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Q:) If d and n are the effective depth and depth of the neutral axis respectively of a singly reinforced beam, the lever arm of the beam is: [ISRO - 2020]

A : d

B : n

C : $d + n/3$

D : $d - n/3$



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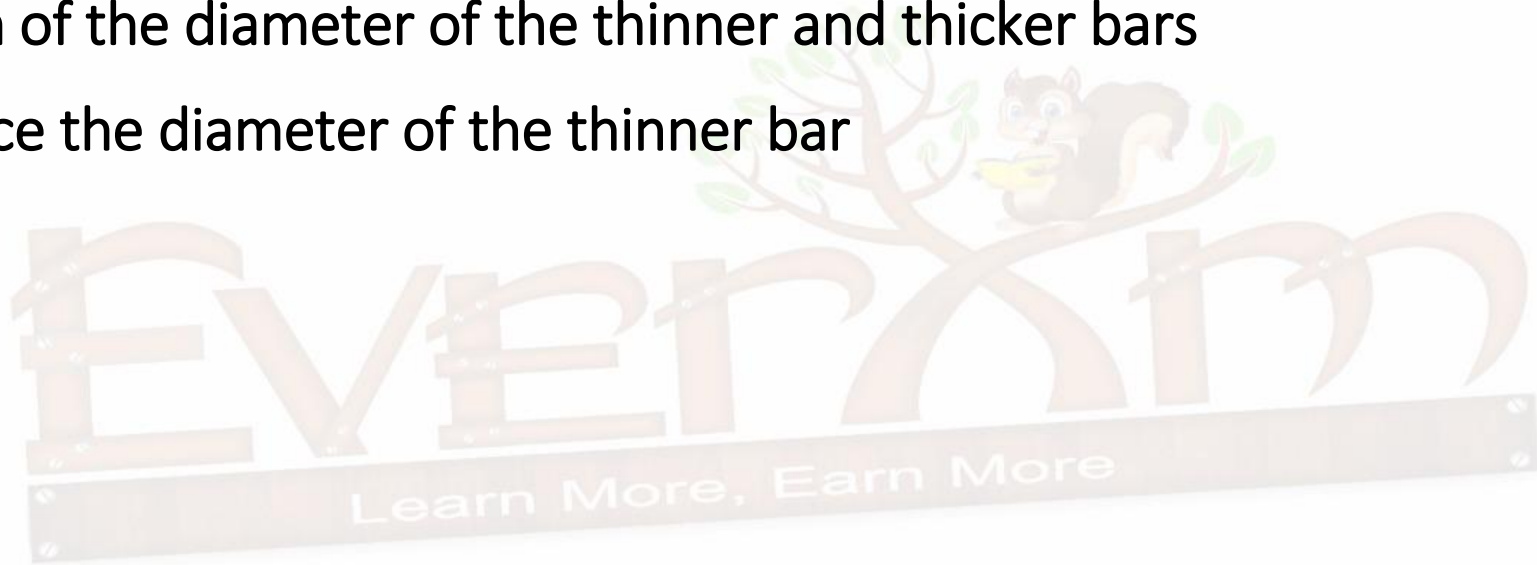
Q:) Minimum spacing between horizontal parallel reinforcement bars of different diameters inter alia should not less than: [ISRO - 2020]

A : One diameter of thinner bar

B : One diameter of thicker bar

C : Sum of the diameter of the thinner and thicker bars

D : Twice the diameter of the thinner bar



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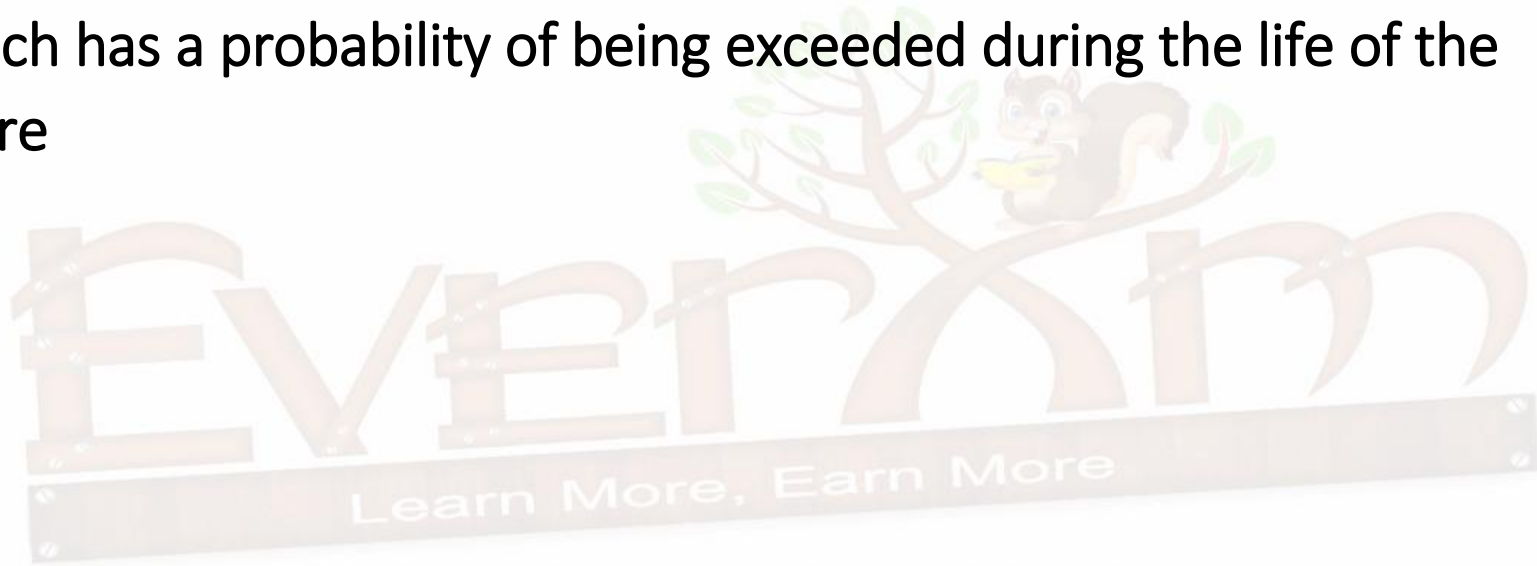
Q:) The characteristic load means the value of the load: [ISRO - 2020]

A : Below which not more than 5% of the results are expected to fall

B : Which has a 95% probability of not being exceeded during structure

C : Which has been factored with partial safety factor

D : Which has a probability of being exceeded during the life of the structure



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Q:) A column splice is used to increase: [ISRO - 2020]

A : Length of the column

B : Strength of the column

C : Cross sectional area of the column

D : Connection with the slab



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Q:) The time by which an activity completion time can be delayed without affecting the early start of the succeeding activities is known as: [ISRO - 2020]

A : Duration

B : Total float

C : Free float

D : Interfering float



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Q:) Web crippling in a steel structure is one account of: [ISRO - 2020]

A : column action of web

B : failure of web under concentrated load

C : excessive bending moment

D : secondary bending moment



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Q:) The self-weight of a steel roof truss in N/m^2 may be computed by: (span = l) [ISRO - 2020]

A : $(l / 3) + 5$

B : $[(l / 3) + 5] \times 10$

C : $(l / 3) - 5$

D : $[(l / 3) - 5] \times 10$



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Q:) A 40 cm diameter circular timber column is 4m long. The slenderness ratio of the column is [ISRO - 2020]

A : 4

B : 10

C : 20

D : 40



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Q:) General ratio of cement: sand: aggregate in nominal mix M20 grade concrete is: [ISRO - 2020]

A : 1:2:4

B : 1:1.5:3

C : 1:3:6

D : 1:1:2



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Q:) In limit state method of design approach, spacing of main reinforcement primarily controls: [ISRO - 2020]

A : Collapse

B : Cracking

C : Deflection

D : Durability



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Q:) What is the ratio of flexural strength (f_{cr}) to the characteristic compressive strength of concrete (f_{ck}) of m25 grade concrete? [ISRO - 2020]

A : 0.08

B : 0.11

C : 0.14

D : 0.17



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Q:) The bulk modulus of elasticity of a material is twice its modulus of rigidity. The Poisson's ratio of the material is [ISRO - 2020]

A : $1/7$

B : $2/7$

C : $3/7$

D : $4/7$



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Q:) Two planks each of $50 \text{ mm} \times 50 \text{ mm}$ section are glued together along section $50 \text{ mm} \times 100 \text{ mm}$ and used as a beam. If the shear force at a section is 1000 N , what is the maximum shear stress on the glue?

[ISRO - 2020]

A : 0.15 MPa .

B : 0.3 MPa .

C : 0.6 MPa .

D : 2.4 MPa .



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Q:) At a certain in a structural member, there are perpendicular stresses 80 N/mm^2 and 20 N/mm^2 , both tensile. What is the equivalent stress in simple tension, according to the maximum principal strain theory? (Poisson's ratio = 0.25) [ISRO - 2020]

A : Zero

B : 20 N/mm^2

C : 60 N/mm^2

D : 75 N/mm^2



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Q:) Two simply supported beams are made up of the same material and are of the same cross section. Both beams carry uniformly distributed loads of equal intensities. One beam is 2 m long and the other is 4 m long. The 2 m long beam shows a central deflection of 1 mm. What is the central deflection of the 4 m long beam? [ISRO - 2020]

A : 16 mm

B : 2 mm

C : 8 mm

D : 1 mm



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Q:) When the ratio of the long to short dimension of the slab is greater than X, the slab shall be designed as one-way slab, where X is [ISRO - 2020]

A : 1.1

B : 1.5

C : 1.8

D : 2.0



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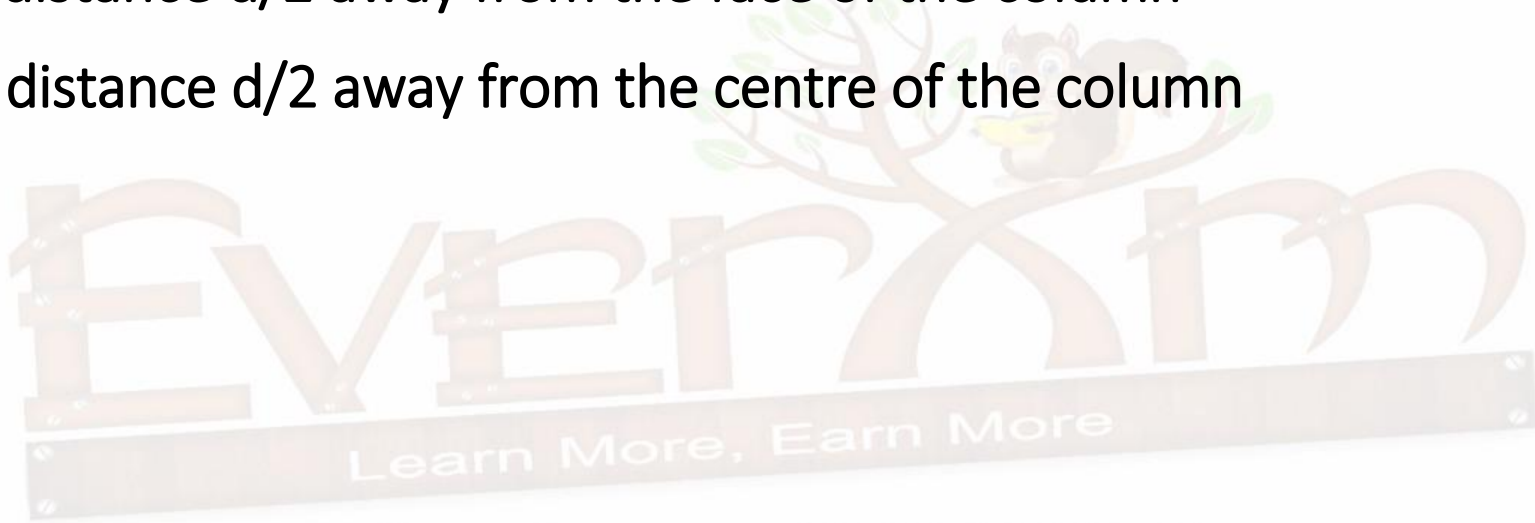
Q:) In an isolated reinforced concrete footing of effective depth d , the stress in punching shear is [ISRO - 2020]

A : at the centre of the column

B : at the face of the column

C : at a distance $d/2$ away from the face of the column

D : at a distance $d/2$ away from the centre of the column



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Q:) An ISJC 200 channel section has the following details: width of flange 70 mm, depth of channel 200 mm, thickness of flange $t_f = 7.1$ mm, moment of inertia $I_{xx} = 1161.2 \text{ cm}^4$: The distance of shear centre from centre of the web will be [ISRO - 2020]

A : 16.82 mm

B : 18.58 mm

C : 22.87 mm

D : 27.87 mm



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Q:) A tube of aluminum of 40 mm external diameter and 20 mm internal diameter is snugly fitted on a solid steel rod of 20 mm diameter. The composite bar is subjected to an axial compressive force P . If the stress on steel bar is 70 N/mm^2 , the stress in the aluminum tube and corresponding value of P will be: (E for steel: $2 \times 10^5 \text{ N/mm}^2$ and E for aluminum $7 \times 10^4 \text{ N/mm}^2$) [ISRO - 2020]

A : 24.5 N/mm^2 , 45.08 kN

B : 36.5 N/mm^2 , 60.10 kN

C : 54.5 N/mm^2 , 73.10 kN

D : 73.80 N/mm^2 , 92.60 kN



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