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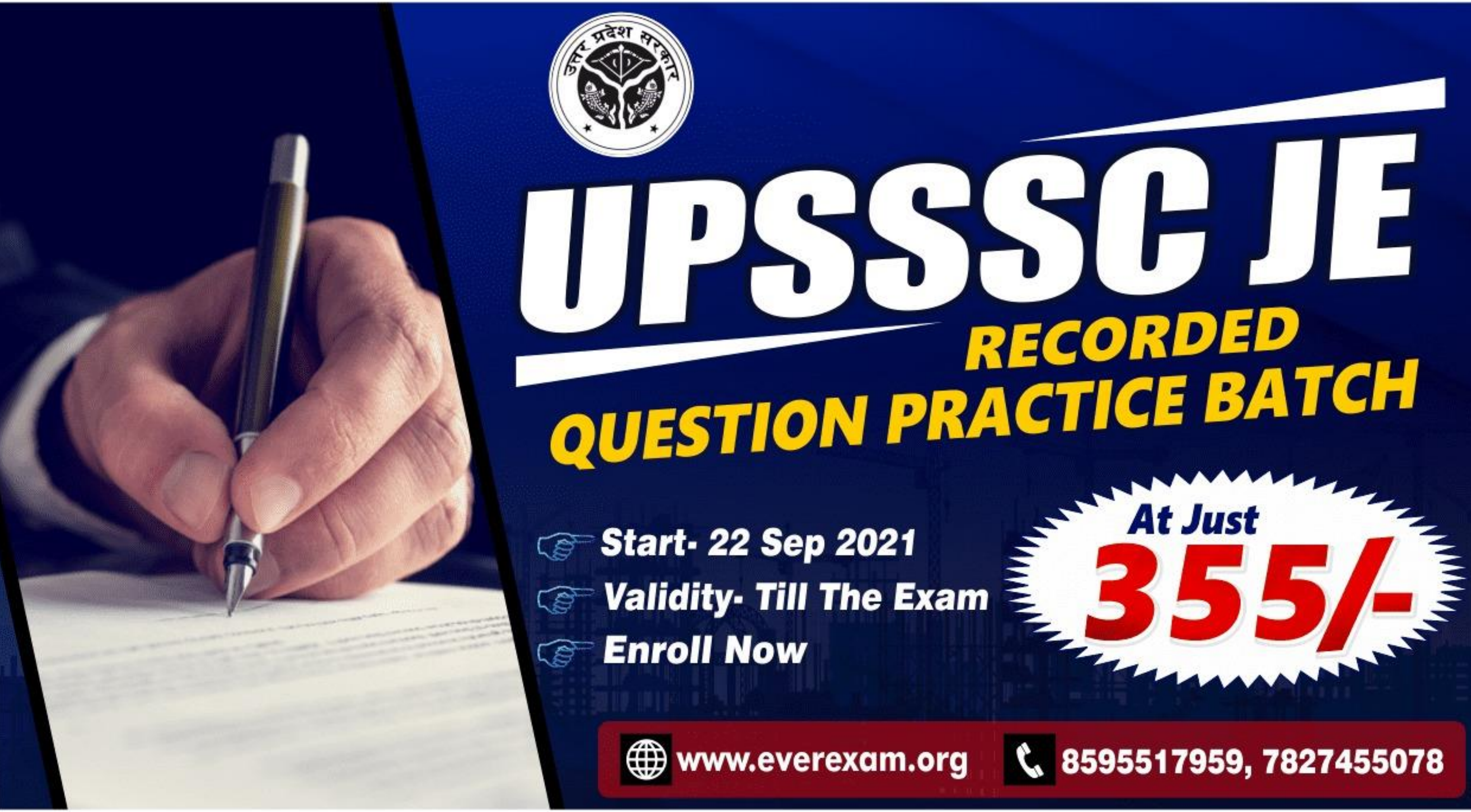
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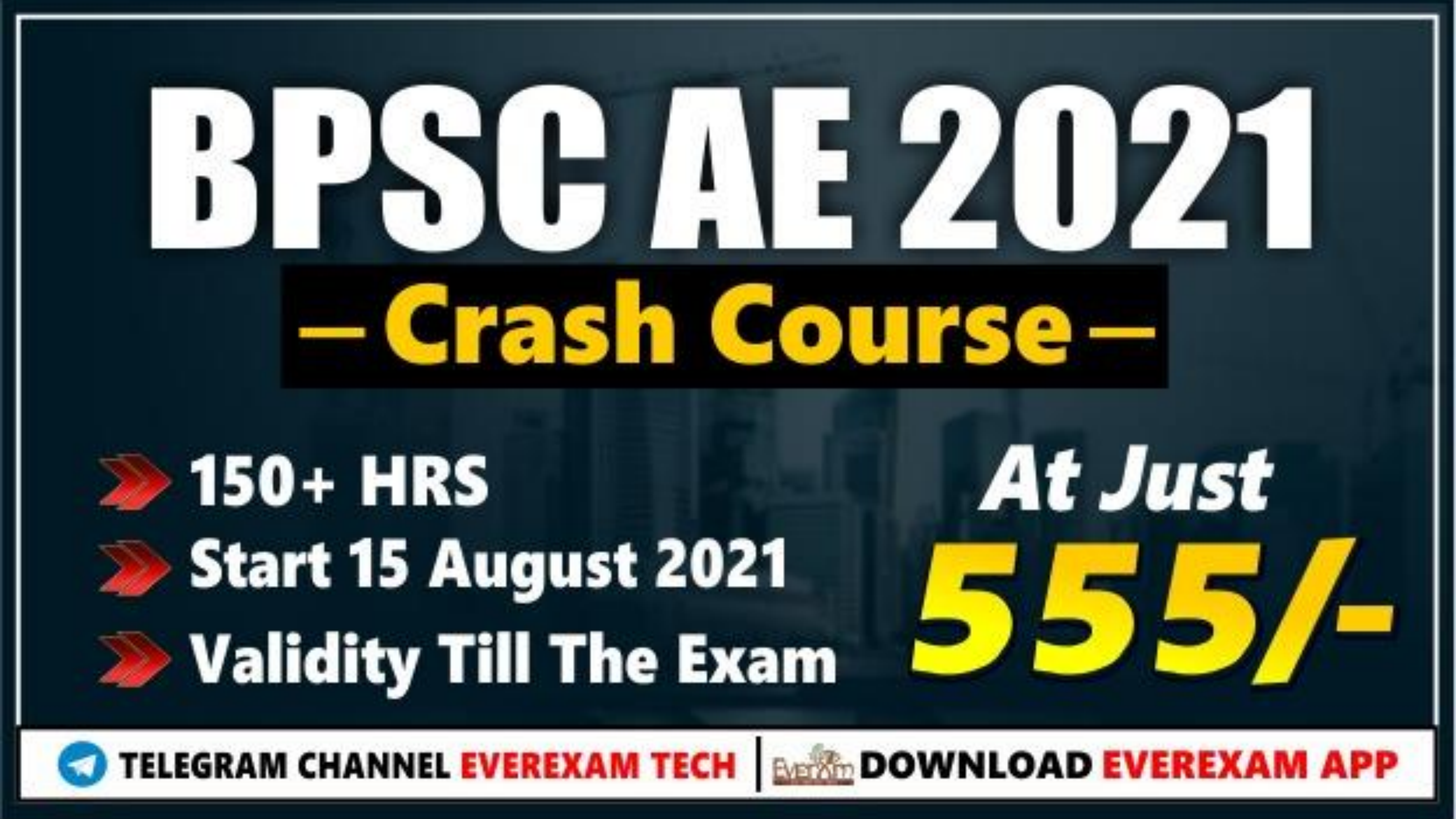
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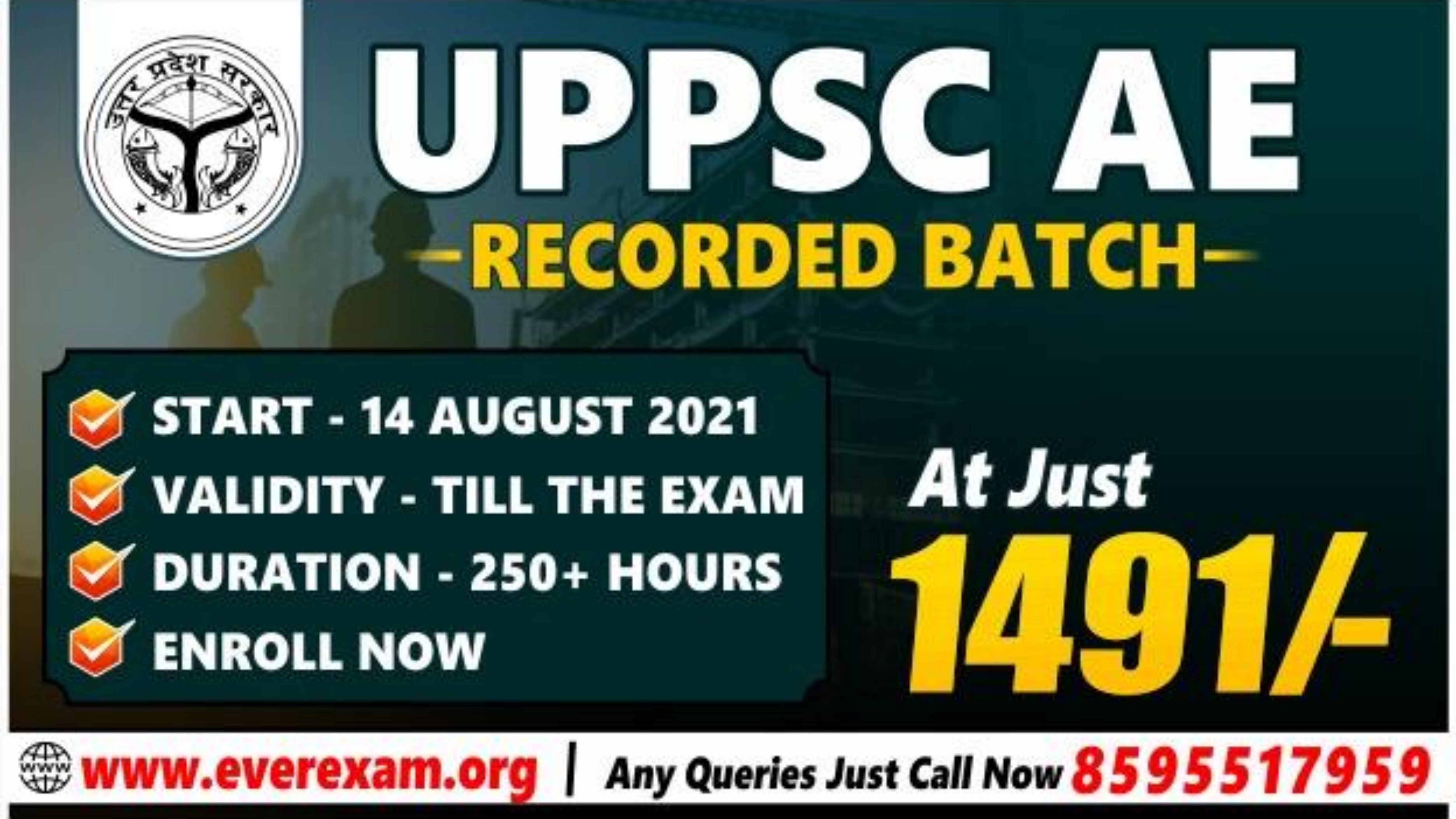
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Q :) Stiffness method of structural analysis starts with

A : Force-deformation relations

B : Equilibrium condition

C : Compatible deformation

D : Equilibrium state of internal stress components

Q :) The rotation at a point in a real beam equal to ____________ in a conjugate beam.

A : Translation

B : Twisting moment

C : Shear force

D : Bending moment

Q :) In a continuous beam ABC, support A is fixed and supports B and C are simply supported. A uniformly distributed load of ‘w’ per meter run is applied over the span AB and span BC is subjected to a point load ‘W’ at mid span. If the beam has uniform cross-section but differs in span lengths for AB and BC, the conditions to be used for the analysis of continuous beam by the slope deflection method are

A : $\theta_A = 0, M_{BA} = M_{BC}, \theta_C = 0$

B : $\theta_A = 0, M_{BA} + M_{BC} = 0, \theta_C = 0$

C : $\theta_A = 0, M_{BA} + M_{BC} = 0, M_{CB} = 0$

D : $\theta_A = 0, M_{BA} = M_{BC}, M_{CB} = 0$

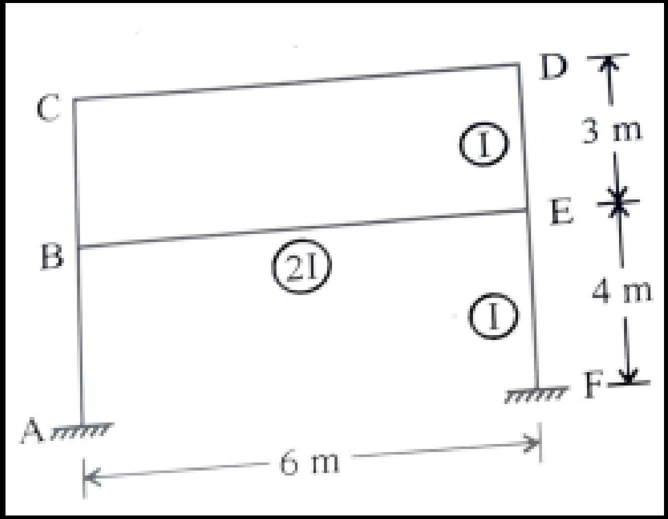
Q :) A frame to be analyzed by moment distribution as shown in figure. The distribution factors for members EB, ED and EF will be respectively

A : $\frac{2}{9}, \frac{4}{9}, \frac{1}{3}$

B : $\frac{8}{13}, \frac{3}{13}, \frac{4}{13}$

C : $\frac{3}{10}, \frac{4}{10}, \frac{3}{10}$

D : $\frac{4}{11}, \frac{4}{11}, \frac{3}{11}$



Q :) If an internal stress component like shear force, bending moment or reaction component is allowed to act through a small distance thereby causing deformation of the structure, the curve of the deformed shape represents to some scale, the influence line diagram for that stress or the reaction component. The above statement is known as:

A : Macaulay’s theorem

B : Muller breaslau principle

C : Castigliano’s theorem

D : Maxwell’s theorem

Q :) A long shaft of diameter 'd' is subjected to twisting moment 'T' at its ends. The maximum normal stress acting at its cross-section is equal to

A : Zero

B : $\frac{16\,T}{\pi d^3}$

C : $\frac{32\,T}{\pi d^3}$

D : $\frac{64\,T}{\pi d^3}$

Q :) The maximum and minimum shear stress in hollow circular shaft of outer diameter 20 mm and thickness 2 mm, subjected to a torque of 92.7 N-m will be

A : 59 MPa and 47.2 MPa

B : 100 MPa and 80 MPa

C : 118 MPa and 160 MPa

D : 200 MPa and 160 MPa

Q :) If the diameter of shaft is subjected to torque alone is doubled, then the horse power ‘P’ can be increased to

A : 16 P

B : 8 P

C : 4 P

D : 2 P

Q :) What structure is more stable?

A : Determinate

B : Indeterminate

C : Both (A) and (B)

D : None of the above

Q :) The strain energy of a structure due to bending is given by

A : $2\int \frac{M^2\,dx}{2\,EI}$

B : $\frac{1}{3}\int \frac{M^2\,dx}{2\,EI}$

C : $\frac{1}{2}\int \frac{M^2\,dx}{2\,EI}$

D : $\int \frac{M^2\,dx}{2\,EI}$

Q :) The distribution factor for a rigid joint always

A : 1

B : 0.5

C : 1.5

D : 0

Q :) A fixed beam AB carries a point load 'W' at centre C. If support B have upward by 'Δ', then

A : Moment at A increase, moment at B increase

B : Moment at A decrease, moment at B increase

C : Moment at A increase, Moment at B decrease

D : Moment at A decrease, moment at B decrease

Q :) Which of the following theories of failure is most appropriate for brittle material?

A : Maximum principal strain theory

B : Maximum principal stress theory

C : Maximum shear stress theory

D : Maximum strain energy theory

Q :) All the failure theories give nearly the same result

A : When one of the principal stresses at a point is large in comparison to other.

B : When shear stresses act.

C : When both the principal stresses are numerically equal.

D : For all situations of stress.

Q :) A steel plate is bent into a circular arc of radius 10 m. If the plate section be 120 mm wide and 20 mm thick with E as 200 GPa, then the maximum bending stress induced is

A : 210 N/mm^2

B : 205 N/mm^2

C : 200 N/mm^2

D : 195 N/mm^2

Q :) A symmetrical I-section is subjected to shear force. The shear stress induced across the section is maximum at which location?

A : Extreme fibres

B : At the bottom of flanges in flanges

C : At the bottom of flanges in web

D : At the neutral axis

Q :)A rectangular beam of width 100 mm is subjected to a maximum shear force of 60 kN. The corresponding shear stress in the cross-section is 4 N/mm^2. The depth of the beam should be

A : 200 mm

B : 150 mm

C : 100 mm

D : 225 mm

Q :) The ‘plane section remains plane’ assumption in bending theory implies

A : Strain profile is linear

B : Stress profile is linear

C : Both profiles are linear

D : Shear deformation is neglected

Q :) The shear stress at the neutral axis in a beam of triangular cross-section with a base of 40 mm and height 20 mm, subjected to a shear force of 3 kN is

A : 3 MPa

B : 6 MPa

C : 10 MPa

D : 20 MPa

Q :) In an experiment it found that the bulk modulus of a material is equal to its shear modulus. The Poisson's ratio is

A : 0.125

B : 0.250

C : 0.375

D : 0.500

Q :) For a material having modulus of elasticity equal to 208 GPa and Poisson's ratio 0.3, what is the modulus of ratio 0.3, what is the modulus if rigidity?

A : 74.0 GPa

B : 80.0 GPa

C : 100.0 GPa

D : 128.5 GPa

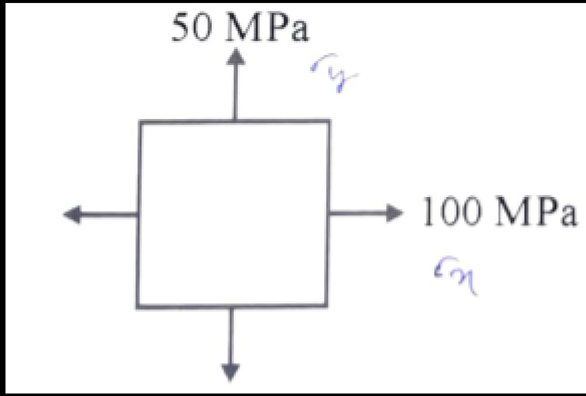
Q :) For a state of stress shown in figure, normal stress acting on the plane of maximum shear stress is:

A : 25 MPa compression

B : 75 MPa compression

C : 25 MPa tension

D : 75 MPa tension



Q :) The radius of Mohr's circle of stress of a strained element is 20 N/mm^2 and minor principal tensile stress is 10 N/mm^2. The major principal stress is

A : 30 N/mm^2

B : 50 N/mm^2

C : 60 N/MM^2

D : 100 N/mm^2

Q :) A material of Young's modulus 'E' and Poisson's ratio 'μ' is subjected to two principal stresses P_1 and P_2 at a point in two dimensional stress system. The strain energy per unit volume of the material is :

A : $\frac{1}{2E}(P_1^2+P_2^2 - 2\mu\, P_1P_2)$

B : $\frac{1}{2E}(P_1^2+P_2^2 + 2\mu\, P_1P_2)$

C : $\frac{1}{2E}(P_1^2-P_2^2 + 2\mu\, P_1P_2)$

D : $\frac{1}{2E}(P_1^2-P_2^2 - 2\mu\, P_1P_2)$

Q :) In the Mohr's circle of strains, radius of the Mohr's circle gives the

A : Minimum value of normal strain

B : Maximum value of normal strain

C : Maximum value of shear strain

D : Half of the value of shear strain

Q :) The fineness of cement is tested by

A : Air content method

B : Air permeability method

C : Le-chatelier apparatus

D : Vicats apparatus

Q :) For marine works best suited cement is :

A : Low heat Portland cement

B : Rapid hardening cement

C : Ordinary Portland cement

D : Blast furnace slag cement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