Samples of questions
Concrete Design

Third Year

2014-2015

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1/ Which govers the max. size of coarse aggregate in reinforced concrete.

2/ Mention the methods of testing the tensile strength of concrete.

3/ - Define Cement.
- Define Ductility of structures.
- Draw stress – strain curves for concrete &steel.

4/ Which govers that max size of coarse aggregate in reinforced concrete .

5/ Define Ductility of structures.

6/ Which govers that max size of coarse aggregate in reinforced concrete .

7/ Draw stress – Strain diagram for steel .

8/ How many types of reinforced compression concrete members? Explain it briefly, then drawing them

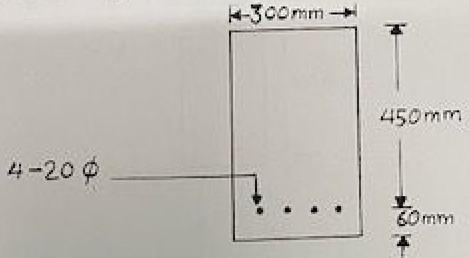
9/ Mention with drawing types of reinforced compression concrete members .

10/ Mention the reasons of using the structural safety in the design calculations.

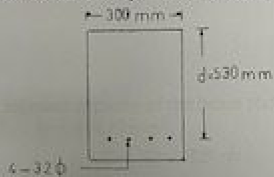
11/ **Complete these sentences:**

- The concrete is consists of ....
- Properly curing concrete leads to .... strength and lower ....
- Ductility in a structure or member means ....
- According to ACI-Code there are two factors to provide safety for the structures
  1-............... 2- ....
- The main measure of quality of concrete is its ....
- The normal use admixture dosages are less than .... by mass of cement.

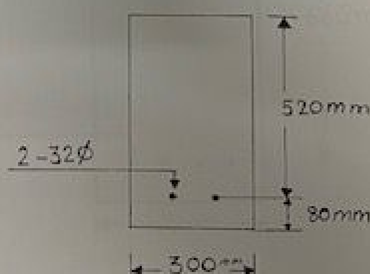
12/ Find the moment Capacity of the beam shown , then check the steel ratio.
If $f_c = 27.6 N\backslash mm^2$, $f_y = 276 N\backslash mm^2$



13/ **Find the moment capacity (Mu) of the beam shown in fig . Then check the steel ratio . If $f_c' = 20.7\ N\backslash mm^2$, $f_y = 276\ N\backslash mm^2$**

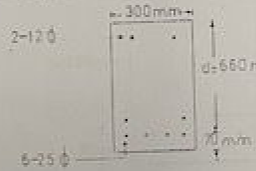


14/ Find the moment capacity (Mu) of the beam shown ; then check the reinforcement ratio . If $f_c = 41.4\ N/mm^2$, $f_y = 414\ N/mm^2$.

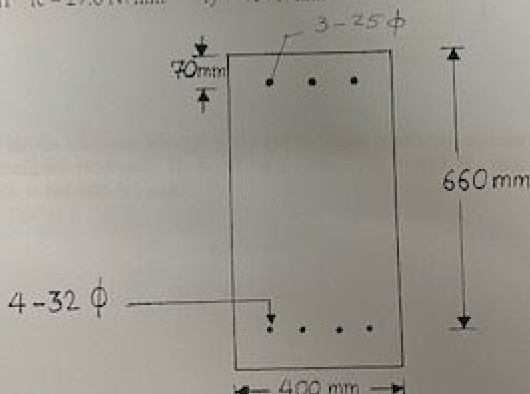


17 / Find the ultimate moment strength (Mu) of the beam reinforced section as shown in fig

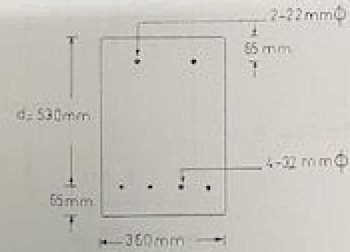
15/ Find the design moment capacity of the beam shown in the fig. Then check the steel ratio. If $f_c' = 20.7\ N\backslash mm^2$, $f_y = 414\ N\backslash mm^2$, $d' = 70$ mm



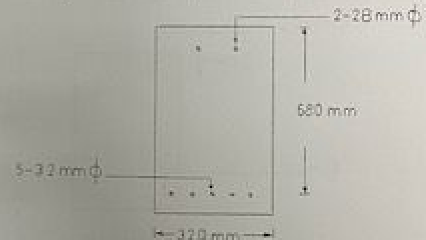
16/ Determine the design moment capacity of the beam shown in fig.
If $f_c' = 27.6\ N\backslash mm^2$ $f_y = 414\ N\backslash mm^2$



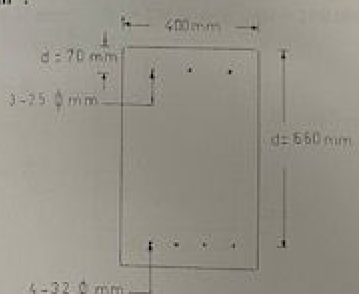
17/ Find the ultimate moment strength (Mu) of the beam reinforced section as shown in fig. If $f_c' = 35 N\backslash mm^2$, $f_y = 420 N\backslash mm^2$, $d' = 65$ mm, $E_s = 200.000 N\backslash mm^2$.



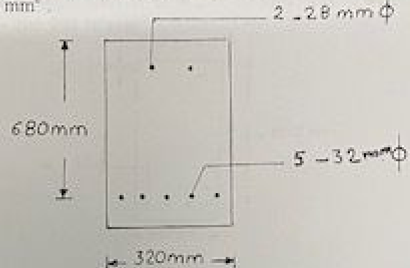
18/ Determine the Ultimate moment capacity (Mu) of the beam reinforced section as shown in fig. If $f_c' = 27.6 N\backslash mm^2$, $f_y = 414 N\backslash mm^2$, $d' = 70$ mm, $E_s = 200.000 N\backslash mm^2$



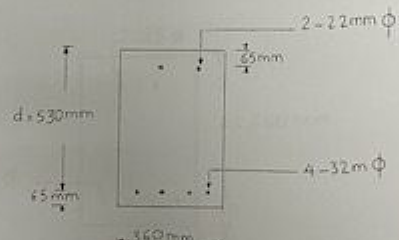
19/ Find the Ultimate strength (Mu) of the beam reinforced section as shown in fig. then check the steel ratio .If **$f_c = 27.6 N\backslash mm^2$, $f_y = 414 N\backslash mm^2$, $d' = 70$ mm, $E_s = 200.000 N\backslash mm^2$.**



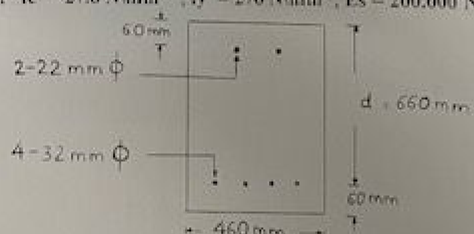
20/ Calculate the Ultimate moment capacity (Mu) of the beam reinforced section as shown in the fig. If $f'_c = 27.6\ N\backslash mm^2$, $f_y = 414\ N\backslash mm^2$, $d' = 70$ mm , $E_s = 200.000\ N\backslash mm^2$.



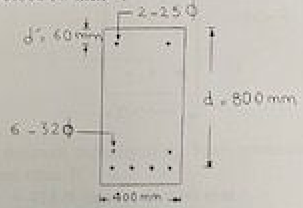
21/ Calculate the Ultimate moment strength (MU) of the beam section as shown in fig. If $f'_c = 35\ N\backslash mm^2$, $f_y = 420\ N\backslash mm^2$, $d' = 65$ mm , $E = 200.000 N\backslash mm^2$.



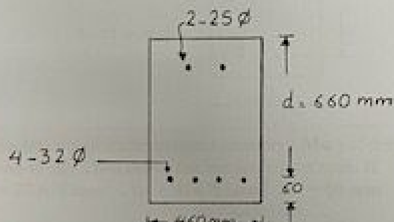
22/ Determine the Ultimate capacity (Mu) of the beam reinforced section as shown in figure . If $f'_c = 27.6\ N\backslash mm^2$, $f_y = 276\ N\backslash mm^2$, $E_s = 200.000\ N\backslash mm^2$.



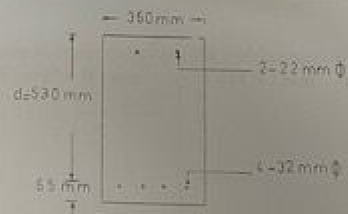
23/ Calculate the ultimate strength (**Mu**) of the beam reinforced section as shown in figure , then check the steel ratio .If $f_c' = 27.6\ N/mm^2$, $f_y = 414\ N/mm^2$, $d' = 60\ mm$, $E_s = 200.000\ N/mm^2$.



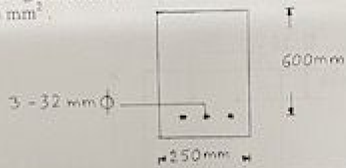
24/ Calculate the ultimate moment capacity (Mu) of the beam reinforced section as shown . $f_c = 27.6\ N\backslash mm^2$, $f_y = 276\ N\backslash mm^2$; $E_s = 200\ K\ N\ \backslash mm$



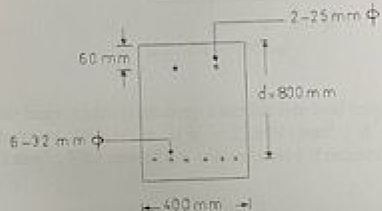
25/ Calculate the ultimate strength (Mu) of the beam reinforced section as shown in figure. If $f_c' = 35\ N\backslash mm^2$, $f_y = 420\ N\backslash mm^2$ $d' = 65mm$, $E_s = 200.000\ N\backslash mm^2$.



26/ Calculate the Ultimate moment capacity (Mu) of the beam cross- section as shown in the figure. Then check the reinforcement ratio. If $f_c' = 20.7 \ N \backslash mm^2$, $f_y = 276 \ N \backslash mm^2$.

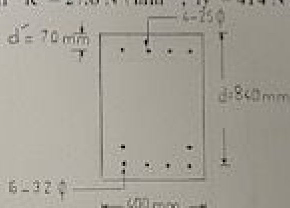


27/ Calculate the ultimate moment capacity of the beam cross-section as shown in fig. Then check the steel ratio. If
$f_c' = 27.6 \ N \backslash mm^2$, $f_y = 414 \ N \backslash mm^2$, $d' = 60$ mm

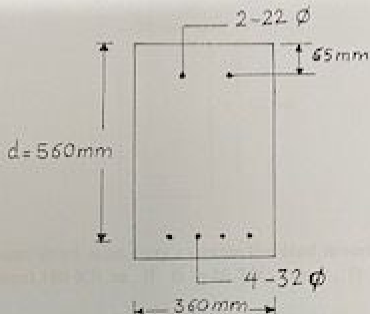


28/ Calculate the ultimate moment capacity (**Mu**) of the beam reinforced section as shown in fig. Then check the reinforcement ratio. If
$f_c' = 27.6 \ N \backslash mm^2$, $f_y = 414 \ N \backslash mm^2$, $d' = 60$ mm

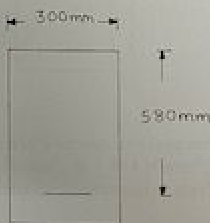
29/ Calculate the Ultimate moment capacity (**Mu**) of the beam reinforced section as shown in fig . If $f_c' = 27.6 \ N \backslash mm^2$, $f_y = 414 \ N \backslash mm^2$, $d' = 70$ mm .



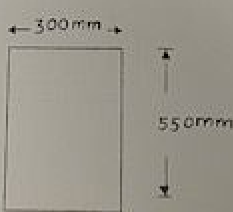
30/ Calculate the ultimate moment strength (Mu) of the beam reinforced section as shown in fig . if $f_c = 35\ N/mm^2$, $f_y = 420\ N/mm^2$, $d' = 65\ mm$, $E = 200\ 000\ N/mm^2$.



31/ A rectangular beam which must carry a service live load moment 260 KN \ m , and dead load moment 190 KN \ m , If $f'_c = 27.6\ N \backslash mm^2$, $d' = 60$ mm , $f_y = 414\ N \backslash mm^2$, Find area of the wanted steel (if required compression steel).



32/ A rectangular beam which must carry a service live load moment 250 KN.m , and dead load moment 200 KN.m . If $f'_c = 27.6\ N/mm^2$, $f_y = 414\ N/mm^2$
Find area of the wanted steel (if required compression steel), $d' = 60$ mm .

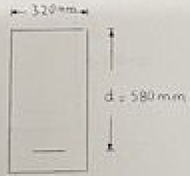


33/ A rectangular beam which must carry a service **live load moment 240 KN \ m** and **dead load moment 180 KN \m** , If $f_c' = 27.6$ N \ mm^2 , fy = 414 N \ mm^2 , $d' = 60$ mm .
Find area of the wanted steel (if required compression steel).

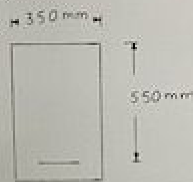
34/ A rectangular beam which must carry a service **live load moment 240 KN \ m** and **dead load moment 180 KN \m** , If $f_c' = 20.7$ **N \ mm^2 , fy = 414 N \ mm^2 , $d' = 70$ mm .**
Find area of the wanted steel (if required compression steel).

35/ A rectangular beam which must carry a service live load moment 230 KN\m and dead loa moment 160 KN\m. If $f_c' = 27.6$ N\mm^2 , fy = 414 N\mm^2 , $d' = 60$ mm
Find area of the wanted steel (If required compression steel).

36/ A rectangular beam which must carry a service **live load moment 280 KN /m** , and **dead load moment 200 KN /m** . If $f_c' = 27.6 N/mm^2$, $f_y = 414 N/mm^2$, **$d' = 60$ mm** . Find area of the wanted steel (If required compression steel).

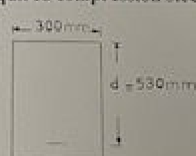


37/ A rectangular beam which must carry a service live load moment 280 KN.m , and dead load 230 KN.m , If $f_c' = 27.6 N\backslash mm^2$, $f_y = 414 N\backslash mm^2$. Find area of the wanted steel (If required comp. steel) $d' = 60$ mm.

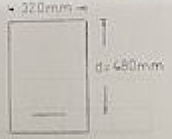


38/ A rectangular beam which must carry a **service live load moment 200 KN.m** and **dead load moment 160 KN.m . If $f_c' = 27.6 N\backslash mm^2$, $f_y = 414 N\backslash mm^2$. $d' = 70$ mm**.
Find area of the wanted steel (If **required compression steel**).

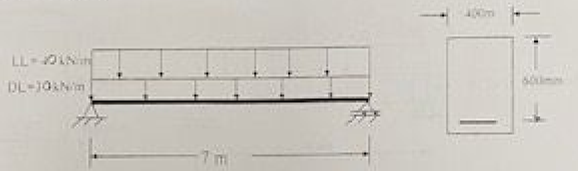
39/ Arectangular beam which must carry a **service live load moment 240 KN\m** and **dead load moment 180 KN\m . If $f_c' = 27.6 N\backslash mm^2$, $f_y = 414 N\backslash mm^2$. $d' = 60$ mm**.
Find area of the wanted steel (If **required compression steel**).



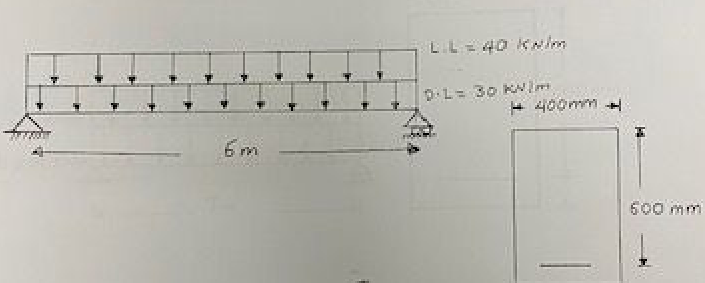
40/ A rectangular beam which must carry a service live load moment 180 KN.m and dead load moment 130 KN.m , If f'_c = 20.7 N/mm^2 , fy = 414 N/mm^2 Find area of the wanted steel (If required compression steel) d$'$ = 90 mm



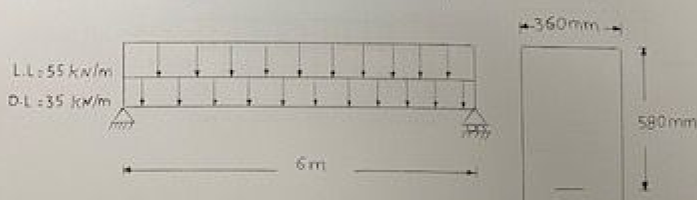
41/ A simply supported rectangular beam shown in fig. If the 30 KN\m is service dead load and a service live load of 40 KN\m. material strength $f_c = 27.6\ N\backslash mm^2$, $f_y = 414\ N\backslash mm^2$. Find the vertical strength that must be provided by steel (Vs) for beam as shown



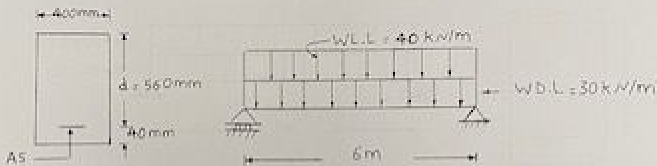
42/ Asimply supported rectangular beam shown in fig. If the 30 KN \ m is a service dead load and a service live load of 40 N \ m material strength
$f_c' = 27.6\ N\backslash mm^2$, $f_y = 414\ N\backslash mm^2$
Find the required web reinforcement (Use ϕ = 10 mm stirrup)



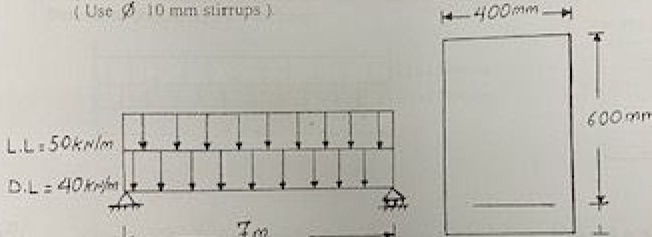
43/ A simply supported rectangular beam as shown in fig below. If the 35 KN \ m is a service dead load and a service live load of 55 KN \ m material strength
$f_c' = 27.6\ N\backslash mm^2$, $f_y = 414\ N\backslash mm^2$
Find the required web reinforcement (Use ϕ = 10 mm stirrup).



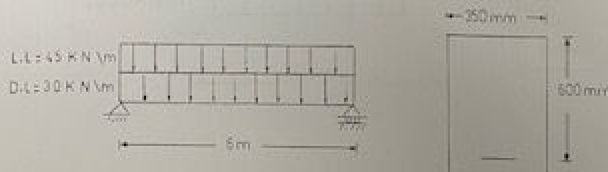
44/ A simply supported rectangular beam as shown in fig. If the **30 KN \ m** is a service **dead load** and a service **live load of 40 KN \ m** . Material strength is **$f_c' = 27.6$ N \ mm^2** and **$f_y = 420$ N \ mm^2** . **Find** web reinforcement that required at critical section. For shear (Use ϕ 10 mm stirrups).



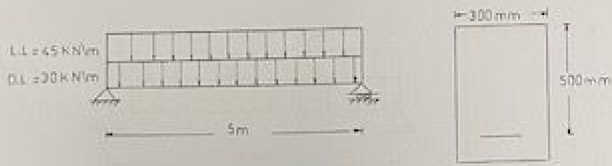
45/ A simply supported rectangular beam shown in figure below. If the 40 KN/m is a service dead load and a service live load of 50 KN/m. material strength $f_c' = 27.6$ N/mm^2 , $f_y = 414$ N/mm^2 . Find the required web reinforcement.
(Use ϕ 10 mm stirrups).



46/ A simply supported rectangular beam shown in fig. If the **30 KN \m** is a service **dead load** and a service **live load of 45 KN\m**. If
$f_c' = 27.6$ N \ mm^2 , $f_y = 414$ N \ mm^2 .
Find the required web reinforcement. **(Use ϕ 10 mm stirrups)**.



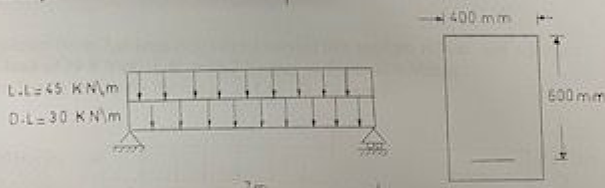
47/ A simply supported rectangular beam as shown in fig. If the 30 KN\m is a service dead load and a service live load of 45 KN\m , material strength $f_c' = 27.6$ N\mm^2 , fy = 414 N\mm^2 . Find the required web reinforcement (Use ϕ 10 mm stirrups) .



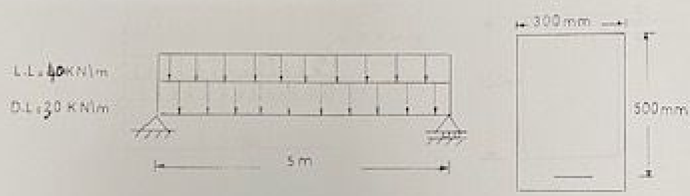
48/ A cantilever beam **2.6 m** long is to carry **a service live load 40 KN\m** and **a service dead load of 20 KN\m** (including beam weight). If **$f_c' = 20.7$ N\mm^2 , fy = 414 N\mm^2** . **Determine** the stirrups for the beam.

49/ A simply supported rectangular beam shown in figure below . If the **30 KN\m** is a service dead load and a service live load of **45 KN\m**, material strength f_c' = **27.6 N\mm^2** , fy = **414 N \ mm^2**.

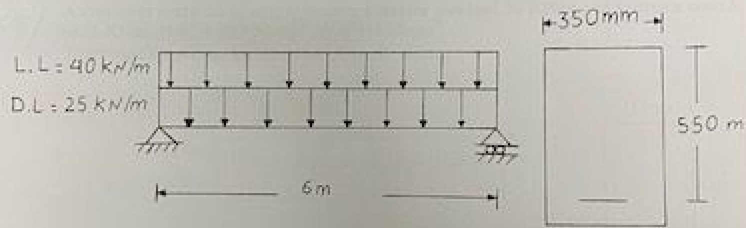
Find the required web reinforcement (**Use ϕ 10 mm stirrups**).



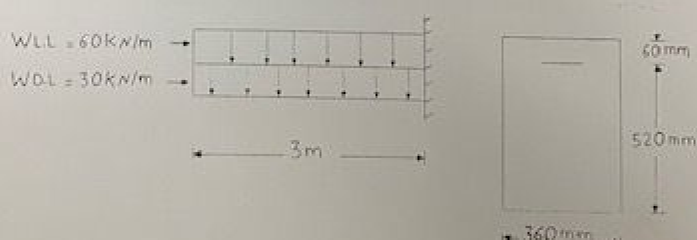
50/ A simply supported rectangular beam shown in fig. If the 30 KN\m is a service dead load and a service live load of 40 KN\m . material strength $f_c' = 27.6$ N\mm^2 , $f_y = 414$ N\mm^2
Find required web reinforcement (Use Φ 10 mm stirrups)



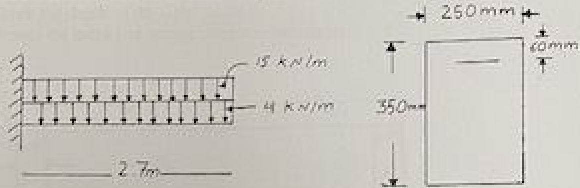
51/ A simply supported rectangular beam shown in fig . If the 25 KN\m is a service dead load and a service live load of 40 KN\m ; material strength $f_c' = 27.6$ N\mm^2 , $f_y = 414$ N\mm^2 .
Find the required web reinforcement (Use Φ 10 mm Stirrups).



52/ A cantilever beam **3 m long** is to carry a service **live load 60 KN\m** and a service **dead load of 30 KN\m**. If $f_c' = 20.7$ N\mm^2 , $f_y = 414$ N\mm^2 .
Determine the stirrup for the beam . (**Use Φ 10 mm**).



53/ Cantilever beam 2.7 m long is to carry a service live load of 15 KN/m . If $f'_c = 20.7\ N/mm^2$, $f_y = 414\ N/mm^2$.
Determine the stirrup for the beam. Use ϕ 10 mm .

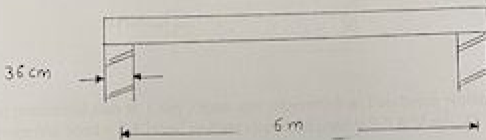


54/ A cantilever beam 2.6 m long is to carry a service live load 50 KN\m and a service dead lo of 25 KN\m. If $f'_c = 20.7\ N\backslash mm^2$, $f_y = 414\ N\backslash mm^2$.
Determine the stirrup for the beam (Use ϕ 10 mm).

55/ The reinforced concrete slab is 6 m span and supported on two brick walls 36 cm width , If service live load = 4.9 KN \ m^2 and service dead load = 3.6 KN \ m^2
If f'_c = 27.6 N \ mm^2 , fy = 276 N \ mm^2

a : Check the depth of the slab .

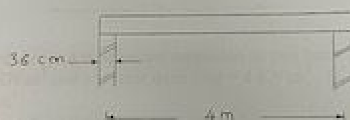
b : Design the main and temperature reinforcement .



56/ The **reinforced concrete slab is 4 m** and supported on two brick walls **36 cm width**. If **service live load = 6 KN \ m^2** and a **service dead load = 4 KN \ m^2**, **f'_c = 20.7 N \ mm^2 , fy = 276 N \ mm^2**.

a – Check the depth of the slab.

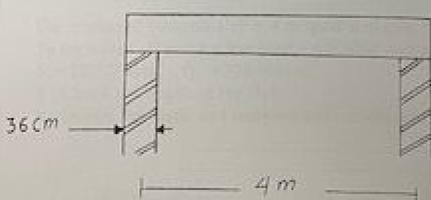
b – Design the main and temperature reinforcement.



57/ The Reinforced concrete slab is 4m span and supported on two brick walls 36 cm. If service live load = 6.5 KN/m^2 and service dead load = 4.5 KN/m^2 , f'_c = 20.7 N/mm^2
fy = 276 N/mm^2 .

a : Check the depth of the slab.

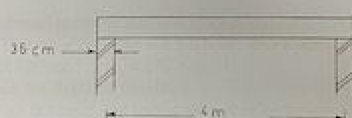
b : design the main and temperature reinforcement.



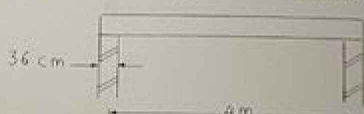
58/ The reinforced slab is 5 m span and supported to two brick walls 36 cm width.
If service **live load** = 7 **KN** \ m and a service **dead load** = **4.5 KN** \ **m.**
If **f'c = 20.7 N \ mm², fy = 276 N \ mm².**
a : Check the depth of the slab.
b : Design the main and temperature reinforcement.

59/ The reinforced slab is (4m) span and supported on two brick walls (36cm) width. If service live load = 4 KN\m² and service dead load = 2.8 KN\m². If f'c = 27.6 N\mm², fy = 276 N\mm².
a) Check the depth of the slab.
b) Design the main and temperature reinforcement.

60/ The Reinforced slab is **4 m** span and supported on two brick walls **36 cm** width, If service live load = **5 KN\m²** and a service dead load = **4 KN\m²**, f'c = **20.7 N\mm²**, fy = **276 N\mm²**
a) Check the depth of the slab.
b) Design the main and temperature reinforcement . (**Use** ϕ **12 mm , Ab = 113 mm²**).



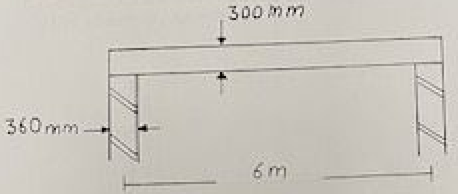
61/ The reinforced concrete slab is **4 m span** and supported on two brick walls 36 cm width. If service live load = 6 KN\m² and a service dead load = 4 KN\m², f'c = 20.7 N\mm², fy = 276 N\mm².
a : Check the depth of the slab.
b : Design the main and temperatures reinforcement .



62/ The slab is supported on two brick walls 6 m on centers and 36 cm width of walls. The factored moment = 60 KN.m , h = 300 mm . $f_c' = 27.6$ N/mm², $f_y = 414$ N/

1- check the depth.

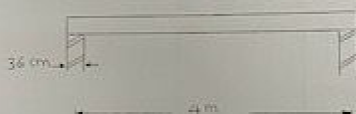
2- design the main and Temperatures reinforcement.



63/ The reinforced slab is 4m span and supported on two brick walls 36 cm width. If live load = 10 KN/m^2 , $f_c' = 27.6$ N/mm^2 , $f_y = 414$ N/mm^2

a : Check thickness of slab.

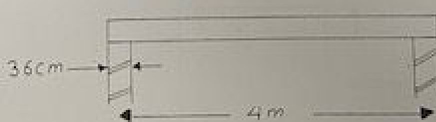
b : Design the main and secondary reinforcement.



64/ The reinforced concrete slab is 4 m span and supported on two brick walls 36 cm width , If service live load = 6.5 KN/m^2 and a service dead load = 4 KN/m^2 , If $f_c' = 20.7$ N/mm^2 , $f_y = 276$ N/mm^2

a : Check the depth of the slab.

b : Design the main and temperature reinforcement.

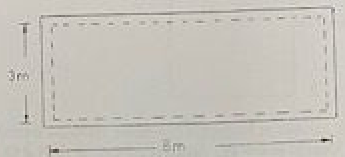


65/ A simply supported reinforced concrete slab as shown which is supported on four brick walls 3×8 m on centers and 36 cm width of walls . If live load = 10KN \ m^2 , dead load = 4.8KN \ m^2 , f'_c = 27.6 N \ mm^2 , fy = 414 N \ mm^2 .

a) Check thickness of slab

b) Design main and secondary reinforcement

(Use 10 mm ϕ , Ab = 79 mm^2)



66/ The tied reinforced concrete column is subjected to a service axial due to **live load = 560 KN** and a service axial force due to **dead load = 290 KN** , If **f'_c = 27.6 N \ mm^2** , **fy 414 N \ mm^2 , eccentricity e = 410 mm** , the dimensions of the **cross – section** are **b = 500 , h = 500 mm , and d' = 70 mm** . Design the longitudinal reinforcements. For this column **(Use 28 mm ϕ)**.

67/ Determine the ultimate strength load (Pu) for the column as shown with eccentricity e = 350 mm , If f'_c = 27.6 N/mm^2 , fy = 414 N/mm^2 , d' = 75 mm.