Q:) In fiber reinforced concrete, if the fibers are not dispersed properly, then the resulting problem is called as- (RRBJE CBT-II 28-08-2019)

A : Spalling
B : Congestion
C : Balling
D : Segregation

(C) Correct

Q:) As per IS 456:2000, the flexural strength of concrete (in N/mm^2) for the characteristic cube compressive strength of 25 N/mm^2 will be:
(SSB Himachal Pradesh 18.11.2018)
(ESE 2005, 2009)

A : 2.5
B : 0.35
C : 3.5
D : 0.25

© Correct

$$f_{ck} = 25 \, N/mm^2$$

$$f_{cr} = 0.7\sqrt{f_{ck}} = 0.7\sqrt{25} = 3.5 \, N/mm^2$$

Q:) The minimum cement concrete (kg/cum) for a ship dock (underwater construction) with 40 mm aggregate is prescribed by the India standard as:

(DDA JE 23.04.2018)

$320 - 30 \Rightarrow 290 \, kg/m^3$

A : 300

B : 250

C : 400

D : 350

(A) Correct

Severe Condition

Sea Water Spray
↓
Under very severe Condition

Nominal Size of
Age

10mm	→	(+40)
20mm	→	
40mm	→	(-30)

IS 456 : 2000

Nominal Size of Aggregate (20mm)
It

mild → 300

moderate → 300 ↑

Severe → 320 (kg/m³)

Very severe → 340

exten → 360

20mm
=

Q:) If the standard deviation of 40 concrete cover samples is 3 MPa and the average is 30 MPa, then the co-efficient of variation (%) for this data set will be: (DDA JE 24.04.2018)

A : 10
B : 1000
C : 1333
D : 4

$$\text{Cofficient of variation (CV)} = \frac{\sigma_{n-1}}{mean}$$

$$\Rightarrow \frac{3}{30} \times 100 \Rightarrow 10$$

Q:) Permissible stress σcb,σcb, as per : 456 for M 20 concrete is : (NBCC JE 2017)

A : 5 N/mm²

B : 7 N/mm²

C : 6 N/mm²

D : 4 N/mm²

$\sigma_{cbc} \Rightarrow$ Concrete in Bending Compression

$\Rightarrow \dfrac{20}{3} \Rightarrow 6.67 \approx \boxed{7}$

Q:) Which of the following exposure conditions will a structural steel element be classified when exposed to corrosive fumes? (DDA JE 23.04.2018)
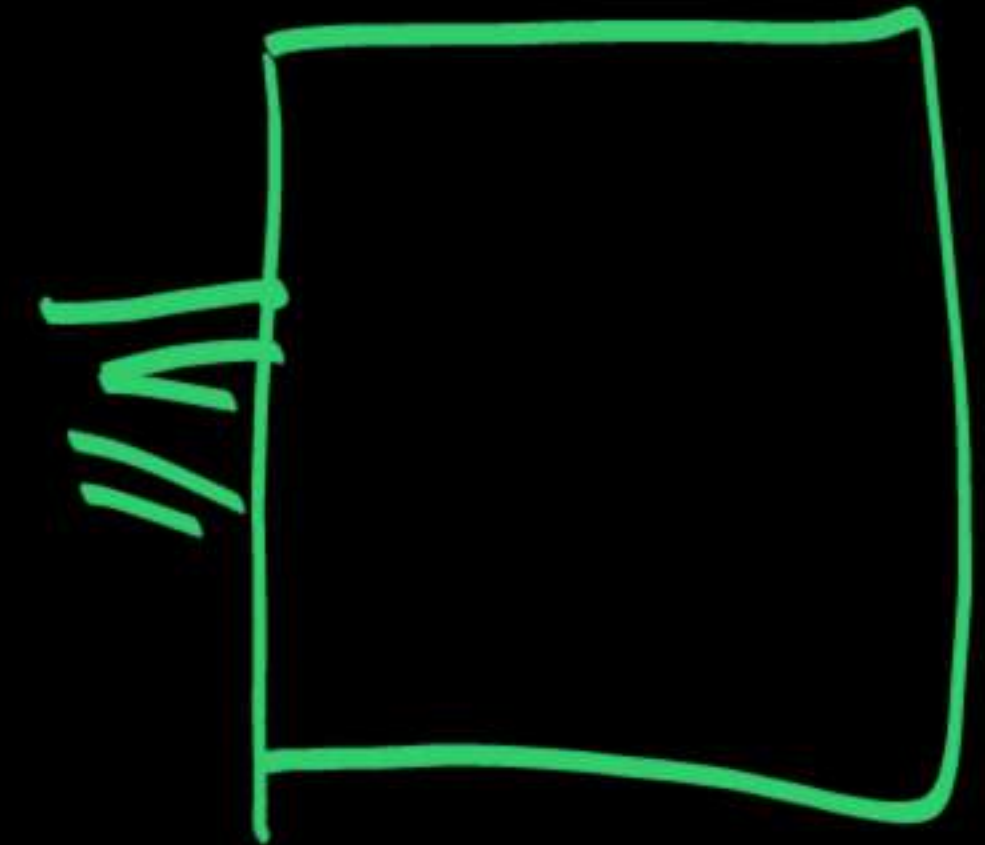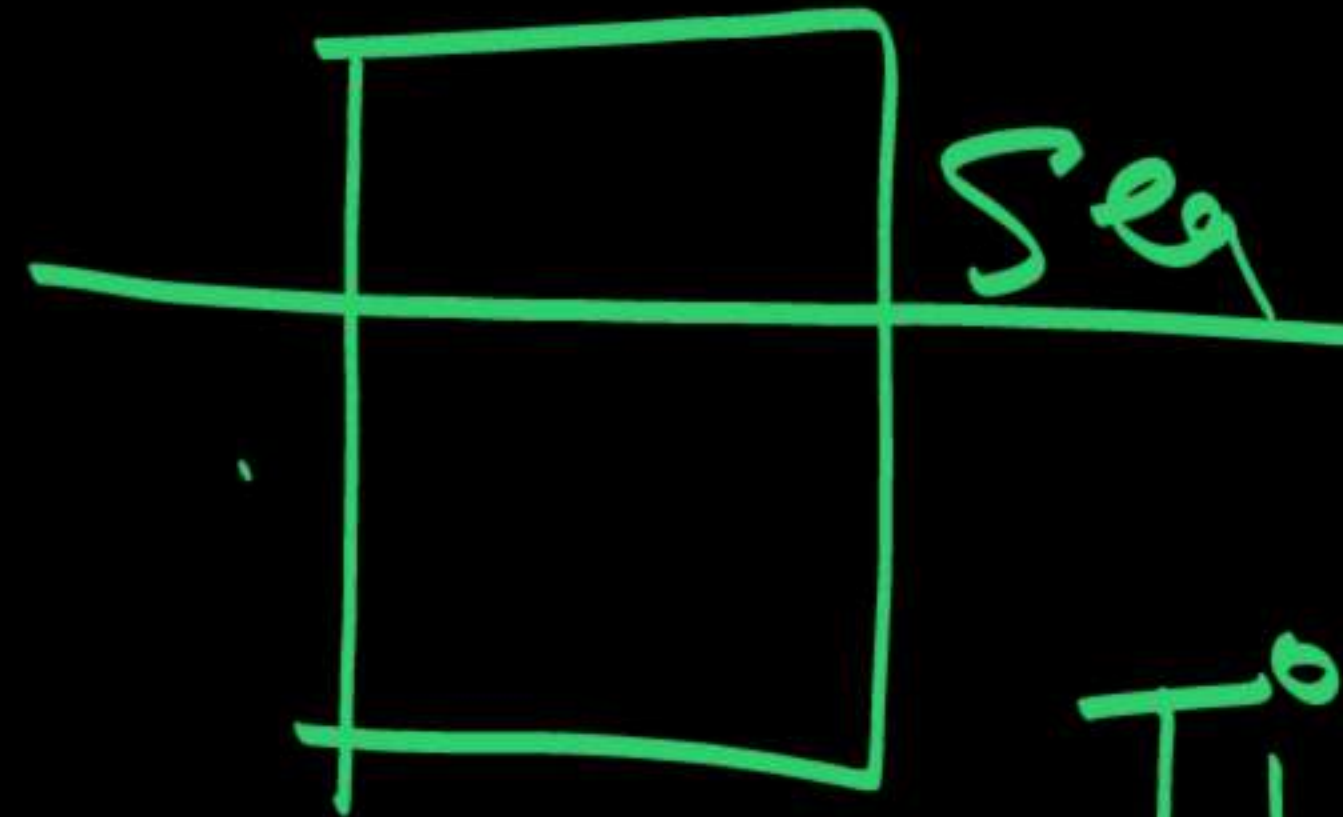
A : Extreme

B : Severe

C : Very Severe

D : Moderate

Ⓒ Correct

Sea

Tidel Zone → Extreme Condition

Q:) Empirical relationship between tensile strength compressive strength of concrete is given by:

M.P. Sub Egg. 4 Sep 2018 2.00 pm

A : Tensile strength = 0.47* fck

B : fck = 0.47*tensile strength

C : Tensile strength = k (compressive strength)^n

D : K= $\dfrac{\text{Compressive strength}}{\text{tensile strength * fck}}$

$\neq$ (D) Correct

tensile strength = ($\frac{1}{10}$ to $\frac{1}{15}$) of compressive strength

Q:) Give the full form of RBLC.
(Haryana SSC 13.04.2018)

A : Reinforced brick Lime Concrete

B : Reinforced Brick Lime Cement

C : Reinforced Brick Light Concrete

D : Reinforced Brick Light Cement

(A) Correct

Q:) Standard cubes of a concrete mix are tested for compressive strength, which is observed to be 36 MPa. Approximate flexural strength (MPa) of this concrete according formula provided in IS 456 will be:
(Chhattisgarh professional exam board 2016)

IS: 516

A : 3.25
B : 4.2
C : 5.5
D : 3.60

$$f_{cr} \Rightarrow 0.7\sqrt{f_{ck}}$$

$$\Rightarrow 0.7\sqrt{36} \Rightarrow 4.2\ MPa$$

Q:) Why steel is commonly used as good reinforcing material?
(DFCCIL, 17-04-2016)

A. It is cheaply available in bulk.

B. Thermal coefficient in nearly equal to concrete.

C. It possesses low tensile strength.

D. It develops good bond with concrete.

Select the correct options.

A : A, B, and D

B : Only C

C : A and D

D : A B and C

(A) Correct

Q:) As per IS 800-2007, the maximum effective slenderness ratio of a member normally caring tension but subjected to reversal of stress due to wind or earthquake forces should be

(BSPCL JE Civil 29.01.2019)

A : 95

B : 350

C : 250

D : 180

B Correct

Tension

Confusion

Q:) What is the very first crack that occurs in any RCC member, especially if constructed during summer (RRB JE CBT-II 29.08.2019)

A : Flexural crack

B : Settlement crack

C : Corrosion spelling crack

D : Shrinkage crack

Q:) The width and effective depth of a reinforced concrete beam are 300 mm and 500 mm respectively. The stresses induced in concrete and steel due to applied loads are ♥ 5 N/mm² and 140 N/mm² respectively, the material used is M-15 grade concrete and mild steel. What will be the depth of neutral axis? Take m = 19 (UPSSSC JE 31.07.2016)

WSM

A : 142.5 mm

B : 202 mm

C : 168 mm

D : Insufficient data

$d = 500 mm$

$\sigma_{cbc} = 5 N/mm^2 \quad \sigma_{st} = 140 N/mm^2$

for Balance depth,

Ⓑ Correct $\dfrac{x_c}{d} = \dfrac{m\,\sigma_{cbc}}{m\,\sigma_{cbc} + \sigma_{st}} = \dfrac{19 \times 5}{19 \times 5 + 140} \times 500$

$\boxed{x_c = 202 mm}$

Q:) The balanced design gives

(AIRPORT AUTHORITY OF INDIA JE 2015)

A : Smallest concrete area and maximum A_{st}

B : Smallest concrete area and minimum A_{st}

C : Largest concrete area and maximum A_{st}

D : Largest concrete area and minimum A_{st}

(B) Correct

Q:) For a beam of uniform strength keeping its depth constant the width will vary in proportion to-
(UPSSSC JE 31-07-2016)

A : Bending moment (M)

B : $\sqrt{M}$

C : M^2

D : None of the above

(A) Correct

$$M \Rightarrow Q \, b_x \, d^2$$

$$M \propto b_x \quad = \text{If Depth Constant}$$

If Width Constant:

$$M \Rightarrow Q \, b \, d_x^2 : \boxed{\sqrt{M} \propto d_x}$$

Q:) In the steel reinforcement calculation for RCC, the additional length for two 45⁰ bent-ups in reinforcing bars is.
(NWDA JE 2019)

Ⓐ Correct ✓

A : 42 times the length of distance between the centre of the upper and lower arms of the bent up bars

B : 84 times the total depth of beam or slab minus bottom and top cover

C : $(1-\sin 45^0)$ times the total depth of beam or slab minus bottom and top cover

D : $\sin 45^0$ times the length of distance the centre of the upper and lower arms of the bent up bars.

Length of Cranked Bar $\Rightarrow$ $\boxed{\dfrac{d}{\sin\theta} - \dfrac{d}{\tan\theta}}$

at $\theta = 45^0$; $\longrightarrow$ $0.42\,d$

at $\theta = 30^0$; $\longrightarrow$ $0.267\,d \approx 0.27\,d$

at $\theta = 60^0$; $\longrightarrow$ $0.567\,d \approx 0.57\,d$

If θ value $(\uparrow)$ then length (additional bar) $\uparrow$

Q:) As per IS 456-2000 standard, the average permissible bond stress (τbd) for plain bars in M25 grade of concrete is:

(LMRCL (ASST. MANAGER) 15-05-2018)

A : 0.8

B : 0.9

C : 1

D : 1.1

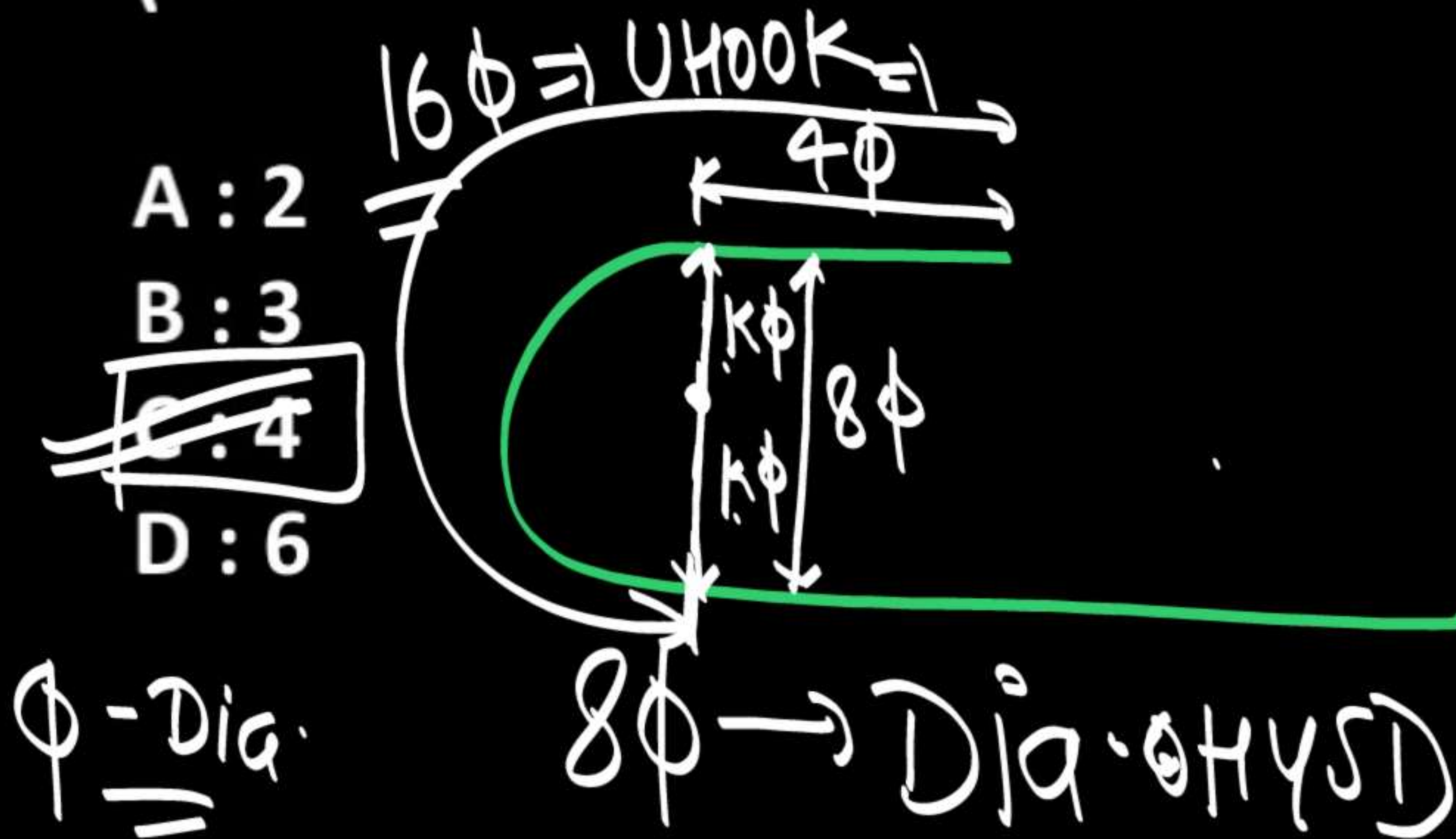| Grade	M15	M20	M25	M30	M35	M40	
τbd	0.6	0.8	0.9	1.0	1.1	1.2	→ WSM
τbd		1.2	1.4	1.5	1.7	1.9	→ LSM

B Correct

Q:) When hooks are formed in deformed bars, the internal radius of the bend should be at least _____ times the diameter of the bar.

(SSB Himachal Pradesh 28.11.2018)

A : 2
B : 3
C : 4
D : 6

$16\phi \Rightarrow$ UHOOK$=1$

4ϕ

$K\phi$

8ϕ

$K\phi$

$\phi - Dia$

$8\phi \rightarrow Dia \cdot \oplus HYSD$

$K \Rightarrow 2 \Rightarrow$ Mild Steel

$K \Rightarrow 4 \Rightarrow$ HYSD

$4\phi \Rightarrow$ Mild Steel

Q:) In simply supported slab, alternate bars are curtailed at (SSB Himachal Pradesh 18.11.2018)

A : $(1/5)^{th}$ of the span
B : $(1/6)^{th}$ of the span
C : $(1/7)^{th}$ of the span
D : $(1/8)^{th}$ of the span

©cornell

Q:) Reinforcement bars are generally bent:
(NBCC JE 2017)

A : By heating
B : Welding
C : Manually using lever
D : By dies and jigs

Ⓒ Correct

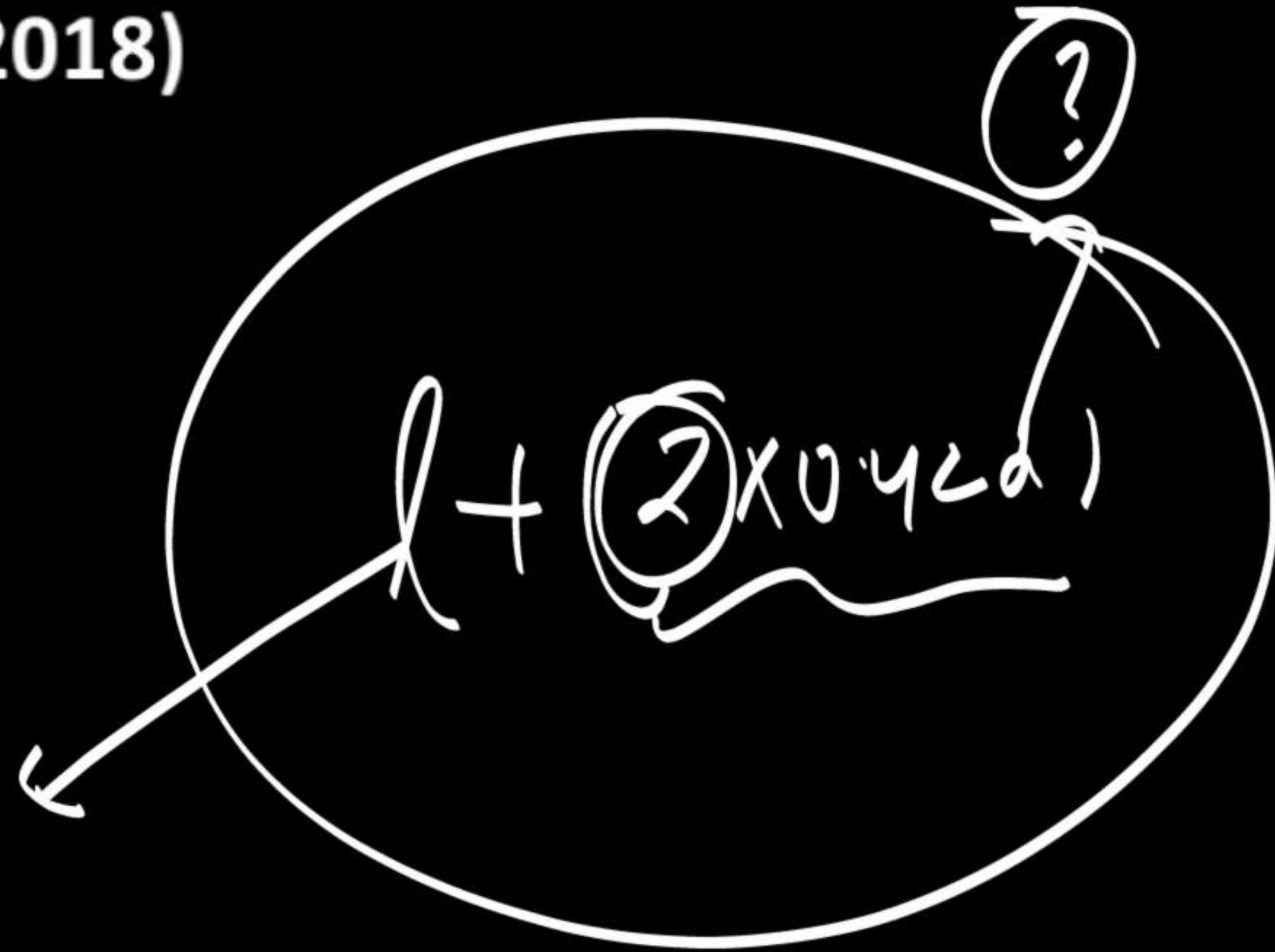Q:) For 45⁰ bend up bar the additional length of one bent up bar is: (DMRC J.E. 12.04.2018)

A : 0.9d

B : 0.42d

C : 0.09d

D : 0.52d

$l + (2 \times 0.42d)$

Ⓑ Corr

Q:) Diagonal tension reinforcement is provided in a beam as

(SSC JE 2011 & 2007/ UK Combined AE paper-I, 2012)

A : Longitudinal bars

B : Bent up bars and vertical stirrups

C : Helical reinforcement

D : 90⁰ bent at the bend of mail bar

B Corre

Q:) Torsion resisting capacity of a given reinforce concrete section......
(SSC JE 3 MARCH 2017/ M.P. Sub Eng. 3 April)

A : Decreases with decrease in stirrup spacing
B : Decreases with increases in longitudinal bars
C : Does not depend upon stirrup and longitudinal steels ①Correct
D : Increases with the increases in stirrups and longitudinal steels

Q:) What is the nominal cover to rebar in reinforced cement concert exposed to very secure conditions? (Coal India 2016)

A : 50 mm
B : 40 mm
C : 60 mm
D : 75 mm

(A) Corr

20 —
30 —
45 →
50 →
75

Q:) As per IS 456:2000, the minimum beam width required for a reinforced concrete beam, for 2 hours of fire exposure is: (SSC JE 25-09-2019)

A : 250 mm

B : 200 mm

C : 150 mm

D : 300 mm

(B) Correct

Q:) A cantilever beam of size 230 × 400 mm has a clear span of 2.5 m and is supported on a 400 × 400 mm column. The effective span of the cantilever is-
(RRB JE CBT-II 28-08-2019)

A : 2.7 m
B : 2.9 m
C : 2.615 m
D : 3.3 m

$l_{eff} \rightarrow$ min $\begin{cases} l_c + \dfrac{d}{2} \Rightarrow 2.5 + \dfrac{.40}{2} \Rightarrow 2.7m \\ l_c + a \Rightarrow 2.5 + 0.4 \Rightarrow 2.9m \end{cases}$

$\dfrac{230}{...}$

(A) Corr

Q:) As per IS: 456-2000, regarding slenderness limits, a simply supported or continuous beam shall be so propertied that the clear distance between the lateral restrains does not exceed _____, whichever is less, where d is the effective depth of the beam and b the breadth of the compression face midway between the lateral restrains. (UPRVUNL JE 2019)

A : $\frac{250b^2}{d}$ or $60b$

B : $\frac{150b^2}{d}$ or $30\ b$

C : $\frac{250b^2}{d}$ or $30\ b$

D : $\frac{150b^2}{d}$ or $60\ b$

Laterd Stability

Simply supported or
Continous

$\min \begin{cases} 60b \\ \dfrac{250\,b^2}{d} \end{cases}$

Cantilene =

$\min \begin{cases} 25b \\ \dfrac{100\,b^2}{d} \end{cases}$

Q:) For a singly reinforced over-reinforced section
(Telangana A.E. 20-09-2015)
1. The lever arm will be less than for a balanced section $\longrightarrow$
2. The maximum stress developed in concrete would be equal to the allowable stress
3. The maximum stress developed in steel would be equal to the allowed stress
Of these statement the correct ounces are
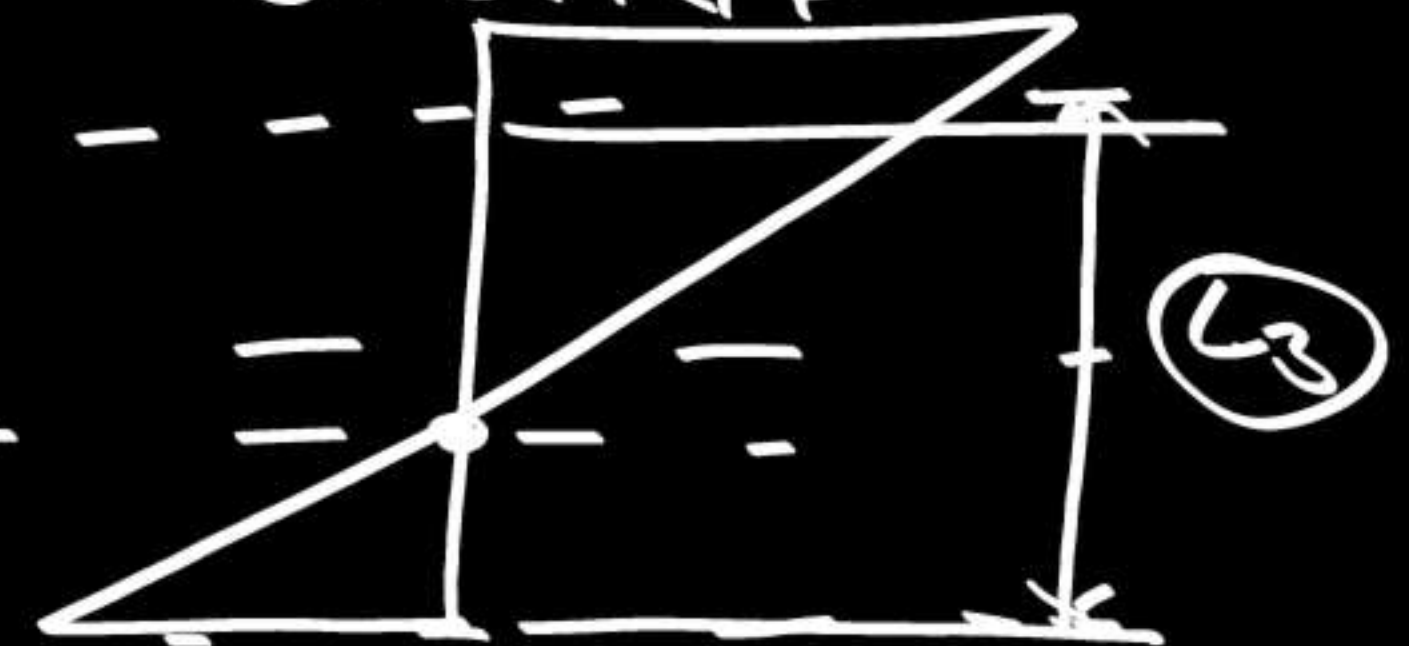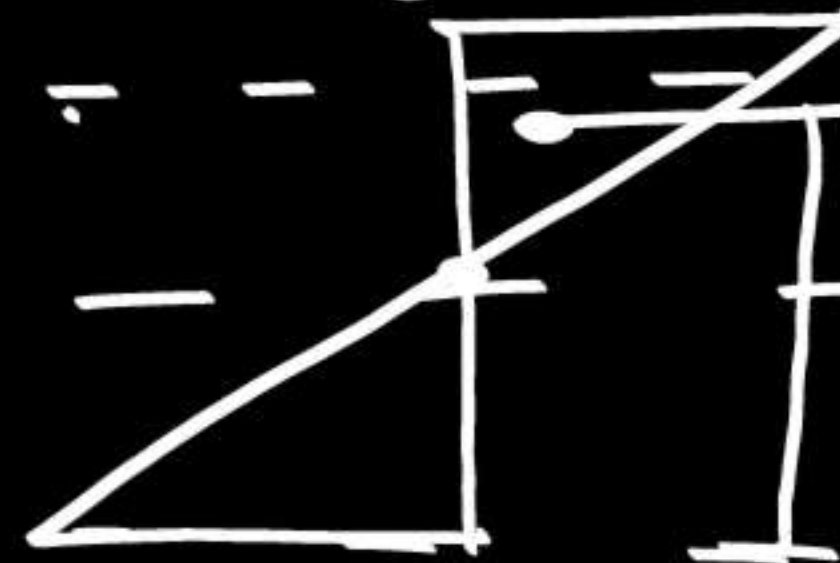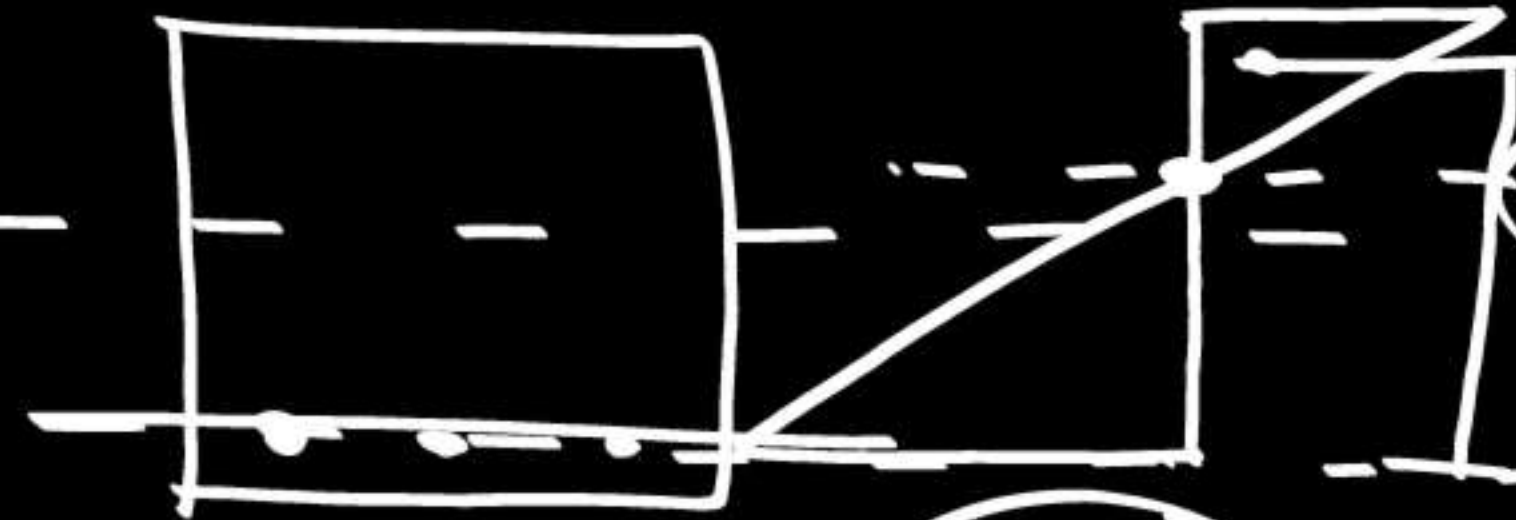A : 1 and 3 ✗
B : 1 and 2
C : 2 and 3 ✗
D : 1, 2 and 3 ✗

(B) Corr

$L_1 \neq L_2 \neq L_3$
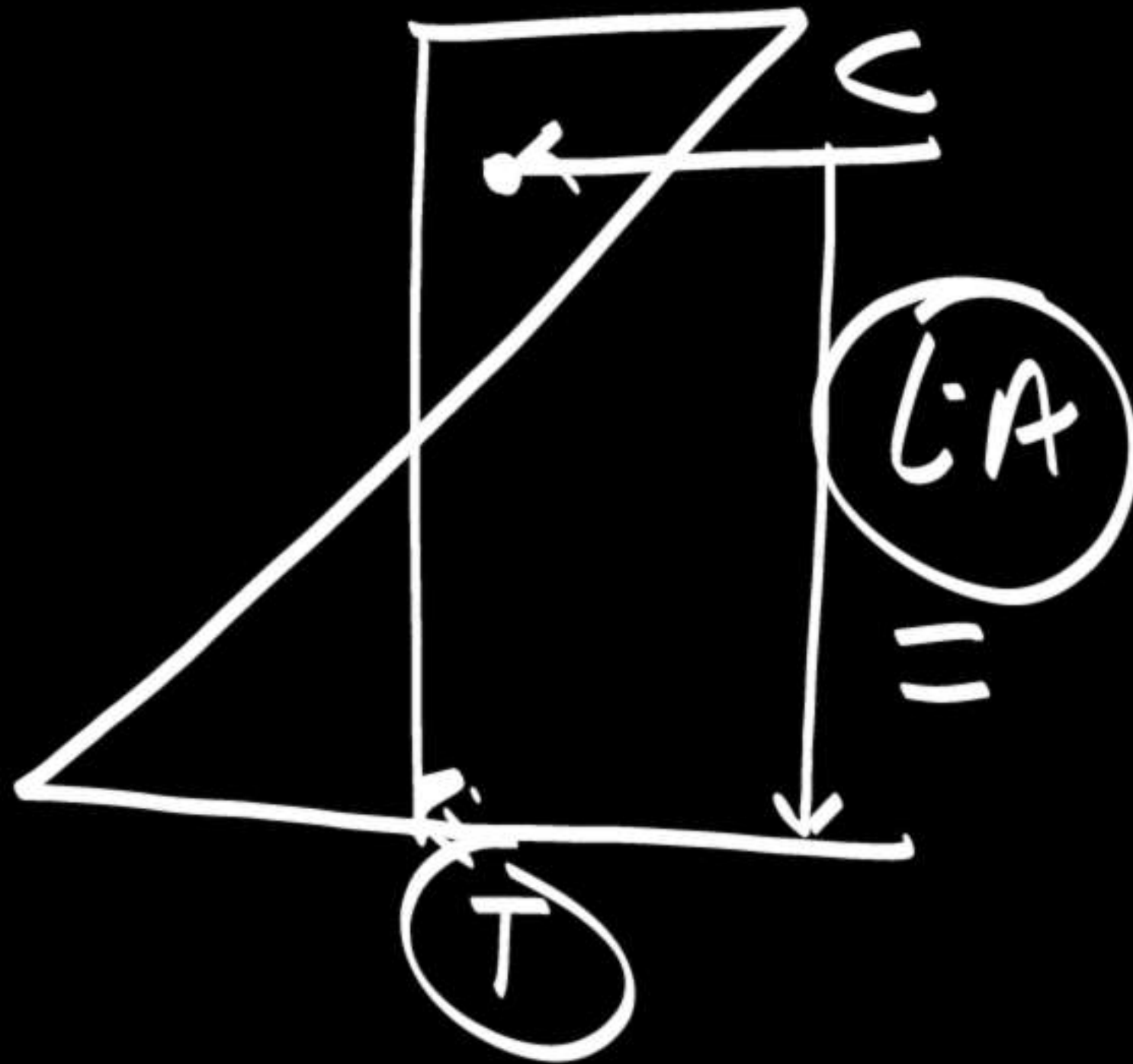
Lever arm :-

Balanced Under R/F

L_1

$\dfrac{d - n_a}{3}$

Balan

L_2

Over R/F

L_3

Q:) In a doubly reinforced rectangular concrete beam, the distance between the centroids of compression and tension reinforcement is generally known as:
(BSPHCL JE Civil 29.01.2019)

A : Lever arm

B : Neutral axis depth

C : Neutral arm

D : Critical axis depth

Q:) A doubly reinforced beam is considered less economical than a singly reinforced beam because: (NBCC JE 2017)

A : Shear reinforcement is more

B : Compressive steel is under stressed => Unecomical

C : Tensile steel required is more than that for balanced section

D : Concrete is not stressed to its full value

(B) Correct

Q:) In a continuous beam, the moment coefficient of the innermost support for the dead load is:
(LMRC (ASST. MANAGER) 15.05.2018)

A : 1/12
B : 1/10
C : 1/9
D : 1/24

Support

Span

@ Continue

Type of load	Span moment		Support moment	
	middle of end span	next to the middle span end	Support next to end supp	interior support
D.L (fixed) imposed load	$+\frac{1}{12}$ $+\frac{1}{10}$	$+\frac{1}{16}$ $+\frac{1}{12}$	$-\frac{1}{10}$ $-\frac{1}{9}$	$-\frac{1}{12}$ $-\frac{1}{9}$

Q:) For a 30 degree cranked or bend up bar, the inclined length of the crank is equal to:

A : 0.267d

B : 0.54d

C : 0.42 d

D : 0.20d

(A) Corr.

Q:) As per IS:456-2000, for simple supported two-way slabs of shorter spans (up to 3 m) with mild steel reinforcement, the span to overall depth ratio generally assumed to satisfy vertical deflection limits for loading class up to 3 kN/m is: (UPRVUNL JE 2019)

A : 45

B : 40

C : 30

D : 35

Fe 250

S·S   Continous

35   40

Fe 415

S-S   Contin

28   32

Q:) A rectangular slab having effective lengths L_x and L_y supported along four sides on unyielding supports is subject to a uniform load 'w' per unit area. Shear of the load on a central strip of unit width parallel of L_x is given by Ly^4/Lx^4+Ly^4w. This method of approximate analysis was given by: (CIVIL ESIC JE 2019)

$$w_x \rightarrow \frac{l_y^4}{l_x^4 + l_y^4} \cdot w$$

Rainke ~ Grashoff formula

Q:) The minimum cover for bars in RCC slabs should be:
(NBCC JE 2017)

Durability criteria

A : 15 mm

B : 15 mm or dia of bars

C : 25 mm of dia of bars

D : 15 mm or the size of the aggregate

Q:) Thickened part of the flat slab over its supporting column is known as: (NBCC JE 2017)

A : Column head

B : Drop panel

C : Capital

D : None of these

B Correct

Enlarging Portion

Drop Panel

Column Capital

Q:) The thickness of the topping of a ribbed slab, varies between: (SSC JE 25-01-2018)

A : 3 cm to 5 cm

B : 5 cm to 10 cm

C : 8 cm to 10 cm

D : 12 cm to 15 cm

Thickness of topping ⇒ thickness of flange

⇒ 5 cm to 10 cm.

Max. Dia of Bar ⇒ 22 mm

Max. Size of Aggregate ≈ 7.5 mm (≈ 10 mm)

(B) Cl/r Spacing should not Be greater then 1.5 m

10 mm

Q:) A reinforced concrete column of size 400 mm × 400 mm is having the diameter of longitudinal bar as 20 mm. The pitch of lateral ties in such a case should be:

(SSC JE 25-09-2019)

A : 320 mm
B : 250 mm
C : 300 mm
D : 400 mm

$$\text{pitch} \Rightarrow \min \begin{cases} \text{Least lateral Dim.} = 400\,mm \\ 16\,(\phi\,log)min = 16 \times 20 = 320\,mm \\ 300\,mm \end{cases}$$

20mm   16mm

Dinner

Potato

Carbohydrate

Decomposition नींद ज्यादा

Pulse → Protein

Decomposition Late

Q:) The ultimate load capacity of an RCC column with lateral ties is attained when it develops a limiting strain of _____ (Civil ESIC JE 2019)

A : 0.002, 0.67 f_{ck}

B : 0.0035, f_{ck}

C : 0.002, 0.446 f_{ck}

D : 0.0035, 0.67 f_{ck}

$$\frac{0.67 f_{ck}}{1.5} \Rightarrow 0.446 f_{ck}$$

$$\approx 0.45 f_{ck}$$

Q:) Wall footing is a type of-
(Hariyana SSC JE Shift-I 11.04.2018)

A : Stepped foundation
B : Deep foundation
C : Spread foundation
D : Strap foundation

© Correct

Q:) In the case of isolated square concrete footing, match the locations at which the less resultants are to be checked, where d is effective depth of footing and select the correct answer using the codes given below the lists:

SSB Himachal Pradesh 18.11.2018 (ESE 2006)

Stress resultant	Location
a. Bending moment	1. At face of column
b. One way shear	2. At d/2 from face of column
c. Punching shear	3. At d from face of column

A : A: a - 1, b - 2, c - 3
B : B: a - 3. b - 1, c - 2
C : C: a - 2. b - 1, c - 3
D : D: a - 1, b - 3, c - 2

(D) Correct

Q:) A short column of **20 cm × 20 cm** section is reinforced with **four bars of steel** having total area of **steel 20 sq cm.** If permissible compressive stress in steel and concrete is **1300 and 40 kg/cm²**, the maximum safe load carrying capacity should not exceed

(SJNVL JE 07-10-2018)

A : 412 kg

B : 4.120 kg

C : 41,200 kg

D : 412.000 kg

$$A_g = 20 \times 20 \to 400 \, cm^2$$

$$A_{sc} = 20 \, cm^2 \qquad A_c = A_g - A_{sc} = 380 \, cm^2$$

$$P = \sigma_{sc} A_{sc} + \sigma_{cc} A_c$$

$$= 1300 \times 20 + 40 \times 380 = 41200 \, kg$$

Q:) Reduction co-efficient of a reinforced concrete column with an effective length of 4.5m and size 200 × 250 mm is _____. (M.P. sub Eng. 4 Sep 2018 9.00 am)

A : 0.78

B : 0.68

C : 0.7

D : 0.60

$$\left(\, r \Rightarrow 1.25 - \frac{left}{48b}\right.$$

$$\Rightarrow 1.25 - \frac{4500}{48 \times 200} \Rightarrow \boxed{0.781}$$

Q:) In reinforced concrete footing on soils, minimum thickness at the edge should normally not be less than _____. (UTTRAKHAND AE 2013/SSC JE 2012)
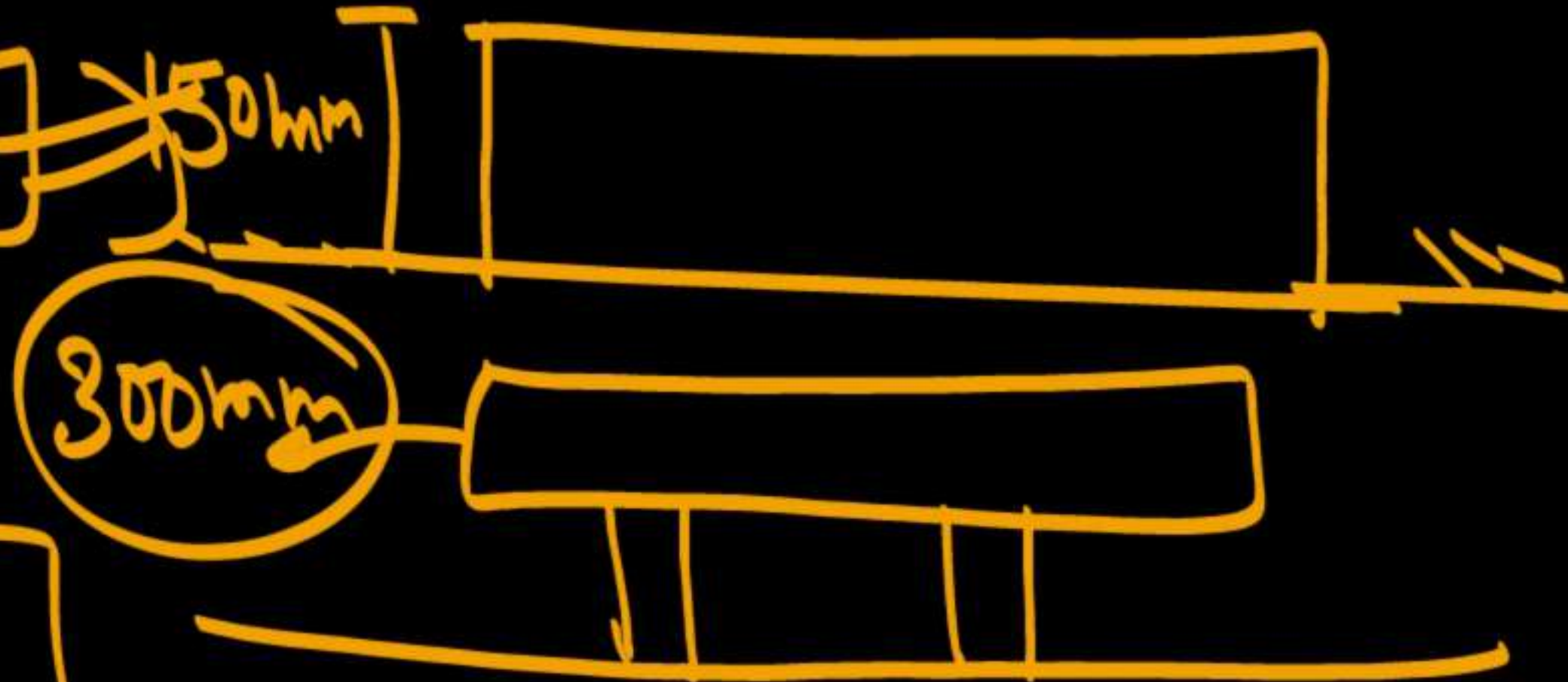
A : 250 mm

B : 150 mm

C : 100 mm

D : 200 mm

B Corr =

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