2 EI
D-Simply supported beam with udl (w/unit length) across complete span (W = Wl)	4- WL^2 / 6 EI

Codes :

a. **A – 1, B – 2, C – 3, D – 4**

b. **A – 3, B – 4, C – 1, D – 2**

c. **A – 1, B – 4, C – 3, D – 2**

d. **A – 3, B – 2, C – 1, D – 4**

Q6 **What is the total strain energy of a member subject to an axial stress f (E = young's modulus)**

a. **(f^2 / 2 E) volume of bar**

b. **(f / E) volume of bar**

c. **(f^2 / E) volume of bar**

d. **(f / 2 E) volume of bar**

Q7   Match List – I(load case) with List – II (Expression for slope / deflection) and select the correct answer using the code given below the lists

List - I	List –II
A-Slope for tip of W B-Deflection for tip load of W C-Slope for total ud/ of W*l* D-Deflection for total ud *l* of W	1. $WL^2 / 8 EI$ 2. $WL^2 / 6 EI$ 3. $WL^2 / 3 EI$ 4. $WL^2 / 2 EI$

Codes :

a. **A – 4, B – 2, C – 3, D – 1**

b. **A – 1, B – 3, C – 2, D – 4**

c. **A – 4, B – 3, C – 2, D – 1**

d. **A – 1, B – 2, C – 3, D – 4**

Q8   **Simply supported beam AB of span 4 m is subjected to terminal couples as shown in the figure. If EI is in kN/m² what is the magnitude of the central deflection of the beam in metres?**
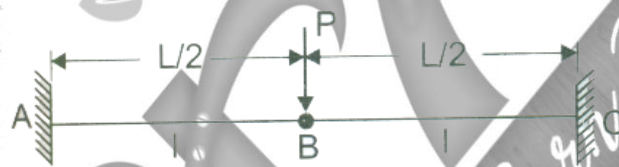

a. **4 / EI**

b. **8 / EI**

c. **2 / EI**

d. **16 / EI**

Q9 If the hinged end of a propped cantilever of span L settles by an amount δ, then the rotation of the hinged end will be

A. $\dfrac{\delta}{L}$ B. $\dfrac{2\delta}{L}$

C. $\dfrac{3\delta}{2L}$ D. $\dfrac{4\delta}{3L}$

Q10 What is the deflection at the hinge for the beam shown?

A. 0 B. $\dfrac{Pl^3}{3EI}$

C. $\dfrac{Pl^3}{24EI}$ D. $\dfrac{Pl^3}{48EI}$

Q11 A cantilever carries a uniformly distributed total load W over its whole length and a concentrated upward load W at its free end . The net vertical deflection at the free end is

A. Zero

B. $\dfrac{5}{24}\dfrac{W\ell^3}{EI}$ download

C. $\dfrac{5}{24}\dfrac{W\ell^3}{EI}$ upward

D. $\dfrac{5}{48}\dfrac{W\ell^3}{EI}$ upward

Q12   If a cantilever beam of span L and flexural rigidity EI carries a moment M at the free end the deflection at that end is

A. $\frac{ML}{24EI}$

B. $\frac{ML^2}{12EI}$

C. $\frac{ML}{6EI}$

D. $\frac{ML^2}{2EI}$

Q13

The reaction of the beam at C is

a. **5.5 kN**

b. **6.5 kN**

c. **7.5 kN**

d. **8.5 kN**

Q14   A hinged support in a real beam

a. **Becomes an internal hinge in a conjugate beam**

b. **Changes to a free support in a conjugate beam**

c. **Changes to a fixed support in a conjugate beam**

d. **Remains as a hinged support in a conjugate beam**

Q15   If the deflection at the free end of a uniformly loaded cantilever beam is 15 mm and the slope of the deflection curve at the free end is 0.02 radian , then the length of the beam is

a. **0.8 m**

b. **1.0 m**

c. **1.2 m**

d. **1.5**