Q:) A ladder of weight W is resting against a smooth vertical wall and a smooth floor. The minimum force to be applied at the floor end to keep it in equilibrium at angle θ with floor is:

A : W tan θ

B : 0.5 W tan θ

C : W cot θ

D : 0.5 W cot θ

Q:) A block of weight 20 kN just begins to move along a horizontal surface on application of 5 kN horizontal force. The coefficient of friction between block and surface is:
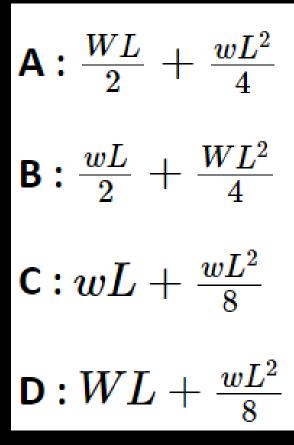
A : 0.1

B : 0.2

C : 0.25

D : 0.5

Q:) Which of the following is an incorrect assumption in the analysis of truss?

A : All joints are pinned

B : Loads applied at joints only

C : All members are straight

D : Weights of members are acting at their centres

Q:) During strain hardening:
A : Material undergoes changes in atomic and crystalline structures
B : Increased resistance to further deformation
C : Stress strain diagram has positive slope
D : All the above

Q:) Ability of a material to absorb energy within the elastic range:
A : Toughness
B : Elasticity
C : Stiffness
D : Resilience

Q:) A cantilever beam fixed at left end carries a udl w/unit length over the left half portion and a point load W at the free end. If L is the length of the beam, the bending moment at fixed end is:

A : $\dfrac{WL}{2} + \dfrac{wL^2}{4}$

B : $\dfrac{wL}{2} + \dfrac{WL^2}{4}$

C : $wL + \dfrac{wL^2}{8}$

D : $WL + \dfrac{wL^2}{8}$

Q:) The Poisson's ratio of a material is 0.3 and Young's modulus is 200 GPa. Its Rigidity Modulus is:

A : 77 Gpa

B : 51 GPa

C : 125 GPa

D : 333 GPa

Q:) Bending moment M and torque T are applied on a solid circular shaft. If the maximum bending stress is equal to the maximum shear stress developed, M is equal to:

A : T

B : 2T

C : T/2

D : T/3

Q:) Surface tension is caused by a force of _____ at the free surface.

A : Adhesion

B : Cohesion

C : Both (a) and (b)

D : Either (a) or (b)

Q:) Find the height of a mountain if pressure measured at its base and top are 74 cm and 60 cm of mercury respectively. Specific weight of air is 11.97 N/m³:

A : 1000 m

B : 1750 m

C : 2600 m

D : 1560 m

Q:) A stable submerged body has:

A : Centre of gravity below centre of buoyancy

B : Centre of gravity below metacenter

C : Centre of gravity above centre of buoyancy

D : Centre of gravity above metacenter

Q:) Poise is the unit of:

A : Density

B : Velocity gradient

C : Kinematic viscosity

D : Dynamic viscosity

Q:) The velocity distribution at any section of a pipe for steady laminar flow is:

A : Linear

B : Exponential

C : Parabolic

D : Constant

Q:) In flow through pipe, the efficiency of transmission under conditions of maximum power transmission is:

A : 0.5

B : 0.6667

C : 0.7

D : 0.959

Q:) A rectangular channel will be most economical when the flow depth and bottom width are in the ratio:

A : 2:1

B : 1:1

C : 1:2

D : 1:4

Q:) Water flow in large sized pipes for large flow rates can be measured using:

A : Orifices

B : Notches

C : Venture meter

D : Elbow meter

Q:) An inward flow reaction turbine:

A : Impulse turbine

B : Francis turbine

C : Pelton turbine

D : All of the above

Q:) The amount of moisture present in the air expressed as mass per unit volume is:

A : Absolute humidity

B : Saturation rate

C : Vapor pressure

D : All the above

Q:) The salt concentration in irrigation water is generally measured by:
A : SAR value
B : Electrical conductivity value
C : pH value
D : BOD value

Q:) Optimum depth of kor-watering for rice is:
A : 13.5 cm
B : 16.5 cm
C : 19 cm
D : 20 cm

Q:) The crop period of a crop is 120 days. It requires 10 cm depth of water at every 10 days. Its delta is:

A : 120 cm

B : 60 cm

C : 12 cm

D : 6 cm

Q:) Which of the following is a measure of dynamic modulus of elasticity of concrete?
A : Tangent modulus
B : Secant modulus
C : Initial tangent modulus
D : All the above

Q:) When reinforcement bars placed short of their required length need to be extended, we use:
A : Anchorages
B : Standard bends and hooks
C : Development length
D : Splices

Q:) Relation between Young's modulus and cube strength of concrete is:

A : $E_c = 500\sqrt{f_{ck}}$

B : $E_c = 5700\sqrt{f_{ck}}$

C : $E_c = 5000\sqrt{f_{ck}}$

D : $E_c = 700\sqrt{f_{ck}}$

Q:) The minimum area of tension reinforcement required in a rectangular beam section 200 mm × 400 mm if Fe415 steel is used at 25 mm effective cover:

A : 154 mm²

B : 180 mm²

C : 164 mm²

D : 193 mm²

Q:) Effective span of a simply supported beam is:

A : Face to face distance of supports

B : Clear span + effective depth

C : Clear span - effective depth

D : Clear span + effective depth/2

Q:) Minimum grade of concrete for pre tensioned pre-stressed concrete:
A : M20
B : M30
C : M40
D : M45

Q:) Minimum reinforcement required in either direction in slabs reinforced with high strength deformed bars is:

A : 0.11

B : 0.12

C : 0.15

D : 0.17

Q:) Structural steel of grade Fe410 A has ultimate tensile strength of:

A : 410 MPa

B : 328 MPa

C : 300 MPa

D : 520 MPa

Q:) The diameter of bolt hole for a bolt of nominal size 12 mm is:

A : 12.0 mm

B : 12.5 mm

C : 13.0 mm

D : 14.0 mm

Q:) Common hot rolled steel axial compression members fail by:
A : Gross section yielding
B : Critical section rupture
C : Block shear
D : Flexural buckling

Q:) As per Indian Standards, the maximum bearing pressure at the column base should not exceed the bearing strength equal to:

A : 0.40 f_{ck}

B : 0.45 f_{ck}

C : 0.50 f_{ck}

D : 0.60 f_{ck}

Q:) Which of the following decides the width of taxiway?
A : Tail width
B : Fuselage length
C : Wheel base
D : Wing span of aircraft

Q:) The gauge of a railway track is defined as:
A : The clear distance between inner faces of two rails
B : The clear distance between outer faces of two rails
C : The centre to centre distance between two rails
D : The distance between inner faces of a pair two wheels

Q:) Equilibrium cant for a 3º curve on a Broad Gauge track, if the permitted speed is 70 kmph, is:

A : 18.85 cm

B : 16.20 cm

C : 15.85 cm

D : 11.25 cm

Q:) The value of dismantled materials:

A : Scrap value

B : Ratable value

C : Salvage value

D : Market value

Q:) A beam ABC, is simply supported at A and B and BC is overhanging. AB = L and BC = L/2 and it carries a point load P at C. The deflection at C is:

A : $\dfrac{PL^2}{24EI}$

B : $\dfrac{PL^3}{8EI}$

C : $\dfrac{PL^3}{48EI}$

D : $\dfrac{PL^2}{16EI}$