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Q:) The ratio of pressure between the points X and Y located respective at depth 0.5 m and 2 m below a constant level of water in a container is:

[RPSC AE - 2013]

A : 1:2

B : 1 : $\sqrt{2}$

C : 1:16

D : 1:4



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Q:) A vertical rectangular plane surface is submerged in water such that its top and bottom surface are 1.5m and 6.0m respectively below the free surface. The position of centre of pressure below the free surface will be at a distance of : [RPSC AE - 2013]

A : 3.75m

B : 4.0m

C : 4.2m

D : 4.5m



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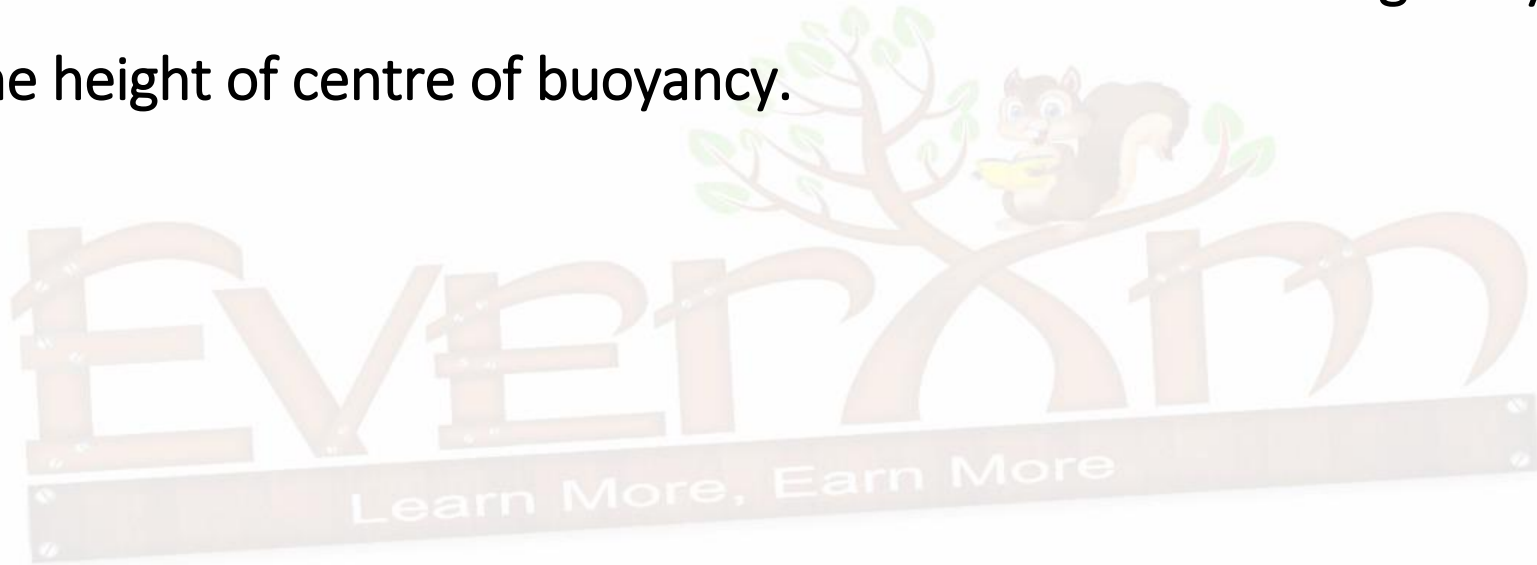
Q:) The metacentric height of a floating body: [RPSC AE - 2013]

A : Is the distance between metacentric and the centre of buoyance

B : Is the same about longitudinal and tranverse axis

C : Is the distance between the metacentric and the centre of gravity

D : Is the height of centre of buoyancy.



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Q:) A stream function is defined by the expression $\phi = 2X^2 - Y^3$. Calculate the components of velocity at point P (X = 3, Y = 1): [RPSC AE - 2013]

A : -3, -12

B : +3, +12

C : +3, +1

D : +12, -1



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Q:) The hydraulic gradient line represent the variation of:

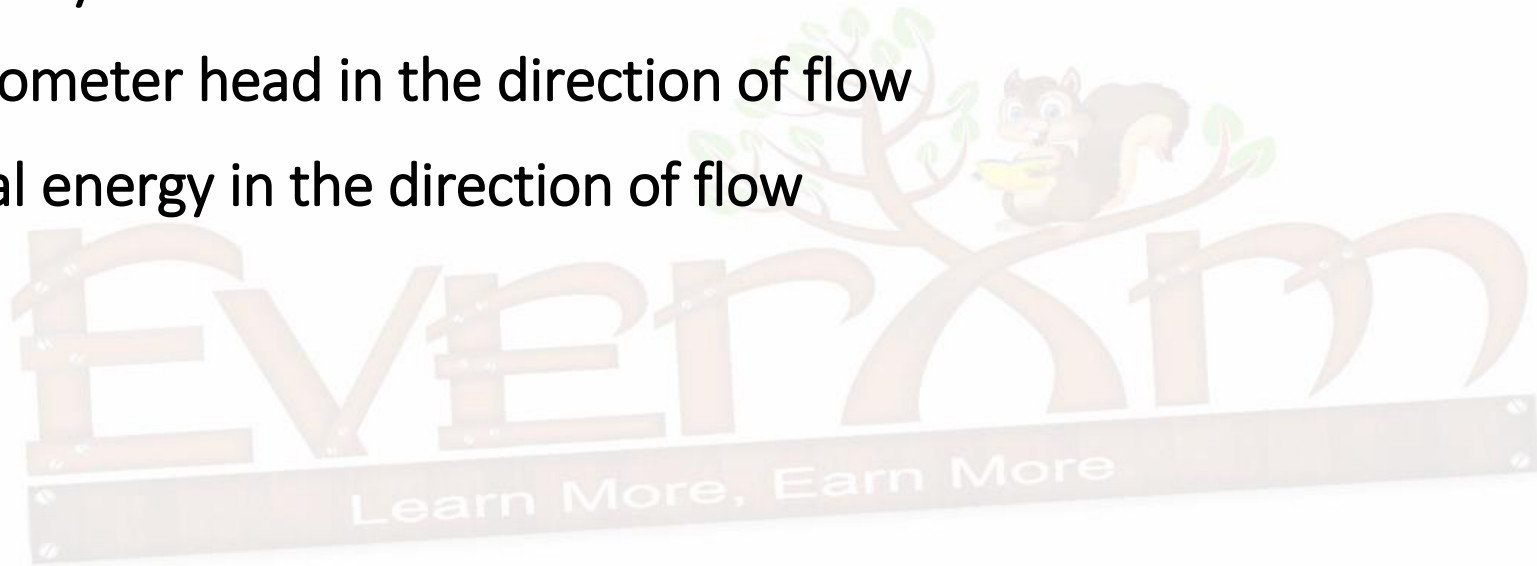
[RPSC AE - 2013]

A : Datum head in the direction of flow

B : Velocity head in the direction of flow

C : Piezometer head in the direction of flow

D : Total energy in the direction of flow



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Q:) If H is the head, the discharge through a V-notch varies as:

[RPSC AE - 2013]

A : $H^{1/2}$

B : $H^{3/2}$

C : $H^{5/2}$

D : $H^{5/8}$



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Q:) In laminar flow, the shear stress distribution for a fluid flowing in between the parallel plates, both at rest, is [RPSC AE - 2013]

A : Constan over the cross section

B : Parabolic distribution across the section

C : Zero at mid plane and varies linearly with distance from mid plane

D : Zero at place and increase linearly to midpoint.



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Q:) With the same cross sectional area the immersed in same turbulent flow, the largest total drag will be on [RPSC AE - 2013]

A : A circular disc of plate held normal to flow

B : A sphere

C : A cylinder

D : A streamlined body



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Q:) Lysimeter is used for the determination of: [RPSC AE - 2013]

A : Transpiration

B : Evapo-transpiration

C : Infiltration

D : Pan coefficient



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Q:) The rainfall of five successive days were measured as 100 mm; 80 mm, 60 mm and 20 mm respectively. If the infiltration index or the storm loss rate for the catchment area is earlier estimated as 50 mm /day, the total surface run off will be: [RPSC AE - 2013]

- A : 50 mm
- B : 60 mm
- C : 90 mm
- D : 140 mm



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Q:) Modulus of rigidity is defined as the ratio of [RPSC AE - 2013]

A : Longitudinal stress to longitudinal strain

B : Shear stress to shear strain

C : Stress to strain

D : Stress to volumetric strain



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Q:) Purlins are supported on the [RPSC AE - 2013]

A : Principal rafter

B : Common rafter

C : Bottom chord

D : Base plate



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Q:) Effective length of a weld is equal to: [RPSC AE - 2013]

A : Overall length - Weld size

B : Overall length - throat thickness overall

C : Overall length - 2 × weld size

D : Length - 2 × throat thickness



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Q:) A beam of rectangular cross sectional is 100 mm wide and 200 mm deep. If the section is subjected to a shear force of 20 kN, then the maximum shear stress in the section is: [RPSC AE - 2013]

A : 1 N/mm²

B : 1.125 N/mm²

C : 1.33 N/mm²

D : 1.5 N/mm²



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Q:) The heaviest I-section for same depth is [RPSC AE - 2013]

A : ISMB

B : ISLB

C : ISHB

D : ISWB



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Q:) A trapezoidal channel is 10.0 m wide at the base and has a side slope of 4 horizontal to 3 vertical. The bed slope is 0.002. The channel is lined with smooth concrete (Manning's $N = 0.012$). hydraulic radius (in m) for a depth of flow of 3 m is- [RPSC AE - 2018]

A : 20

B : 3.5

C : 3

D : 2.1



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Q:) A catchment area of 60 ha has a run off coefficient of 0.40. If a storm of intensity 3 cm/h and duration longer than the time of concentration occurs in the catchment, then what is the peak discharge?

[RPSC AE - 2018]

A : 2.0m³/s

B : 3.5 m³/s

C : 4.5 m³/s

D : 2.5 m³/s



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Q:) A 8 hours unit hydrograph of catchment is triangular in shape with a base width of 64 hours and peak ordinate of $20 \text{ m}^3/\text{s}$. The equilibrium discharge of S - curve obtained by using this 8 hours unit hydrograph is [RPSC AE - 2018]

- A : $60 \text{ m}^3/\text{s}$
- B : $80 \text{ m}^3/\text{s}$
- C : $100 \text{ m}^3/\text{s}$
- D : $800 \text{ m}^3/\text{s}$



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Q:) The conditions required to be satisfied for the analysis of indeterminate structure are [RPSC AE - 2018]

A : Equilibrium

B : Compatibility

C : Force-displacement relationship

D : All of these



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Q:) In slope deflection method, the joints are considered rigid when
[RPSC AE - 2018]

A : No change in value of the angles between members

B : 90° angle between the member frame

C : 180° angle between the members in beams

D : All of these



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Q:) Maxwell's reciprocal theorem in structural analysis [RPSC AE - 2018]

A : Is true for any structural obeying Hooke's law

B : Can be applied to the rotations can by flexure, shear or torsion

C : Is useful in analyzing indeterminate structures

D : All of these



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Q:) As per IS: 456:2000, the final deflection due to all loads including the effects of temperature, creep and shrinkage and measured from the as cast level of the support of floors, roofs and all other horizontal members should not normally exceed [RPSC AE - 2018]

A : $\text{Span}/250$

B : $\text{Span}/350$

C : 20mm

D : Both (B) and (C)



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Q:) For the overall cost of roof trusses to be minimum, the cost of trusses should be equal to [RPSC AE - 2018]

A : Twice the cost of purlins plus the cost of roof coverings

B : Twice the cost of roof covering plus the cost of purlins

C : The cost of roof coverings plus the cost of purlins

D : Twice the cost purlins plus twice the cost of roof covering



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Q:) Intermediate vertical stiffeners in plate girders are used to

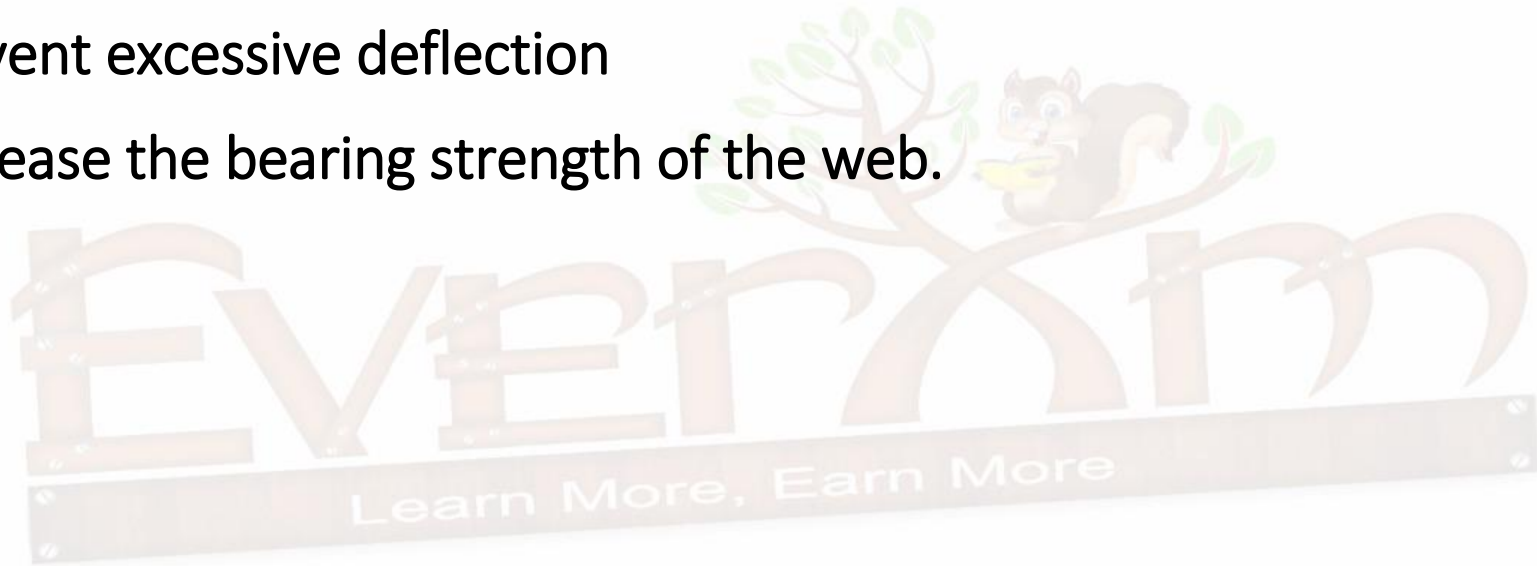
[RPSC AE - 2018]

A : Prevent local buckling of the web

B : Prevent local buckling of the flange

C : Prevent excessive deflection

D : Increase the bearing strength of the web.



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