قائمة الاسئلة

خرسانة1-قسم الهندسة المعمارية-المستوى الثالث-درجة الأختبار 70 درجة-الزمن ثلاث ساعات

د / عبدالوهاب النونو

1) Advantages of concrete:
   1) - Relatively high compressive strength.
   2) - Better resistance to fire than steel.
   3) - Long service life with low maintenance cost.
   4) + All of these

2) For Improving plasticity and fluidity of the cement mix, Need water to:
   1) - Wet aggregate surfaces,
   2) - Provide mobility of water during hydration.
   3) - Provide workability.
   4) + All of these

3) When Steel reaches yield at same time as concrete reaches ultimate strength, this case is called:
   1) + Balanced section
   2) - Over reinforced section
   3) - Under reinforced section
   4) - None of these.

4) **For adequate section the ratio of steel must be as:**

   a) $\rho_{min} \leq \rho_{actual} > \rho_{max}$

   b) $\rho_{min} > \rho_{actual} \leq \rho_{max}$

   c) $\rho_{min} \geq \rho_{actual} \geq \rho_{max}$

   d) $\rho_{min} < \rho_{actual} < \rho_{max}$

   1) - a
   2) - b
   3) - c
   4) + d

5) If Ru (actual) > Ru (max) then:
   1) - The section is Single of reinforcement.
   2) - No compression steel is needed.
   3) - Stirrup steel is needed.
   4) + None of these.

6) if the depth of equivalent compression zone (a) lies in the web of the T-section, then treat the section as:
   1) - Single reinforcement section
   2) - Double reinforcement section
   3) + T- section.
   4) - Rectangular section

7)

Some equations:

$$\rho_{bal} = 0.85\beta_1 \frac{f'_c}{f_y}\left(\frac{600}{600 + f_y}\right) \qquad \rho_{max} = 0.75\rho_{bal}$$

$$a = \frac{A_s f_y}{0.85 f'_c b} = \frac{\rho d f_y}{0.85 f'_c}$$

$$M_u = \phi \rho b d^2 f_y \left(1 - \frac{\rho f_y}{1.7 f'_c}\right)$$

$$M_n = A_s f_y \left(d - \frac{a}{2}\right) \quad ; also\ \phi M_n = \phi A_s f_y \left(d - \frac{a}{2}\right) = M_u$$

$$R_u = \frac{M_u}{bd^2} = \phi \rho f_y \left(1 - \frac{\rho f_y}{1.7 f'_c}\right) \qquad Asf = \frac{0.85 f_c (b_f - b_w) hf}{f_y}$$

$$\rho_d = \frac{0.18 f'_c}{f_y} \quad or \quad \rho_d = \frac{\rho_{max}}{2}$$

$$V_c = 0.17 (\sqrt{f'_c})\, b_w d \qquad \varnothing V_c = \varnothing 0.17 (\sqrt{f'_c})\, b_w d$$

$$V_u = \varnothing V_s + \varnothing V_c.$$

$$S_1 = \frac{A_v f_y d}{V_s}, \quad where \quad V_s = \frac{V_u - \phi V_c}{\phi}$$

if $V_s \le \frac{\sqrt{f'_c}}{3} b_w d$ → then use $S_2 = \frac{d}{2} \le$ 24" (60 cm)

But if $V_s > \frac{\sqrt{f'_c}}{3} b_w d$ → then use $S_2 = \frac{d}{4} \le$ 12" (30 cm)

$$S_3 = \frac{3 A_v f_y}{b_w}$$

$$Y' = \frac{(b_f - b_w).\frac{h_f^2}{2} + b_w .y1^2/2}{A_c}$$

For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. **The balanced steel reinforcement.**
b. **The maximum reinforcement area allowed by the ACI code.**
c. **The position of the neutral axis and the depth of equivalent compressive stress block for case (b).**
d. **check the adequacy of section if the section was reinforced with 6Ø28**

The balanced steel reinforcement ratio ρ_b :

1) - 0.0028

2) - 0.02086
3) + 0.02868
4) - 0.02745

8)

Some equations:

$$\rho_{bal} = 0.85\beta_1 \frac{f'_c}{f_y}\left(\frac{600}{600 + f_y}\right) \quad \rho_{\max} = 0.75\rho_{bal}$$

$$a = \frac{A_s f_y}{0.85 f'_c b} = \frac{\rho d f_y}{0.85 f'_c}$$

$$M_u = \phi \rho b d^2 f_y\left(1 - \frac{\rho f_y}{1.7 f'_c}\right)$$

$$M_n = A_s f_y\left(d - \frac{a}{2}\right) \quad ; also\ \phi M_n = \phi A_s f_y\left(d - \frac{a}{2}\right) = M_u$$

$$R_u = \frac{M_u}{bd^2} = \phi \rho f_y\left(1 - \frac{\rho f_y}{1.7 f_c'}\right) \qquad Asf = \frac{0.85 f_c(b_f - b_w)hf}{f_y}$$

$$\rho_d = \frac{0.18 f_c'}{f_y} \quad or \quad \rho_d = \frac{\rho_{\max}}{2}$$

$$V_c = 0.17 (\sqrt{f_c'})\, b_w d \qquad \varnothing V_c = \varnothing 0.17 (\sqrt{f_c'})\, b_w d$$

$$V_u = \varnothing V_s + \varnothing V_c.$$

$$S_1 = \frac{A_v f_y d}{V_s}, \quad where \quad V_s = \frac{V_u - \phi V_c}{\phi}$$

if $V_s \le \frac{\sqrt{f_c'}}{3} b_w d$ → then use $S_2 = \frac{d}{2} \le$ 24" (60 cm)

But if $V_s > \frac{\sqrt{f_c'}}{3} b_w d$ → then use $S_2 = \frac{d}{4} \le$ 12" (30 cm)

$$S_3 = \frac{3 A_v f_y}{b_w}$$

$$Y' = \frac{(b_f - b_w).\frac{h_f^2}{2} + b_w .y1^2/2}{A_c}$$

For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. **The balanced steel reinforcement.**
b. **The maximum reinforcement area allowed by the ACI code.**
c. **The position of the neutral axis and the depth of equivalent compressive stress block for case (b).**
d. **check the adequacy of section if the section was reinforced with 6Ø28**

The area of balanced steel reinforcement $As_{(bal)}$:

a) **4250 mm²**
b) **4302 mm²**
c) **4550 mm²**
d) **4250 cm²**

1) - a
2) + b
3) - c
4) - d

9) **For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate**

a. **The balanced steel reinforcement.**
b. **The maximum reinforcement area allowed by the ACI code.**
c. **The position of the neutral axis and the depth of equivalent compressive stress block for case (b).**
d. **check the adequacy of section if the section was reinforced with 6Ø28**

The maximum reinforcement ratio ρ_{max} :

a) **2.0125 %**
b) **0.01956**
c) **0.021512**
d) **0.02125**

1) - a
2) - b
3) + c
4) - d

10) **For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate**

a. **The balanced steel reinforcement.**
b. **The maximum reinforcement area allowed by the ACI code.**
c. **The position of the neutral axis and the depth of equivalent compressive stress block for case (b).**
d. **check the adequacy of section if the section was reinforced with 6Ø28**

The maximum steel reinforcement $As_{(max)}$:

a) **3400.5 mm²**
b) **3226.5 mm²**
c) **4177.5 mm²**
d) **3187.5 mm²**

1) - a
2) + b
3) - c
4) - d

11)

For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. The balanced steel reinforcement.
b. The maximum reinforcement area allowed by the ACI code.
c. The position of the neutral axis and the depth of equivalent compressive stress block for case (b).
d. check the adequacy of section if the section was reinforced with 6Ø28

The depth of the equivalent compressive stress block *a* for case (b):
a) 241.56 mm
b) 225.71 mm
c) 200.12 mm
d) None of these

1) + a
2) - b
3) - c
4) - d

12) For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. The balanced steel reinforcement.
b. The maximum reinforcement area allowed by the ACI code.
c. The position of the neutral axis and the depth of equivalent compressive stress block for case (b).
d. check the adequacy of section if the section was reinforced with 6Ø28

The position of the neutral axis *c* :
a) 225.01 mm
b) 284.19 mm
c) 364.71 cm
d) 307.95 mm

1) - a
2) + b
3) - c
4) - d

13) For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. The balanced steel reinforcement.
b. The maximum reinforcement area allowed by the ACI code.
c. The position of the neutral axis and the depth of equivalent compressive stress block for case (b).
d. check the adequacy of section if the section was reinforced with 6Ø28

The steel reinforcement area $As_{(acual)}$:
a) 3200.45 mm^2
b) 3078.76 mm^2
c) 3694.51 mm^2
d) 2659.94 mm^2

1) - a
2) - b
3) + c
4) - d

14)

For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. The balanced steel reinforcement.
b. The maximum reinforcement area allowed by the ACI code.
c. The position of the neutral axis and the depth of equivalent compressive stress block for case (b).
d. check the adequacy of section if the section was reinforced with 6Ø28

The actual reinforcement ratio ρ_{actual} :

a) 0.02053
b) 0.02203
c) 2.55 %
d) 0.02463

1) - a
2) - b
3) - c
4) + d

15) For the section with (b=250mm, d = 600 mm, and d_s= 50 mm) and if given (f'_c= 22 Mpa, and f_y= 350 Mpa.) calculate

a. The balanced steel reinforcement.
b. The maximum reinforcement area allowed by the ACI code.
c. The position of the neutral axis and the depth of equivalent compressive stress block for case (b).
d. check the adequacy of section if the section was reinforced with 6Ø28

The section is:

a) Adequate
b) Over reinforcement section
c) Not safe
d) Circular section

1) - a
2) - b
3) + c
4) - d

16) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The value of steel reinforcement As:

a) 5157.54 mm^2
b) 3800.67 mm^2
c) 7890.45 cm^2
d) 6157.52 mm^2

1) - a
2) - b
3) - c
4) + d

17)

Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The steel reinforcement ratio $\rho_{(max)}$:
a) 0.002125
b) 0.021252
c) 0.031332
d) 0.021512

1) - a
2) - b
3) - c
4) + d

18) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

Value of $\rho_{(actual)}$ =As/b_wd is:
a) 0.005598
b) 0.556789
c) 0.05598
d) None of these

1) - a
2) - b
3) + c
4) - d

19) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The value of $\rho_{(actual)}$ =As/b_f d =
a) 0.01317
b) 0.13171
c) 0.03456
d) 0.00234

1) + a
2) - b
3) - c
4) - d

20) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The area of steel Asf =
a) 3400.54 mm^2
b) 4051.67 mm^2
c) 4560.88 mm^2
d) 3820.14 mm^2

1)	-	a
2)	-	b
3)	-	c
4)	+	d

21) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width $b_f = 850$ mm,
- Web width $b_w = 200$ mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness $h_f = 110$ mm,
- Effective depth $d = 550$ mm,
- $f'_c = 22$ MPa, $f_y = 350$ MPa.

The value of As – Asf =

a) 3261.87 mm²
b) 4065.01 mm²
c) 2337.38 mm²
d) 2105.85 mm²

1)	-	a
2)	-	b
3)	+	c
4)	-	d

22) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width $b_f = 850$ mm,
- Web width $b_w = 200$ mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness $h_f = 110$ mm,
- Effective depth $d = 550$ mm,
- $f'_c = 22$ MPa, $f_y = 350$ MPa.

The value of ratio $\rho - \rho_{sf}$ =

a) 0.029524
b) 0.001914
c) 0.010984
d) 0.02125

1)	-	a
2)	-	b
3)	-	c
4)	+	d

23) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width $b_f = 850$ mm,
- Web width $b_w = 200$ mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness $h_f = 110$ mm,
- Effective depth $d = 550$ mm,
- $f'_c = 22$ MPa, $f_y = 350$ MPa.

Tension due to steel reinforcement T =

a) 3090.56 kn
b) 2586.16 kn
c) 2155.13 kn
d) 2500.99 km

1)	-	a
2)	-	b
3)	+	c
4)	-	d

24)

Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w = 200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The area of compression zone Ac is:
a) 108662.12 mm²
b) 130945.12 mm²
c) 115247.71 mm²
d) 158745.44 mm²

1) - a
2) - b
3) + c
4) - d

25) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w = 200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The area of flange Af =
a) 99500 mm²
b) 108900 mm²
c) 89400 mm²
d) 93500 mm²

1) - a
2) - b
3) - c
4) + d

26) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w = 200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

By comparing of Ac and Af the result is:
a) Ac < Af then the neutral axis lies in flange so treat it as rectangular- section
b) Ac > Af then the neutral axis lies in web so treat it as rectangular- section
c) Ac > Af then the neutral axis lies in web so treat it as T- section
d) Ac = Af then the neutral axis lies in web so treat it as T- section

1) - a
2) - b
3) + c
4) - d

27) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w = 200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The depth of compressive zone y_1 =
a) 218.74 mm
b) 185.81 mm
c) 185.81 mm³
d) 218.74 cm³

1) + a
2) - b
3) - c
4) - d

28) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The centroid of compressive zone from top of the section y' =

a) 67.96 cm
b) 75.64 mm
c) 55.12 mm
d) 79.96 mm

1) - a
2) + b
3) - c
4) - d

29) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

The value of Z =

a) 482.04 mm
b) 378.66 mm
c) 492.04 mm
d) 524.36 mm

1) - a
2) - b
3) - c
4) + d

30) Calculate the ultimate moment capacity of a T- section that has the following dimensions:

- Flange width b_f = 850 mm,
- Web width b_w =200 mm,
- Tension reinforcement (10Ø28 mm)
- Flange thickness h_f = 110 mm,
- Effective depth d = 550 mm,
- f'_c = 22 MPa, f_y = 350 MPa.

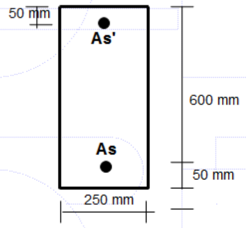
The ultimate moment capacity of the T-section Mu =

a) 1017.06 kn.m
b) 756.184 kn.m
c) 1476.23 kn/m
d) 1121.969 kn.m

1) + a
2) - b
3) - c
4) - d

31)

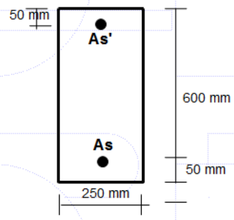
A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



The ultimate bending moment Mu = $wl^2/8$=
a) 607.5 kn.m
b) 560.5 kn.m
c) 625.6 kn.m
d) 530.7 kn.m

1) + a
2) - b
3) - c
4) - d

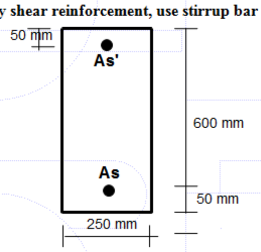
32) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



The value of Ru was obtained as:
a) 8.52 Mpa
b) 6.23 Mpa
c) 7.00 Mpa
d) 6.75 Mpa

1) - a
2) - b
3) - c
4) + d

33) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Maximum steel reinforcement ratio $\rho_{(max)}$ =
a) 0.0021515
b) 0.0212511
c) 0.021512
d) 0.019515

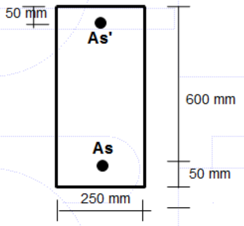
1) - a
2) - b
3) + c

4) - d

34) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$

1- Calculate the required reinforcement As and As'.

2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



$Ru_{(max)}$ was obtained as:

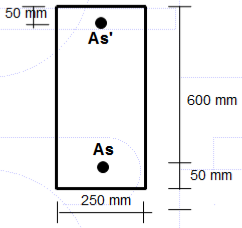
a) 6.12 Mpa
b) 5.412 Mpa
c) 8.52 Mpa
d) 6.53 Mpa

1) - a
2) + b
3) - c
4) - d

35) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$

1- Calculate the required reinforcement As and As'.

2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



By compering of Ru and $Ru_{(max)}$ the result was:

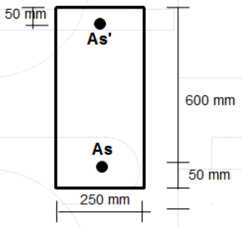
a) $Ru < Ru_{(max)}$ so the section is single reinforcement
b) $Ru > Ru_{(max)}$ so the section is double reinforcement
c) $Ru \geq Ru_{(max)}$ so the section is rectangular
d) None of these

1) - a
2) + b
3) - c
4) - d

36) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$

1- Calculate the required reinforcement As and As'.

2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



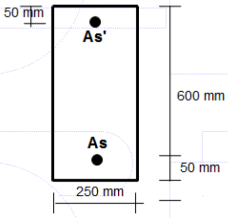
Maximum steel reinforcement area $As_{(max)}$ =As1 =

a) 3187.5 mm^2
b) 3997.5 mm^2
c) 3226.8 mm^2
d) 2560.8 mm^2

1) - a
2) - b

3) + c
4) - d

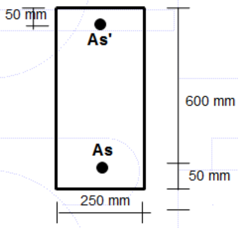
37) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



The depth of equivalent compressive stress block a =
a) 241.58 mm
b) 260.57 mm
c) 225.25 mm
d) 308.65 mm

1) + a
2) - b
3) - c
4) - d

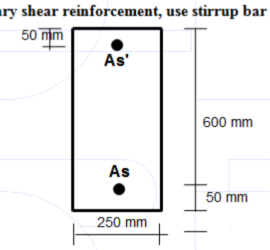
38) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



The neutral axis is at distance C =
a) 320.56 mm
b) 199.87 mm
c) 284.21 mm
d) 264.71 mm

1) - a
2) - b
3) + c
4) - d

39) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Mu1 was calculated equal to:
a) 638.67 kn.m
b) 587.37 kn.m
c) 460.65 kn.m
d) 487.09 kn.m

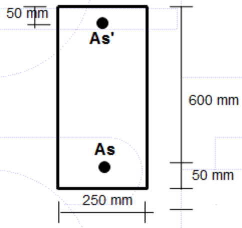
1) - a

2) - b

3) - c

4) + d

40) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Mu2 =
a) 42.63 kn.m
b) 70.78 kn.m
c) 34.54 kn.m
d) None of these

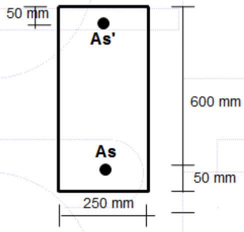
1) - a

2) - b

3) - c

4) + d

41) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



the value of ε_s' =
a) 0.01234
b) 0.02433
c) 0.00247
d) 0.00343

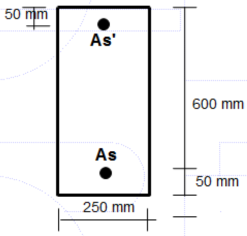
1) - a

2) - b

3) + c

4) - d

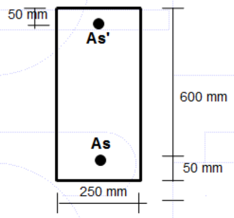
42) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



The value of ε_y =
a) 0.00314
b) 0.00175
c) 0.01751
d) 0.00210

1) - a
2) + b
3) - c
4) - d

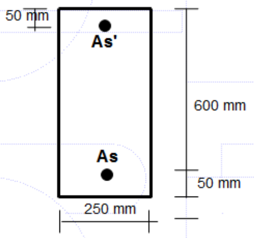
43) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



By comparing the values ε_s' and ε_y :
a) $\varepsilon_s' < \varepsilon_y$ then the steel no yielding As' ≠ As2
b) $\varepsilon_s' = \varepsilon_y$ then the steel is yielding As' ≠ As2
c) $\varepsilon_s' > \varepsilon_y$ then the steel is yielding As' = As2
d) None of these

1) - a
2) - b
3) + c
4) - d

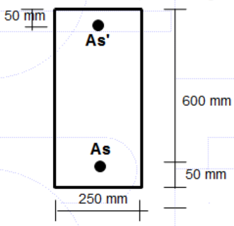
44) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



As2 = As'
a) 205.05 mm^2
b) 620.78 mm^2
c) 695.01 mm^2
d) 525.45 mm^2

1) - a
2) - b
3) + c
4) - d

45) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



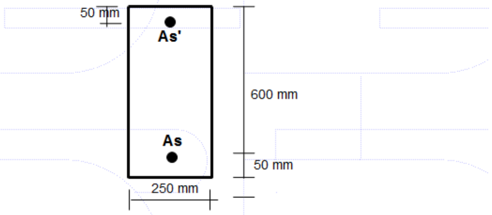
As (total steel area) =
a) 4055.65 mm^2
b) 3392.55 mm^2
c) 2908.44 mm^2
d) 3921.81 mm^2

1) - a
2) - b
3) - c
4) + d

46) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$

1- Calculate the required reinforcement As and As'.

2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Design of shear reinforcement:

The shear at support Vu =

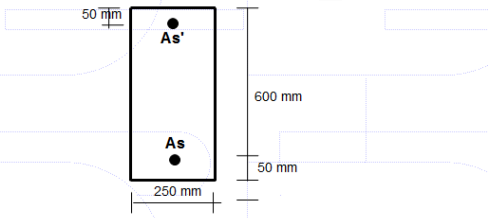
a) 420 kn
b) 330 kn
c) 405 kn
d) 395 kn

1) - a
2) - b
3) + c
4) - d

47) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$

1- Calculate the required reinforcement As and As'.

2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Design of shear reinforcement:

The shear at a distance d from the face of support Vu(d) =

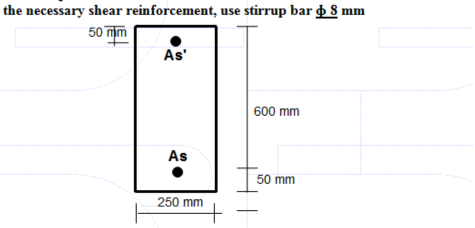
a) 301 kn
b) 336 kn
c) 406 kn
d) 324 kn

1) - a
2) - b
3) - c
4) + d

48) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$

1- Calculate the required reinforcement As and As'.

2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



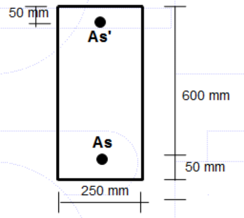
Design of shear reinforcement:

The strength of concert for shear Vc =

a) 134.933 kn
b) 104.246 kn
c) 209,332 kn
d) 119.61 kn

1) - a
2) - b
3) - c
4) + d

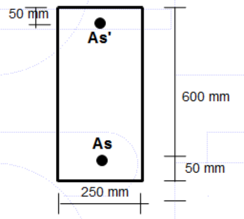
49) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Design of shear reinforcement:
the value of ØVc =
a) 211.66 kn
b) 114.69 kn
c) 170.77 kn
d) 101.67 kn

1) - a
2) - b
3) - c
4) + d

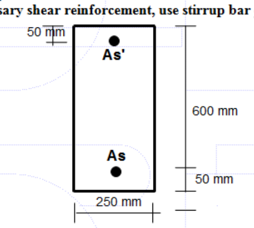
50) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Design of shear reinforcement:
ØVc/2 =
a) 70.76 kn
b) 50.84 kn
c) 44.35 kn
d) None of these

1) - a
2) + b
3) - c
4) - d

51) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

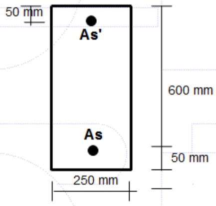


Design of shear reinforcement:

by comparing Vu(d) with ØVc/2 then:
a) Vu(d) > ØVc/2 then Stirrups are not be needed
b) Vu(d) > ØVc/2 then Stirrups are be needed
c) Vu(d) < ØVc/2 then Stirrups are be needed
d) Vu(d) > ØVc/2 Double steel reinforcement is needed

1) - a
2) + b
3) - c
4) - d

52) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

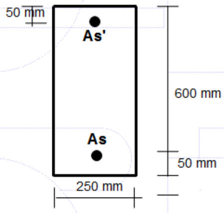


Design of shear reinforcement:

Vs =
a) 340.765 kn
b) 178.675 kn
c) 221.311 kn
d) 261.56 kn

1) - a
2) - b
3) - c
4) + d

53) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

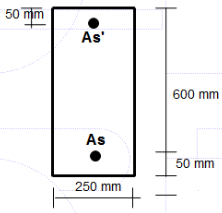


Design of shear reinforcement:

the distance X1 from face of support at which ØVc/2:
a) 2.591 m
b) 3.453 m
c) 2.623 m
d) 2.015 m

1) - a
2) - b
3) + c
4) - d

54) A **6 m** simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

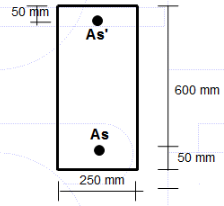


Design of shear reinforcement:

the distance X2 from face of support at which ØVc:
a) 2.182 m
b) 2.495 m
c) 2.247 m
d) None of these

1) - a
2) - b
3) + c
4) - d

55) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f_c'= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

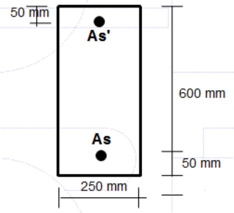


Design of shear reinforcement:

Av for 2 branches stirrup ϕ 8 =
a) 75.156 mm^2
b) 170.87 mm^2
c) 100.53 mm^2
d) 230.33 mm^2

1) - a
2) - b
3) + c
4) - d

56) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f_c'= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

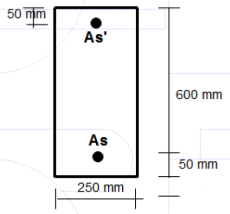


Design of shear reinforcement:

The space between stirrups S1 is:
a) 97.32 mm
b) 72.86 mm
c) 80.71 mm
d) 250.5 mm

1) - a
2) - b
3) + c
4) - d

57) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f_c'= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm

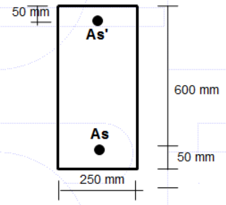


Design of shear reinforcement:

value of $(\frac{1}{3}\sqrt{f_c'}bd)$ =
a) 264.58 kn
b) 160.78 kn
c) 300.58 kn
d) 234.52 kn

1) - a
2) - b
3) - c
4) + d

58) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



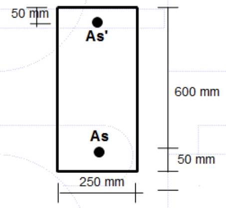
Design of shear reinforcement:

after comparing ($\frac{1}{3}\sqrt{f_c'}bd$) with Vs then the space S2 will be:

a) 150 mm
b) 200 mm
c) 300 mm
d) 350 mm

1) + a
2) - b
3) - c
4) - d

59) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



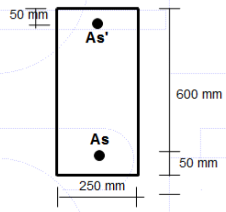
Design of shear reinforcement:

the values of Vs and ΦVs for S2 respectively =

a) 84.45 kn and 71.78 kn
b) 140.74 kn and 119.63 kn
c) 95.64 kn and 95.71 kn
d) 103.5 kn and 71.78 kn

1) - a
2) + b
3) - c
4) - d

60) A 6 m simply supported beam with limited section as shown in the following figure has been subjected to an ultimate load 135 KN/m'. using (f'_c= 22 MPa, and f_y= 350 MPa.), and assume $M_u = wl^2/8$
1- Calculate the required reinforcement As and As'.
2- Design the necessary shear reinforcement, use stirrup bar ϕ 8 mm



Design of shear reinforcement:

the distance X3 from the face of support where S2 begin =

a) 1.19 m
b) 1.67 m
c) 2.52 m
d) 1.36 m

1)	-	a
2)	-	b
3)	-	c
4)	+	d