TCSiON CAE

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	MECHANICAL 15th MAY S2
Subject Name :	Civil - Mechanical
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console?	Yes
Change Font Color :	No
Change Background Color :	No
Change Theme :	No
Help Button :	No
Show Reports :	No
Show Progress Bar :	No
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No

Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 1 Question Id : 63068074935 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Of the following concepts of classical mechanics, which is NOT an independent one?

Options :

1. ✖ Space
2. ✖ Time
3. ✖ Mass
4. ✔ Force

Question Number : 2 Question Id : 63068074936 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

If the line of action of all the forces in the system lies on the same plane, then it is called a _____.

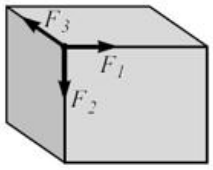
Options :

1. ✔ coplanar force system
2. ✖ non-coplanar force system
3. ✖ concurrent force system
4. ✖ parallel force system

Question Number : 3 Question Id : 63068074937 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The system of forces represented in the following figure is the _____.



Options :

1. ✖ coplanar concurrent force system
2. ✔ non-coplanar concurrent force system
3. ✖ coplanar non-concurrent force system
4. ✖ non-coplanar non-concurrent force system

Question Number : 4 Question Id : 63068074938 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A planet, having mass and radius half of that of earth, will have a value of acceleration due to gravity _____ that on earth (assume that constant of gravitation is the same for both the planets).

Options :

1. ✖ half of
2. ✖ the same as
3. ✔ double
4. ✖ four times

Question Number : 5 Question Id : 63068074939 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The resultant of any two _____ forces may be found by the Parallelogram Law.

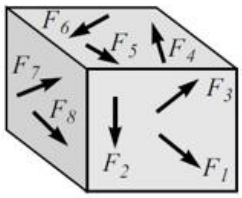
Options :

1. ✖ collinear concurrent
2. ✔ non-collinear concurrent
3. ✖ collinear non-concurrent
4. ✖ non-collinear non-concurrent

Question Number : 6 Question Id : 63068074940 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The system of forces represented in the following figure is the _____.



Options :

1. ✖ coplanar unlike parallel force system
2. ✖ non-coplanar unlike parallel force system
3. ✖ coplanar non-concurrent and non-parallel force system
4. ✔ non-coplanar non-concurrent and non-parallel force system

Question Number : 7 Question Id : 63068074941 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A block rests on a horizontal frictional surface. Of the conditions given in the options, in which case can the equation $F = \mu_s N$ be applied (where F is the frictional force, μ_s is the coefficient of static friction and N is the normal reaction)?

Options :

1. ✖ The forces applied to the block do not tend to move it along the surface of contact.
2. ✖ The applied forces tend to move the block along the surface of contact, but are not large enough to set it in motion.
3. ✔ The applied forces are such that the block is just about to slide.
4. ✖ The block is sliding under the action of the applied forces.

Question Number : 8 Question Id : 63068074942 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Based on the two statements given below, choose the correct answer.

Statement A: A point where the whole weight of the body is assumed to act is called the centre of gravity.

Statement B: For a non-homogeneous plate, the coordinates for the centre of gravity and the centroid of the area are the same.

Options :

1. ✖ Both statements A and B are correct.
2. ✖ Both statements A and B are incorrect.
3. ✔ Statement A is correct, but statement B is incorrect.
4. ✖ Statement A is incorrect, but statement B is correct.

Question Number : 9 Question Id : 63068074943 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A shaft runs at 80 rpm and drives another shaft at 150 rpm through belt drive. If the diameter of the driving pully is 600 mm, the diameter of the driven pulley is (neglect the belt thickness):

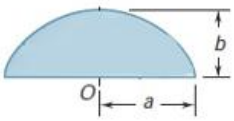
Options :

1. ✔ 320 mm
2. ✖ 520 mm
3. ✖ 850 mm
4. ✖ 1125 mm

Question Number : 10 Question Id : 63068074944 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The coordinates of the centre of gravity (x, y) of the semi-elliptical area shown in the given figure, with respect to the origin *O*, are:



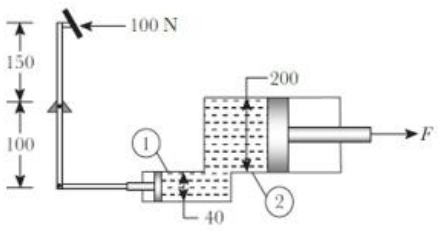
Options :

1. ✖ $(0, \frac{4a}{3\pi})$
2. ✔ $(0, \frac{4b}{3\pi})$
3. ✖ $(\frac{4a}{3\pi}, \frac{4b}{3\pi})$
4. ✖ $(\frac{4b}{3\pi}, \frac{4a}{3\pi})$

Question Number : 11 Question Id : 63068074945 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A schematic diagram of a hydraulic braking system is shown in the following figure. If the driver applies a force of 100 N, the force F available at the brakes is (take specific gravity of the fluid to be 0.8 and units of length as mm):



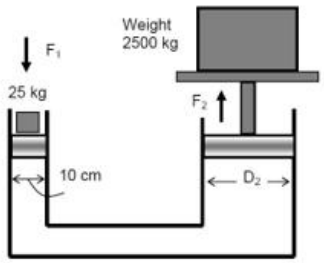
Options :

1. ✖ 1.67 kN
2. ✖ 2.5 kN
3. ✖ 2.75 kN
4. ✔ 3.75 kN

Question Number : 12 Question Id : 63068074946 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A hydraulic lift is used to lift a weight, as shown in the following figure. The diameter of the piston (D_2) on which the weight is to be placed is:



Options :

1. ✖ 0.1 m
2. ✔ 1 m
3. ✖ 1 mm
4. ✖ 1 cm

Question Number : 13 Question Id : 63068074947 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The efficiency, η, of the Screw Jack is given by (where α is the helix angle and φ is the angle of friction):

Options :

1. ✔ $\eta = \frac{\tan\alpha}{\tan(\alpha+\varphi)}$
2. ✖ $\eta = \frac{\tan\alpha}{\tan(\alpha-\varphi)}$
3. ✖ $\eta = \frac{\tan(\alpha+\varphi)}{\tan\alpha}$
4. ✖ $\eta = \frac{\tan(\alpha-\varphi)}{\tan\alpha}$

Question Number : 14 Question Id : 63068074948 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

When one object presses against another, the stresses developed at the contact surface is referred to as:

Options :

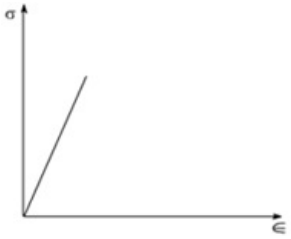
1. ✔ bearing stress
2. ✖ tensile stress
3. ✖ normal stress
4. ✖ shear stress

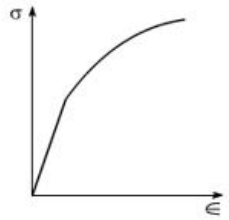
Question Number : 15 Question Id : 63068074949 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

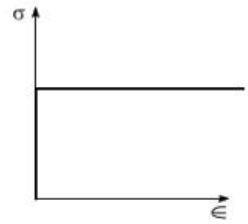
Correct Marks : 1

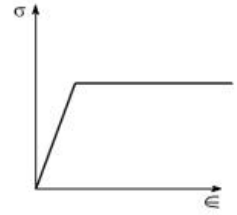
The Stress (σ) – Strain (ϵ) diagram for a Linear-Elastic material is:

Options :

1. ✔ 

2. ✖ 

3. ✖ 

4. ✖ 

Question Number : 16 Question Id : 63068074950 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relationship between the Engineering Strain (e) and the True Strain (ε), for materials with no changes in volume during deformation, is (where ln represents natural log):

Options :

1. ✔ $\varepsilon = \ln(e + 1)$

2. ✖ $\varepsilon = \ln(e-1)$
3. ✖ $e = \ln(\varepsilon + 1)$
4. ✖ $e = \ln(\varepsilon-1)$

Question Number : 17 Question Id : 63068074951 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relationship between the Engineering Stress (s) and the True Stress (σ), for materials with no changes in volume during deformation, is (where e is the Engineering Strain and ε is the True Strain):

Options :

1. ✔ $\sigma = s(e + 1)$
2. ✖ $\sigma = s(e - 1)$
3. ✖ $s= \sigma(\varepsilon + 1)$
4. ✖ $s= \sigma(\varepsilon - 1)$

Question Number : 18 Question Id : 63068074952 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relationship between Young's modulus of rigidity (E), bulk modulus of elasticity (K) and modulus of rigidity (G) is:

Options :

1. ✔ $E=\frac{9GK}{(3K+G)}$
2. ✖ $E=\frac{(3K+G)}{9GK}$
3. ✖ $E=\frac{3GK}{(3K+2G)}$
4. ✖ $E=\frac{(3K+2G)}{3GK}$

Question Number : 19 Question Id : 63068074953 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relationship between Poisson's ratio (γ), bulk modulus of elasticity (K) and modulus of rigidity (G) is:

Options :

1. ✖ $\gamma=\frac{2(G-3K)}{(3K+2G)}$
2. ✔ $\gamma=\frac{(3K-2G)}{2(G+3K)}$
3. ✖ $\gamma=\frac{2(G+3K)}{(3K-2G)}$
4. ✖ $\gamma=\frac{(3K+2G)}{2(G-3K)}$

Question Number : 20 Question Id : 63068074954 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A rod is 2 m long at a temperature of 10 °C. The temperature of it is raised to 80 °C. If the expansion due to temperature rise is prevented, the stress developed in the rod is (take Young's modulus of rigidity, E, = 1.0×10^5 MN/m^2 and coefficient of thermal expansion, α, = 0.000012 per

°C):

Options :

1. ✖ 64 N/mm^2
2. ✖ 64 kN/mm^2
3. ✔ 84 N/mm^2
4. ✖ 84 kN/mm^2

Question Number : 21 Question Id : 63068074955 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The cylindrical portion of the rivet is called the _____ and the lower portion is known as the _____.

Options :

1. ✔ shank; tail
2. ✖ head; tail
3. ✖ body; base
4. ✖ head; base

Question Number : 22 Question Id : 63068074956 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A riveted joint formed between two plates, when they are brought face to face such that an overlap exists, is called a _____.

Options :

1. ✔ lap joint
2. ✖ butt joint
3. ✖ tee joint
4. ✖ edge joint

Question Number : 23 Question Id : 63068074957 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which riveted joint has the highest efficiency, which is expressed in percentile of the commercial boiler joint?

Options :

1. ✖ Double riveted lap joint
2. ✖ Triple riveted lap joint
3. ✖ Double riveted butt joint
4. ✔ Triple riveted butt joint

Question Number : 24 Question Id : 63068074958 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The distance between the _____ of the rivet hole and the _____ of the plate is known as the marginal pitch.

Options :

1. ✔ centre; nearest edge
2. ✖ centre; farthest edge
3. ✖ edge; centre
4. ✖ edge; nearest edge

Question Number : 25 Question Id : 63068074959 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The basic symbol used for the single V-butt weld joint is:

Options :

1. ✖ 

2. ✖ 

3. ✔ 

4. ✖ 

Question Number : 26 Question Id : 63068074960 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A plate, 100 mm wide and 10 mm thick, is to be welded to another plate by means of double parallel fillets. The plates are subjected to a static load of 80 kN. The length of weld (neglecting allowance), if the permissible shear stress in the weld does not exceed 55 MPa, is:

Options :

1. ✖ 103 cm
2. ✔ 103 mm
3. ✖ 115.5 mm
4. ✖ 115.5 cm

Question Number : 27 Question Id : 63068074961 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Two plates, 200 mm wide and 10 mm thick, are to be welded by means of transverse welds at the ends. If the plates are subjected to a load of 70 kN, the size of the weld (neglecting allowance), assuming the allowable tensile stress of 70 MPa, is:

Options :

1. ✔ 141.42 mm
2. ✖ 141.42 cm
3. ✖ 153.92 mm
4. ✖ 153.92 cm

Question Number : 28 Question Id : 63068074962 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Uniformly varying load on a beam is also known as:

Options :

1. ✖ concentrated load
2. ✖ sinusoidal load
3. ✔ triangular load
4. ✖ unequal load

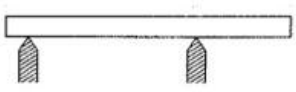
Question Number : 29 Question Id : 63068074963 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

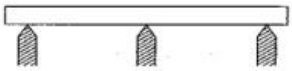
Which of the following is the overhanging beam?

Options :

1. ✖ 

2. ✔ 

3. ✖ 

4. ✖ 

Question Number : 30 Question Id : 63068074964 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In a loaded beam, the point where the bending moment is zero is known as:

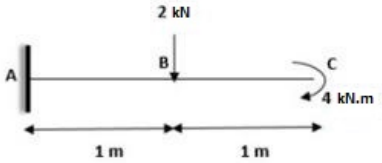
Options :

1. ✔ the contraflexure point
2. ✖ the zero point
3. ✖ the bottom point
4. ✖ the Unwin point

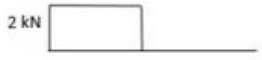
Question Number : 31 Question Id : 63068074965 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A cantilever beam AB carries loading as shown in the following figure. Which of the following is the SFD for the beam?



Options :

1. ✔ 

2. ✖ 

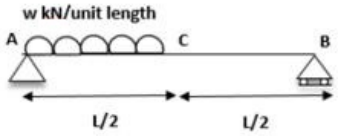
3. ✖ 

4. ✖ 

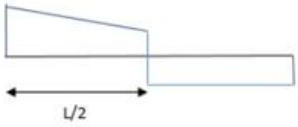
Question Number : 32 Question Id : 63068074966 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A simply supported beam has span L as shown in the following figure. Point C is the centre of the beam. It is subjected to UDL, w/unit length, in the portion A to C. Which of the following is the SFD for the beam?

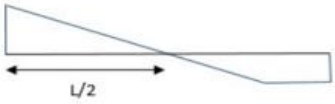


Options :

1. ✖ 

2. ✖ 

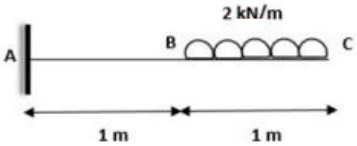
3. ✔ 

4. ✖ 

Question Number : 33 Question Id : 63068074967 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A cantilever beam is loaded as shown in the following figure. What is the shape of the bending moment diagram for portion AB?



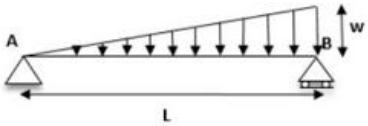
Options :

1. ✖ Parabolic
2. ✖ Linearly varying with maximum bending moment at B
3. ✖ Constant bending moment from A to B
4. ✔ Linearly varying with maximum bending moment at A

Question Number : 34 Question Id : 63068074968 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For the simply supported beam shown in the following figure, at what distance from the support A is the shear force zero?



Options :

1. ✖ L/4
2. ✖ L/3
3. ✖ L/2
4. ✔ $L/\sqrt{3}$

Question Number : 35 Question Id : 63068074969 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is NOT true about pure bending in beams?

Options :

1. ✖ Inner edge of cross-section of the beam undergoes compression.
2. ✖ Outer edge of cross-section of the beam undergoes tension.
3. ✖ Internal stresses are present along the length of the beam.
4. ✔ Shear stress is present in the beam.

Question Number : 36 Question Id : 63068074970 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following is NOT an assumption used in the Theory of Simple Bending?

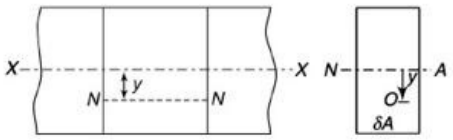
Options :

1. ✖ The material is homogeneous and isotropic.
2. ✖ Transverse planes remain plane after bending.
3. ✖ Initially the beam is straight.
4. ✔ The radius of curvature is small compared with the dimensions of the cross-section.

Question Number : 37 Question Id : 63068074971 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The longitudinal stress (σ) for the section of beam (*N-N*) shown in the following figure, subjected to simple bending having moment M, is given by the formula (where E = Young's modulus of rigidity, I = second moment of area):



Options :

1. ✔ $\sigma = \frac{M}{I}y$
2. ✖ $\sigma = \frac{I}{M}y$
3. ✖ $\sigma = \frac{y}{MI}$
4. ✖ $\sigma = \frac{MI}{y}$

Question Number : 38 Question Id : 63068074972 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Section modulus (Z) of a beam in simple bending is (where M = bending moment, = second moment of area, σ = longitudinal stress):

Options :

1. ✔ $Z = \frac{M}{\sigma}$

2. ✖ $Z = \frac{\sigma}{M}$

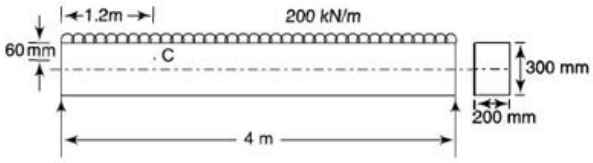
3. ✖ $Z = \frac{M}{I}$

4. ✖ $Z = \frac{I}{M}$

Question Number : 39 Question Id : 63068074973 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A 200-mm-wide, 300-mm-deep and 4-m-long simply supported beam is shown in the following figure. The bending moment at the point C which is 60 mm below the top surface and 1.2 m from the left support is:



Options :

1. ✖ 236 kN.m
2. ✔ 336 kN.m
3. ✖ 527 kN.m
4. ✖ 627 kN.m

Question Number : 40 Question Id : 63068074974 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A 120-mm-wide and 10-mm-thick steel plate is bent into circular arc of 8-m radius. The maximum value of stress produced is (take Young's Modulus of Rigidity, E, = 200 GPa):

Options :

1. ✖ 12.5 Mpa
2. ✖ 25 Mpa
3. ✔ 125 Mpa
4. ✖ 250 MPa

Question Number : 41 Question Id : 63068074975 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The variation of bending moment due a point load on a simply supported beam is governed by the _____.

Options :

1. ✖ Cubic Law
2. ✖ Parabolic Law
3. ✔ Linear Law
4. ✖ Quartic Law

Question Number : 42 Question Id : 63068074976 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The variation of bending moment between two sections of a beam is equal to:

Options :

1. ✔ the area under the shear force diagram
2. ✖ the difference of shear force between the two sections
3. ✖ the area under the bending moment diagram
4. ✖ the difference of bending moment between the two sections

Question Number : 43 Question Id : 63068074977 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Variation in bending moment in a cantilever beam, carrying a load, the intensity of which varies uniformly from zero at the free end to w per unit run at the fixed end, is governed by the _____.

Options :

1. ✔ Cubic Law
2. ✖ Parabolic Law
3. ✖ Linear Law
4. ✖ Quartic Law

Question Number : 44 Question Id : 63068074978 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Variation in shear force in a cantilever beam, carrying a load, the intensity of which varies uniformly from zero at the free end to w per unit run at the fixed end, is governed by the _____.

Options :

1. ✖ Cubic Law
2. ✔ Parabolic Law
3. ✖ Linear Law
4. ✖ Quartic Law

Question Number : 45 Question Id : 63068074979 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Variation in shear force in a cantilever beam (length = ℓ), carrying a load, the intensity of which varies uniformly from zero at the fixed end to w per unit run at the free end, is (x is distance from free end):

Options :

1. ✖ $w\left(x^2-\frac{x^2}{2\ell}\right)$
2. ✔ $w\left(x-\frac{x^2}{2\ell}\right)$
3. ✖ $w\left(x^2-\frac{x}{2\ell}\right)$
4. ✖ $w\left(x^2-\frac{x^3}{2\ell}\right)$

Question Number : 46 Question Id : 63068074980 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A simply supported beam (length =) has a distributed load of intensity varying with zero at each end to w per unit run at midspan. The variation in shear force will be:

Options :

1. ✖ $w\left(\frac{\ell}{8}-\frac{2x^2}{\ell}\right)$

2. ✖ $w\left(\frac{\ell}{8}-\frac{4x^2}{\ell}\right)$

3. ✔ $w\left(\frac{\ell}{4}-\frac{x^2}{\ell}\right)$

4. ✖ $w\left(\frac{\ell}{4}-\frac{2x^2}{\ell}\right)$

Question Number : 47 Question Id : 63068074981 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A simply supported beam (length = ℓ), has a distributed load of intensity varying with zero at each end to w per unit run at midspan. The variation in bending moment will be (x is distance from left end):

Options :

1. ✔ $w\left(\frac{\ell}{4}-\frac{x^2}{3\ell}\right)x$

2. ✖ $w\left(\frac{3\ell}{4}-\frac{x^2}{\ell}\right)x$

3. ✖ $w\left(\frac{3\ell}{4}-\frac{x^3}{3\ell}\right)x$

4. ✖ $w\left(\frac{\ell}{4}-\frac{x^3}{3\ell}\right)x$

Question Number : 48 Question Id : 63068074982 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In an analysis of plane frame structure, members are assumed to be joined together with:

Options :

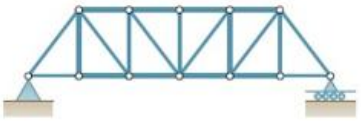
1. ✖ riveted joints
2. ✖ welded joints
3. ✖ rigid joints
4. ✔ pin joints

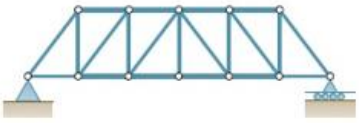
Question Number : 49 Question Id : 63068074983 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

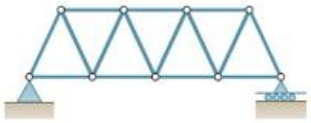
Correct Marks : 1

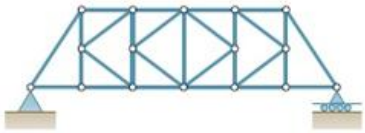
Which of the is the Pratt type truss?

Options :

1. ✔ 

2. ✖ 

3. ✖ 

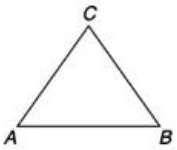
4. ✖ 

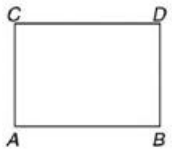
Question Number : 50 Question Id : 63068074984 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

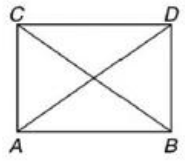
Correct Marks : 1

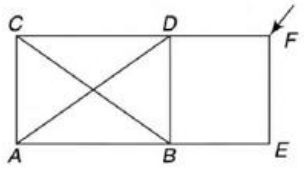
Which of the following is a deficiency frame?

Options :

1. ✖ 

2. ✔ 

3. ✖ 

4. ✖ 

Question Number : 51 Question Id : 63068074985 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The method of joints is preferred in the analysis of plane frames if forces are required to be determined in:

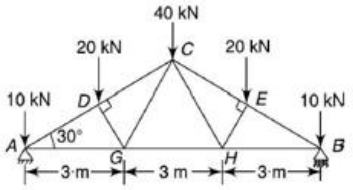
Options :

1. ✖ one member only
2. ✖ two members only
3. ✖ a few members
4. ✔ in all the members

Question Number : 52 Question Id : 63068074986 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The force in member AD of the truss shown in the following figure is (take D and E as the mid-points of AC and BC, respectively):



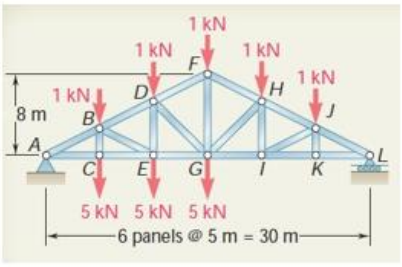
Options :

1. ✖ 120 kN
2. ✖ –120 kN
3. ✖ 80 KN
4. ✔ –80 kN

Question Number : 53 Question Id : 63068074987 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

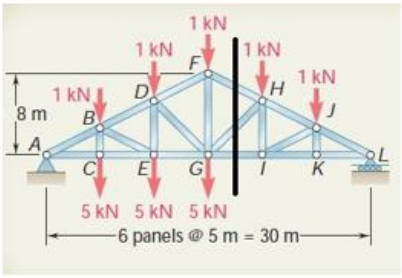
Correct Marks : 1

To determine the force in members FH, GH and GI of the truss shown in the following figure, using the method of sections, the correct way to draw the section will be:

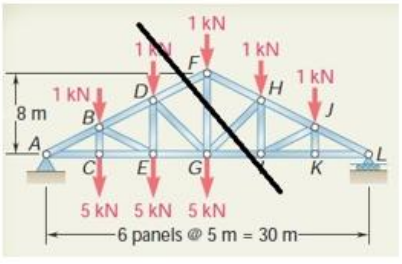


Options :

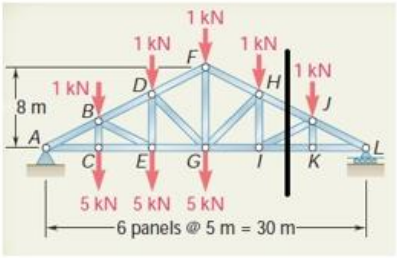
1. ✔



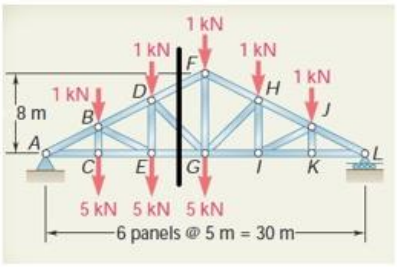
2. ✖



3. ✖



4. ✖



Question Number : 54 Question Id : 63068074988 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The variation of shear stress in a circular shaft, subjected to torsion, with radial distance is:

Options :

1. ✔ linear
2. ✖ parabolic
3. ✖ hyperbolic
4. ✖ quartic

Question Number : 55 Question Id : 63068074989 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relation governing the torsional torque in circular shafts is (where T = Torque, τ = shear stress, r = radial distance, ℓ = length of shaft, J = polar moment of inertia, G = modulus of rigidity, θ = angle of twist):

Options :

1. ✖ $\frac{T}{r}=\frac{\tau}{\ell}=\frac{G\theta}{J}$

2. ✔ $\frac{T}{J}=\frac{\tau}{r}=\frac{G\theta}{\ell}$

3. ✖ $\frac{T}{J}=\frac{\tau}{\ell}=\frac{G\theta}{r}$

4. ✖ $\frac{T}{\ell}=\frac{\tau}{r}=\frac{G\theta}{J}$

Question Number : 56 Question Id : 63068074990 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The angle of twist of a circular shaft is given by (where T = Torque, ℓ = length of shaft, J = polar moment of inertia, G = modulus of rigidity):

Options :

1. ✖ $\frac{GJ}{T\ell}$

2. ✔ $\frac{T\ell}{GJ}$

3. ✖ $\frac{TJ}{G\ell}$

4. ✖ $\frac{TG}{J\ell}$

Question Number : 57 Question Id : 63068074991 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The maximum shear stress of a solid shaft is given by (where T = Torque, d = shaft diameter):

Options :

1. ✖ $\frac{16T}{\pi d}$

2. ✖ $\frac{16T}{\pi d^2}$

3. ✔ $\frac{16T}{\pi d^3}$

4. ✖ $\frac{16T}{\pi d^4}$

Question Number : 58 Question Id : 63068074992 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The maximum shear stress in a hollow shaft subjected to a torsional moment _____.

Options :

1. ✖ is at the middle of thickness

2. ✖ is at the at the inner surface of the shaft

3. ✔ is at the at the outer surface of the shaft

4. ✖ can be anywhere on the shaft

Question Number : 59 Question Id : 63068074993 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The ratio of the maximum stress of a hollow shaft to that of a solid shaft, subjected to torsion, if both are of the same material and of the same outer diameters, is (k is the ratio of the inner diameter to the outer diameter of the hollow shaft):

Options :

1. ✔ $\frac{1}{\left(1-(k)^4\right)}$

2. ✖ $\left(1-(k)^4\right)$

3. ✖ $\frac{1}{\left(1-(k)^3\right)}$

4. ✖ $\left(1-(k)^3\right)$

Question Number : 60 Question Id : 63068074994 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The torsional stiffness is given by (ℓ = length of shaft, J = polar moment of inertia, G = modulus of rigidity):

Options :

1. ✔ $\frac{JG}{\ell}$

2. ✖ $\frac{J}{G\ell}$

3. ✖ $\frac{G}{J\ell}$

4. ✖ $\frac{\ell}{JG}$

Question Number : 61 Question Id : 63068074995 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A cylinder-shell may be termed as thin if the ratio of thickness of the wall to the diameter of the shell is less than:

Options :

1. ✖ 1 : 5
2. ✖ 1 : 10
3. ✔ 1 : 15
4. ✖ 1 : 20

Question Number : 62 Question Id : 63068074996 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The circumferential stresses in thin cylinders are also known as:

Options :

1. ✔ hoop stresses
2. ✖ radial stresses
3. ✖ tangential stresses
4. ✖ longitudinal stresses

Question Number : 63 Question Id : 63068074997 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Longitudinal stresses in the body of a thin cylinder (with uniform thickness) having spherical ends are _____ hoop stresses.

Options :

1. ✔ half of
2. ✖ the same as
3. ✖ double of
4. ✖ triple of

Question Number : 64 Question Id : 63068074998 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Hoop strain in the body of a thin cylinder (with uniform thickness 't') having spherical ends is (d = internal diameter, p = internal pressure, E = Young's modulus, v = Poisson's ratio):

Options :

1. ✖ $\frac{pd}{2tE}(2-\nu)$

2. ✔ $\frac{pd}{4tE}(2-\nu)$

3. ✖ $\frac{pd}{4tE}(4-\nu)$

4. ✖ $\frac{pd}{2tE}(4-\nu)$

Question Number : 65 Question Id : 63068074999 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The ratio of hoop stress to hoop strain in the hemispherical portion of a thin cylinder (with uniform thickness 't') is (E = Young's modulus, ν = Poisson's ratio):

Options :

1. ✔ $\frac{E}{(1-\nu)}$

2. ✖ $\frac{E}{(2-\nu)}$

3. ✖ $\frac{2E}{(1-\nu)}$

4. ✖ $\frac{2E}{(2-\nu)}$

Question Number : 66 Question Id : 63068075000 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Neglecting the effect of internal pressure, the volumetric strain of a thin cylinder is (σ = hoop stress, E = Young's modulus, ν = Poisson's ratio):

Options :

1. ✔ $\frac{\sigma}{E}(2.5-2\nu)$

2. ✖ $\frac{\sigma}{E}(2.5-\nu)$

3. ✖ $\frac{\sigma}{E}(1.5-2\nu)$

4. ✖ $\frac{\sigma}{E}(1.5-\nu)$

Question Number : 67 Question Id : 63068075001 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

If the load on a column is increased to a value that on its removal the deflection remains and the column doesn't return to its original position, the load is known as:

Options :

1. ✔ critical load
2. ✖ ultimate load
3. ✖ yield load
4. ✖ breaking load

Question Number : 68 Question Id : 63068075002 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The ratio of the equivalent length of a column fixed at one end with the other free to that of a column with both ends hinged is (consider the lengths of the two columns to be the same):

Options :

1. ✖ 1 : 1
2. ✔ 2 : 1
3. ✖ 3 : 1
4. ✖ 1 : 2

Question Number : 69 Question Id : 63068075003 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Euler's Crippling Load for a column with both ends fixed is _____ that for a column fixed at one end with the other end hinged.

Options :

1. ✖ the same as
2. ✖ half of
3. ✔ double of
4. ✖ triple of

Question Number : 70 Question Id : 63068075004 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Perry's approximate formula is (where σ_{max}= maximum compressive stress, $\sigma_o = \frac{P}{A}$, $\sigma_e = \frac{P_e}{A}$,

e = eccentricity, y_c = distance of the extreme compressive fibre from the neutral axis, k = radius of gyration,

P = Rankine's crippling load, P_e = Euler's crippling load, A = area):

Options :

1. ✔ $\left(\frac{\sigma_{max}}{\sigma_o}-1\right)\left(1-\frac{\sigma_o}{\sigma_e}\right)=\frac{(1.2e)y_c}{k^2}$

2. ✖ $\left(1-\frac{\sigma_{max}}{\sigma_o}\right)\left(1-\frac{\sigma_o}{\sigma_e}\right)=\frac{(1.2e)y_c}{k^2}$

3. ✖ $\left(\frac{\sigma_{max}}{\sigma_o}-1\right)\left(\frac{\sigma_o}{\sigma_e}-1\right)=\frac{(1.2e)y_c}{k^2}$

4. ✖ $\left(\frac{\sigma_{max}}{\sigma_o}+1\right)\left(1+\frac{\sigma_o}{\sigma_e}\right)=\frac{(1.2e)y_c}{k^2}$

Question Number : 71 Question Id : 63068075005 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In a column, what is the relationship between the slenderness ratio and the critical stress?

Options :

1. ✖ Slenderness ratio increases with the increase in critical stress.
2. ✔ Slenderness ratio decreases with the increase in critical stress.
3. ✖ Slenderness ratio remains constant with the increase in critical stress.
4. ✖ Slenderness ratio first increases and after a maximum value, starts to decrease, with the increase in critical stress.

Question Number : 72 Question Id : 63068075006 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Secant formula is applicable for:

Options :

1. ✖ short columns under axial loading
2. ✖ long columns under axial loading
3. ✖ short columns under eccentric loading
4. ✔ long columns under eccentric loading

Question Number : 73 Question Id : 63068075007 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

On application of shear stress, the fluid will:

Options :

1. ✔ start to flow
2. ✖ not flow
3. ✖ flow or not depending on the value of the shear stress
4. ✖ flow or not depending on other factors apart from the shear stress

Question Number : 74 Question Id : 63068075008 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

_____ is the ratio of dynamic viscosity to kinematic viscosity.

Options :

1. ✔ Density
2. ✖ Virtual viscosity
3. ✖ Specific weight
4. ✖ Specific volume

Question Number : 75 Question Id : 63068075009 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The dimensions of specific weight are same as that of:

Options :

1. ✖ pressure
2. ✔ force/volume

3. ✖ work/volume
4. ✖ density

Question Number : 76 Question Id : 63068075010 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is correct about the density of water?

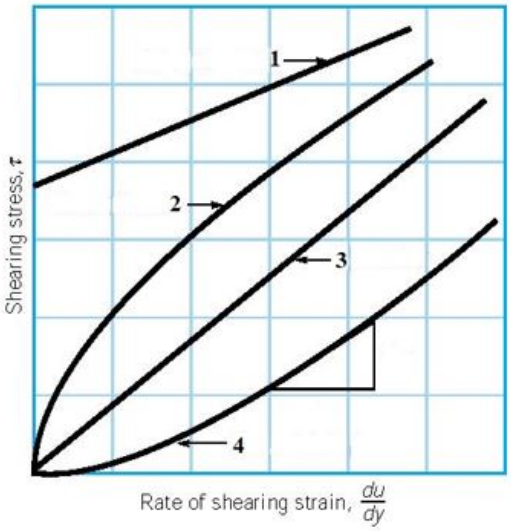
Options :

1. ✖ Density of water increases with temperature.
2. ✖ Density of water decreases with temperature.
3. ✔ Density of water is maximum at 4 °C.
4. ✖ Density of water is maximum at 0 °C.

Question Number : 77 Question Id : 63068075011 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In the graph of shearing stress vs. rate of shearing strain, which of the following lines represent shear thinning fluid?



Options :

1. ✖ 1
2. ✔ 2
3. ✖ 3
4. ✖ 4

Question Number : 78 Question Id : 63068075012 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

If the specific gravity of a fluid is 1.26, its specific weight will be (take density of water = 1000 kg/m^3 and acceleration due to gravity = 10 m/s^2):

Options :

1. ✖ 12.6 N/m^3
2. ✔ 12.6 kN/m^3
3. ✖ 1.26 N/m^3
4. ✖ 1.26 kN/m^3

Question Number : 79 Question Id : 63068075013 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For liquids or gases at rest, the pressure gradient in the vertical direction at any point in a fluid depends only on the _____ of the fluid at that

point.

Options :

1. ✖ viscosity
2. ✔ specific weight
3. ✖ temperature
4. ✖ thermal conductivity

Question Number : 80 Question Id : 63068075014 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is NOT correct about gauge pressure?

Options :

1. ✔ It can be more than absolute pressure.
2. ✖ For a pressure value more than atmospheric pressure, gauge pressure will be positive.
3. ✖ It can have negative values.
4. ✖ For a pressure value less than atmospheric pressure, gauge pressure will be negative.

Question Number : 81 Question Id : 63068075015 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The variation of atmospheric pressure with altitude is given by (where P_a and T_a are the pressure and temperature at sea level, β is the lapse rate, is the acceleration due to gravity and R is gas constant):

Options :

1. ✔ $p = p_a\left(1-\frac{\beta z}{T_a}\right)^{\frac{g}{R\beta}}$
2. ✖ $p = p_a\left(1-\frac{\beta z}{T_a}\right)^{\frac{R\beta}{g}}$
3. ✖ $p = p_a\left(\frac{\beta z}{T_a}-1\right)^{\frac{g}{R\beta}}$
4. ✖ $p = p_a\left(\frac{\beta z}{T_a}-1\right)^{\frac{R\beta}{g}}$

Question Number : 82 Question Id : 63068075016 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Any two points at _____ elevation in a continuous mass of the same static fluid will be at _____ pressure(s).

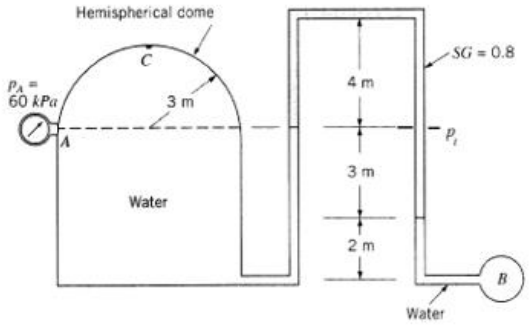
Options :

1. ✔ the same; the same
2. ✖ the same; different
3. ✖ different; the same
4. ✖ the same; absolute

Question Number : 83 Question Id : 63068075017 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

With reference to the given figure, if p represents pressure, which of the following is correct?



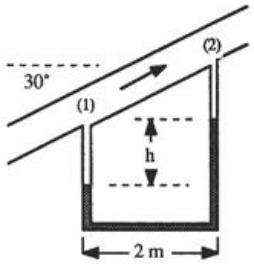
Options :

1. ✔ $p_A = p_1$
2. ✖ $p_A = p_1 - p_B$
3. ✖ $p_A < p_1$
4. ✖ $p_A > p_1$

Question Number : 84 Question Id : 63068075018 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Water flows upward in a pipe slanted at 30°, as shown in the given figure. If the mercury manometer reads h = 12 cm, the pressure difference between points (1) and (2) in the pipe is (take specific weights of water as 9790 N/m^3 and of mercury as 133100 N/m^3):



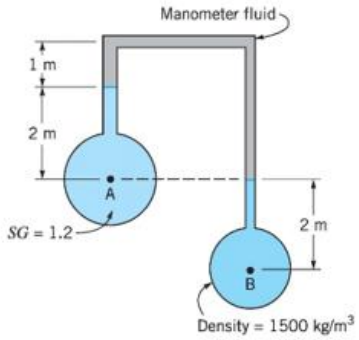
Options :

1. ✖ 2.4 kPa
2. ✖ 16.0 kPa
3. ✔ 26.1 kPa
4. ✖ 34.4 kPa

Question Number : 85 Question Id : 63068075019 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For the stationary fluid shown in the following figure, if the pressure at point B is 20 kPa greater than that at point A, the specific weight of the manometer fluid is (take specific weight of water as 9810 N/m^3 and acceleration due to gravity as 9.81 m/s^2):



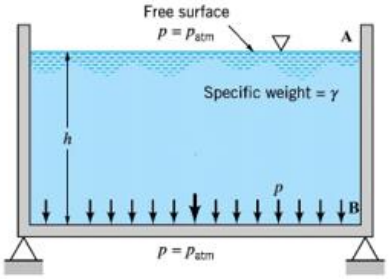
Options :

1. ✔ 7.1 kN/m^3
2. ✖ 7.1 N/m^3
3. ✖ 16.5 kN/m^3
4. ✖ 16.5N/m^3

Question Number : 86 Question Id : 63068075020 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For the tank shown in the following figure, the resultant force due to the pressure on side wall AB will be:



Options :

1. ✖ located at the mid-point of the wall
2. ✖ located at the upper half of the wall
3. ✔ located at the lower half of the wall
4. ✖ located at the base of the wall (at point B)

Question Number : 87 Question Id : 63068075021 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Based on the two statements given below, choose the correct answer.

Statement A: The magnitude of the resultant fluid force is equal to the pressure acting at the centroid of the area multiplied by the total area.

Statement B: The resultant fluid force, acting on a fully submerged inclined plane surface, does not pass through the centroid of the area.

Options :

1. ✔ Both statements A and B are correct.
2. ✖ Both statements A and B are incorrect.
3. ✖ Statement A is correct but statement B is incorrect.
4. ✖ Statement A is incorrect but statement B is correct.

Question Number : 88 Question Id : 63068075022 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

If the atmospheric pressure is neglected, the coordinates for the centre of pressure (x_{CP}, y_{CP}) for a fully submerged inclined plane surface is (where I_{xx} is the area moment of inertia of the plate area about its centroidal x axis, I_{xy} is the product of inertia of the plane surface, θ is the angle of inclination of the plane surface, h_{CG} is the depth straight down from the surface to the plate centroid, A is the area of plane surface):

Options :

1. ✔ $x_{CP} = \frac{I_{xy}\sin\theta}{h_{CG}A}, \quad y_{CP} = \frac{I_{xx}\sin\theta}{h_{CG}A}$

2. ✖ $x_{CP} = \frac{I_{xx}\sin\theta}{h_{CG}A}, \quad y_{CP} = \frac{I_{xy}\sin\theta}{h_{CG}A}$

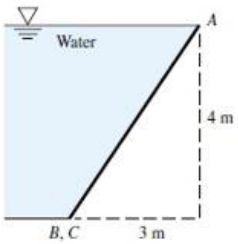
3. ✖ $x_{CP} = \frac{I_{xy}\sin\theta}{h_{CG}A}, \quad y_{CP} = \frac{I_{xx}\cos\theta}{h_{CG}A}$

4. ✖ $x_{CP} = \frac{I_{xx}\cos\theta}{h_{CG}A}, \quad y_{CP} = \frac{I_{xy}\sin\theta}{h_{CG}A}$

Question Number : 89 Question Id : 63068075023 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Panel ABC in the slanted side of a water tank (shown in the following figure) is an isosceles triangle with vertex at A and base BC = 2 m. The water force on the panel is (take specific weight of water as 9790 N/m^3):



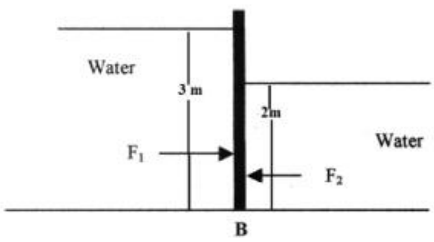
Options :

1. ✖ 131.0 N
2. ✔ 131.0 kN
3. ✖ 32.6 kN
4. ✖ 32.6 N

Question Number : 90 Question Id : 63068075024 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A vertical lock gate is 4 m wide and separates water levels of 2 m and 3 m, respectively, as shown in the following figure. The moment about the bottom required to keep the gate stationary is (take specific weight of water as 9790 N/m^3):



Options :

1. ✖ 104 kN.m
2. ✖ 114 kN.m
3. ✔ 124 kN.m
4. ✖ 134 kN.m

Question Number : 91 Question Id : 63068075025 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Flow at varying rates through a long straight pipe of uniform cross-section is a _____.

Options :

1. ✖ steady and uniform flow
2. ✖ steady and non-uniform flow
3. ✔ unsteady and uniform flow
4. ✖ unsteady and non-uniform flow

Question Number : 92 Question Id : 63068075026 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A _____ is a set of fluid particles that form a line at a given instant.

Options :

1. ✖ streamline
2. ✖ pathline
3. ✖ streakline
4. ✔ timeline

Question Number : 93 Question Id : 63068075027 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is NOT correct about flow streamlines?

Options :

1. ✖ Fluid particles accelerate normal to streamlines.
2. ✖ Fluid particles accelerate along streamlines.
3. ✔ The component of weight along a streamline does not depend on the streamline angle.
4. ✖ The lines that are tangent to the velocity vectors throughout the flow field are called streamlines.

Question Number : 94 Question Id : 63068075028 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The Bernoulli equation can be obtained by integrating F = ma along a _____.

Options :

1. ✔ streamline
2. ✖ pathline
3. ✖ streakline
4. ✖ timeline

Question Number : 95 Question Id : 63068075029 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following assumptions for the Bernoulli equation $\frac{p}{\rho}+\frac{V^2}{2}+gz=\text{constant}$, is NOT correct?

Options :

1. ✖ Flow is steady.
2. ✖ Flow is incompressible.
3. ✔ Flow is viscous.
4. ✖ Flow is along single streamline.

Question Number : 96 Question Id : 63068075030 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The pitot formula, used for velocity measurement using pitot tube, is (where V is the flow velocity, p_0 is the stagnation pressure, p_s is the static pressure and ρ is the density):

Options :

1. ✔ $V \approx \left[2\frac{(p_0 - p_s)}{\rho}\right]^{\frac{1}{2}}$

2. ✖ $V \approx \left[\frac{(p_0 - p_s)}{\rho}\right]^{\frac{1}{2}}$

3. ✖ $V \approx \left[2\frac{\sqrt{(p_0 - p_s)}}{\rho}\right]^{\frac{1}{2}}$

4. ✖ $V \approx \left[\frac{\sqrt{(p_0 - p_s)}}{\rho}\right]^{\frac{1}{2}}$

Question Number : 97 Question Id : 63068075031 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following is NOT a constriction meter?

Options :

1. ✖ Thin-plate orifice
2. ✖ Flow nozzle
3. ✖ Venturi tube
4. ✔ Rotameter

Question Number : 98 Question Id : 63068075032 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is NOT true about nozzle meter discharge coefficient, C_d (Re is Reynolds number, and β is ratio of nozzle diameter to pipe diameter)?

Options :

1. ✔ C_d generally increases with increase in Re at constant β.
2. ✖ C_d generally increases with increase in β at constant Re.
3. ✖ C_d for nozzle meter is more than that for an orifice meter at the same β and Re.
4. ✖ Formation of Vena contracta does not take place.

Question Number : 99 Question Id : 63068075033 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

If the actual velocity in the contracted section of a jet of liquid flowing from a 50-mm-diameter orifice is 8.91 m/s under a head of 5 m, the value of the coefficient of velocity will be (take acceleration due to gravity as 10 m/s^2):

Options :

1. ✔ 0.891
2. ✖ 0.861
3. ✖ 0.901
4. ✖ 0.821

Question Number : 100 Question Id : 63068075034 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The flow velocity (V) from an orifice, attached to a tank of sufficiently large cross-sectional area, is (where a_c is the area of vena contracta, a_1 is the tank area, h is the height of the fluid in the tank and g is the acceleration due to gravity):

Options :

1. ✖ $V = \sqrt{2gh}\,\frac{a_c}{a_1}$

2. ✖ $V = \sqrt{\frac{2gh}{\left(\frac{a_1}{a_c}\right)^2 - 1}}$

3. ✖ $V = \sqrt{\frac{2gh}{1 - \left(\frac{a_c}{a_1}\right)^2}}$

4. ✔ $V = \sqrt{2gh}$

Question Number : 101 Question Id : 63068075035 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The actual discharge (Q) through an orifice, attached to a tank, is given by (where V is the flow velocity from the orifice, a_c is the area of contraction, a is the orifice area, h is the height of the fluid in the tank, C_c is the coefficient of contraction, C_v is the coefficient of velocity and g is the acceleration due to gravity):

Options :

1. ✖ $Q=(a\times V)$

2. ✔ $Q=(C_c\times a)\times(C_v\sqrt{2gh})$

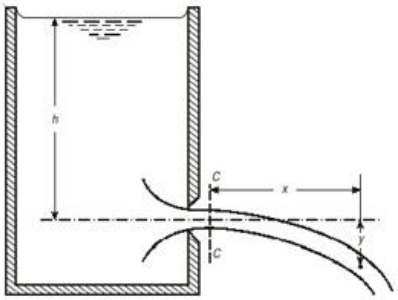
3. ✖ $Q=(C_c\times a_c)\times(C_v\sqrt{2gh})$

4. ✖ $Q=a\sqrt{2gh}$

Question Number : 102 Question Id : 63068075036 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In reference to the following figure, the coefficient of velocity is given by:



Options :

1. ✔ $\sqrt{\frac{x^2}{4hy}}$

2. ✖ $\sqrt{\frac{y}{4hx^2}}$

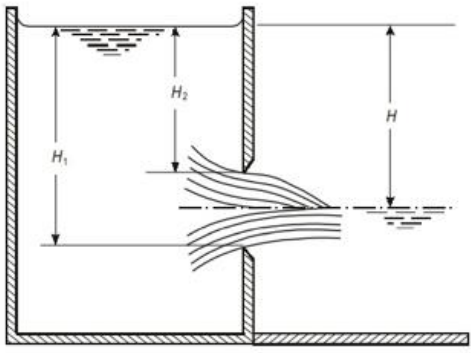
3. ✖ $\sqrt{\frac{x}{4hy^2}}$

4. ✖ $\sqrt{\frac{y^2}{4hx}}$

Question Number : 103 Question Id : 63068075037 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In reference to the following figure, the total discharge, Q, through the partially submerged orifice is given by (where C_{d1} and C_{d2} represents the coefficients of discharge for the free portion and submerged portion of the orifice, respectively, and the breadth of the orifice is b):



Options :

1. ✔ $Q = \frac{2}{3} C_{d1} b \sqrt{2g} \left\{ H^{3/2} - H_2^{3/2} \right\} + C_{d2} b (H_1 - H) \sqrt{2gH}$

2. ✖ $Q = \frac{2}{3} C_{d1} b \sqrt{2g} \{ H_1 - H \} + C_{d2} b \left(H^{3/2} - H_2^{3/2} \right) \sqrt{2gH}$

3. ✖ $Q = \frac{2}{3} C_{d1} b \sqrt{2gH} \left\{ H^{3/2} - H_2^{3/2} \right\} + C_{d2} b (H_1 - H) \sqrt{2g}$

4. ✖ $Q = C_{d1} b \sqrt{2g} \left\{ H^{3/2} - H_2^{3/2} \right\} + \frac{2}{3} C_{d2} b (H_1 - H) \sqrt{2gH}$

Question Number : 104 Question Id : 63068075038 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Water discharges at the rate of 98 litres per second through a vertical sharp-edged orifice of area 0.01 m^2 placed under a constant head of 10 m. A point on the jet measured from the vena contracta of the jet has coordinates 3.85 m horizontal and 0.4 m vertical. The value of coefficient of contraction is (take acceleration due to gravity as 10 m/s^2):

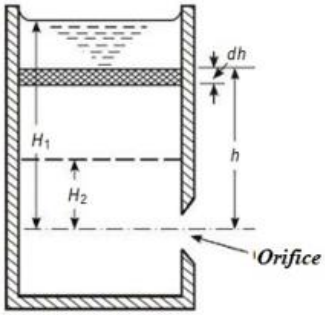
Options :

1. ✖ 0.63
2. ✔ 0.73
3. ✖ 0.78
4. ✖ 0.96

Question Number : 105 Question Id : 63068075039 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In reference to the following figure, the time to completely empty the vertical cylindrical tank is (where A is the cross-sectional area of the tank, a is the area of orifice and C_d is the coefficient of discharge):



Options :

1. ✔ $\frac{2A\left(H_1^{1/2}\right)}{C_d a\sqrt{2g}}$

2. ✖ $\frac{2a\left(H_1^{1/2}\right)}{C_d A\sqrt{2g}}$

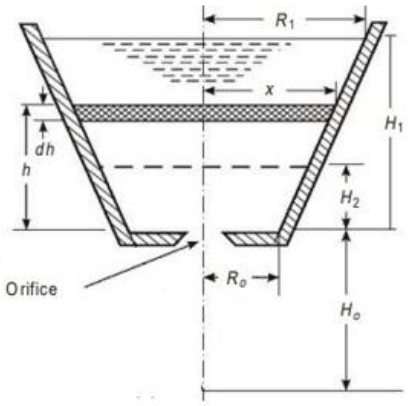
3. ✖ $\frac{2A\left(h^{1/2}\right)}{C_d a\sqrt{2g}}$

4. ✖ $\frac{2a\left(H_1\right)}{C_d A\sqrt{2gh}}$

Question Number : 106 Question Id : 63068075040 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In reference to the conical tank shown in the given figure, which of the following expressions for H_0 is correct?



Options :

1. ✔ $H_0 = \frac{R_0 H_1}{(R_1 - R_0)}$

2. ✖ $H_0 = \frac{R_1 H_2}{(R_1 - R_0)}$

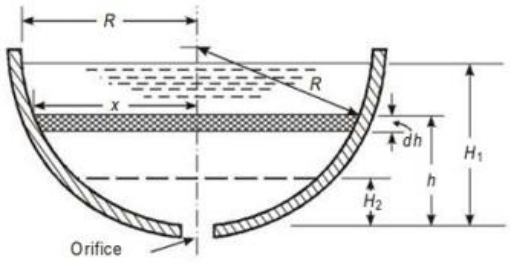
3. ✖ $H_0 = \frac{(R_1 - R_0)}{R_0 H_1}$

4. ✖ $H_0 = \frac{(R_1 - R_0)}{R_1 H_2}$

Question Number : 107 Question Id : 63068075041 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In reference to the following figure, if the hemispherical tank was full at the beginning and it is completely emptied, the time taken is given by (where g is the acceleration due to gravity, a is the area of orifice and C_d is the coefficient of discharge):



Options :

1. ✔ $\frac{14\pi R^{5/2}}{15 C_d a\sqrt{2g}}$

2. ✖ $\frac{15\pi R^{5/2}}{14 C_d a\sqrt{2g}}$

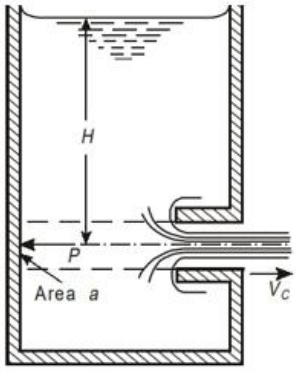
3. ✖ $\frac{14C_d a\sqrt{2g}}{15\pi R^{5/2}}$

4. ✖ $\frac{15C_d a\sqrt{2g}}{14\pi R^{5/2}}$

Question Number : 108 Question Id : 63068075042 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In a Borda's mouthpiece as shown in the following figure, 40 mm diameter discharges under a constant head of 1.5 m. If the coefficient of velocity for the entrance section of the mouthpiece is 0.95, the coefficient of contraction, when the mouthpiece is running free, is:



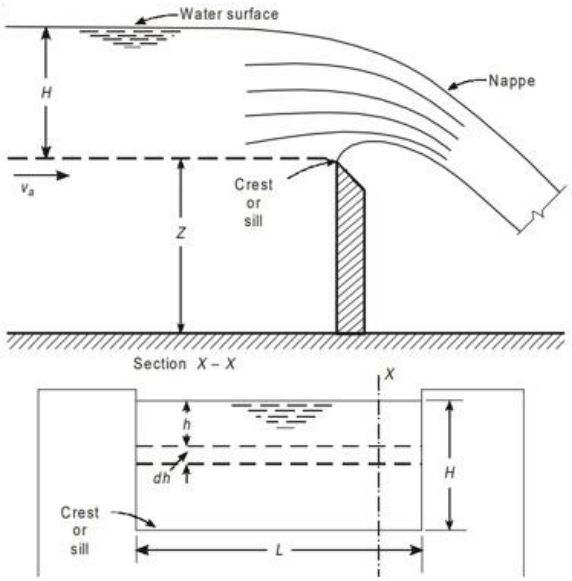
Options :

1. ✔ 0.554
2. ✖ 0.59
3. ✖ 0.63
4. ✖ 0.68

Question Number : 109 Question Id : 63068075043 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The discharge Q passing over the rectangular notch shown in the following figure is given by (where C_d is the coefficient of discharge, h_a is the approach velocity based head and g is the acceleration due to gravity):



Options :

1. ✔ $Q = \frac{2}{3} C_d \sqrt{2g} L \left[(H + h_a)^{3/2} - h_a^{3/2} \right]$

2. ✖ $Q = C_d \sqrt{2g} L \left[(H + h_a)^{3/2} - h_a^{3/2} \right]$

3. ✖ $Q = \frac{3}{2} C_d \sqrt{2g} L \left[(H + h_a)^{3/2} - h_a^{3/2} \right]$

4. ✖ $Q = \frac{2}{3} C_d \sqrt{2g} L \left[(H + h_a)^{2/3} - h_a^{2/3} \right]$

Question Number : 110 Question Id : 63068075044 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Francis formula for the discharge over a rectangular weir neglecting the approach velocity is (where H and L are the height and width of the weir, respectively, and n is the number of end contractions for the weir):

Options :

1. ✔ $Q = 1.84 (L - 0.1(nH)) H^{3/2}$

2. ✖ $Q = 2.84 (L - 0.1(nH)) H^{3/2}$

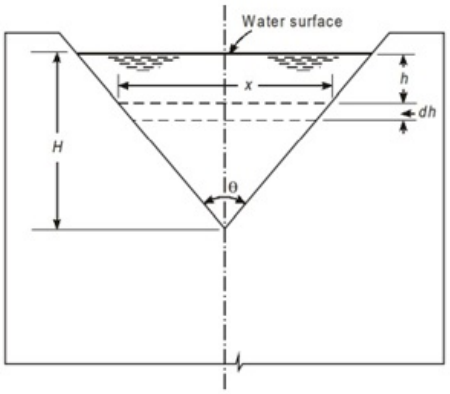
3. ✖ $Q = 1.84 (L - 0.1(nH)) H^{2/3}$

4. ✖ $Q = 2.84 (L - 0.1(nH)) H^{2/3}$

Question Number : 111 Question Id : 63068075045 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For flow over the triangular notch shown in the following figure, constant for the notch is given by (where C_d is the coefficient of discharge, and g is the acceleration due to gravity):



Options :

1. ✖ $\frac{15}{8} C_d \sqrt{2g} \sin\frac{\theta}{2}$

2. ✖ $\frac{8}{15} C_d \sqrt{2g} \sin\frac{\theta}{2}$

3. ✖ $\frac{15}{8} C_d \sqrt{2g} \tan\frac{\theta}{2}$

4. ✔ $\frac{8}{15} C_d \sqrt{2g} \tan\frac{\theta}{2}$

Question Number : 112 Question Id : 63068075046 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is NOT true about a triangular weir?

Options :

1. ✖ The nappe emerging from a triangular weir or notch has the same shape for nearly all different heads.

2. ✖ For measuring low discharges, a triangular weir or notch is more useful as compared to a rectangular weir.

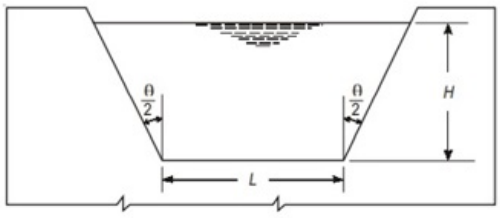
3. ✖ In most of the cases of flow over a triangular weir or notch, the velocity of approach may be neglected without introducing an appreciable error.

4. ✔ Ventilation of a triangular weir is must.

Question Number : 113 Question Id : 63068075047 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In a typical Cipolletti weir shown in the following figure, the value of $\frac{\theta}{2}$ is:



Options :

1. ✔ 14°

2. ✖ 22°

3. ✖ 30°
4. ✖ 38°

Question Number : 114 Question Id : 63068075048 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The Darcy friction factor (f) for laminar flow in circular pipes is given by (Re_d is pipe diameter-based Reynolds number):

Options :

1. ✔ $f = \frac{64}{Re_d}$
2. ✖ $f = \frac{Re_d}{64}$
3. ✖ $f = 0.316 Re_d^{-1/4}$
4. ✖ $f = \left(1.8 \log\left(\frac{Re_d}{6.9}\right)\right)^{-2}$

Question Number : 115 Question Id : 63068075049 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Darcy–Weisbach equation used for computing the loss of head due to friction (h_f) in pipes is given by (where V is the velocity of flow, L and D are the length and diameter of the pipe, respectively, f is the friction factor and g is the acceleration due to gravity):

Options :

1. ✔ $h_f = \frac{fLV^2}{2gD}$
2. ✖ $h_f = \frac{2gD}{fLV^2}$
3. ✖ $h_f = \frac{fLV}{\sqrt{2gD}}$
4. ✖ $h_f = \frac{\sqrt{2gD}}{fLV}$

Question Number : 116 Question Id : 63068075050 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following losses occurring in pipe flow does NOT belong to the category of minor loss?

Options :

1. ✖ Loss in sudden expansion
2. ✖ Loss in bends
3. ✖ Loss in flow through valves, open or partially closed
4. ✔ Frictional loss in pipes

Question Number : 117 Question Id : 63068075051 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In pipe flows, the minor loss coefficient, K, and the Darcy friction factor, f, are related by the equation (where L_{eq} is the pipe equivalent length

and d is the pipe diameter):

Options :

1. ✔ $L_{eq} = \frac{Kd}{f}$

2. ✖ $L_{eq} = \left(\frac{K}{f}\right)^{1/2} d$

3. ✖ $L_{eq} = \left(\frac{K}{f}\right)^{1/3} d$

4. ✖ $L_{eq} = \left(\frac{K}{f}\right)^{2} d$

Question Number : 118 Question Id : 63068075052 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

What is the correct relationship of loss coefficients (K) for 90° bends with pipe bend radius (R) to pipe diameter (d) ratio?

Options :

1. ✖ K increases with increase in R/d
2. ✖ K decreases with increase in R/d
3. ✔ K first decreases till a certain value and then increases with increase in R/d
4. ✖ K first increases till a certain value and then decreases with increase in R/d

Question Number : 119 Question Id : 63068075053 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The loss coefficient, K_{SE}, of flow entering from a pipe of smaller diameter (d) to a pipe of larger diameter (D), known as sudden expansion, is:

Options :

1. ✖ $K_{SE} = \left(1 - \frac{d^2}{D^2}\right)^{1/2}$

2. ✖ $K_{SE} = \left(1 - \frac{d^2}{D^2}\right)$

3. ✖ $K_{SE} = \left(1 - \frac{d}{D}\right)^{2}$

4. ✔ $K_{SE} = \left(1 - \frac{d^2}{D^2}\right)^{2}$

Question Number : 120 Question Id : 63068075054 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The empirical formula of loss coefficient, K, for a flow entering from a finite reservoir of diameter D to a pipe of diameter d is (valid up to d/D = 0.76):

Options :

1. ✖ $K = 0.42\left(1 - \frac{d^2}{D^2}\right)^{2}$

2. ✖ $K = 0.42\left(1-\frac{d}{D}\right)^2$

3. ✔ $K = 0.42\left(1-\frac{d^2}{D^2}\right)$

4. ✖ $K = 0.42\left(1-\frac{d^2}{D^2}\right)^{1/2}$

Question Number : 121 Question Id : 63068075055 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For gradual conical expansion from a pipe of diameter d_1 to a pipe of diameter d_2, the loss coefficient K is (where C_P is the pressure-recovery coefficient):

Options :

1. ✖ $K = C_p - \frac{d_1^4}{d_2^4}$

2. ✖ $K = 1-\frac{d_1}{d_2} - C_p$

3. ✖ $K = 1-\frac{d_1^2}{d_2^2} - C_p$

4. ✔ $K = 1-\frac{d_1^4}{d_2^4} - C_p$

Question Number : 122 Question Id : 63068075056 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The pipe-head loss is equal to the change in the _____.

Options :

1. ✔ height of the hydraulic grade line
2. ✖ pressure head only
3. ✖ gravity head only
4. ✖ velocity head only

Question Number : 123 Question Id : 63068075057 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In frictionless flow, with no work or heat transfer, the energy grade line:

Options :

1. ✖ linearly increases
2. ✖ linearly decreases
3. ✔ has constant height
4. ✖ first increases then decreases

Question Number : 124 Question Id : 63068075058 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The height to which a liquid would rise in a piezometer tube attached to the flow is the same as the _____.

Options :

1. ✔ height of the hydraulic grade line
2. ✖ height of the energy grade line
3. ✖ gravity head only
4. ✖ velocity head only

Question Number : 125 Question Id : 63068075059 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

In an open-channel flow, the hydraulic grade line is:

Options :

1. ✖ below the free surface of the water
2. ✔ identical to the free surface of the water
3. ✖ above the free surface of the water
4. ✖ can be above or below the free surface of the water

Question Number : 126 Question Id : 63068075060 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relationship between hydraulic grade line (HGL) and the energy grade line (EGL) is:

Options :

1. ✔ HGL = EGL – velocity head
2. ✖ HGL = EGL – potential head
3. ✖ HGL = EGL – pressure head
4. ✖ HGL = EGL – (pressure head + potential head)

Question Number : 127 Question Id : 63068075061 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The head given by a pitot stagnation-velocity tube corresponds to the _____.

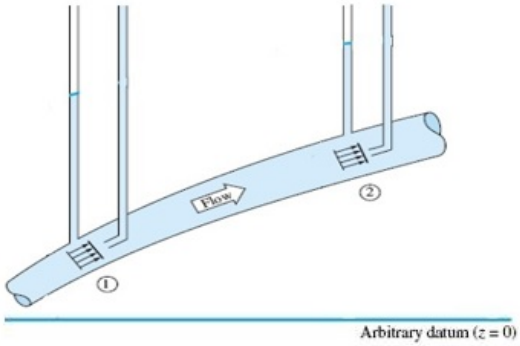
Options :

1. ✖ hydraulic grade line
2. ✔ energy grade line
3. ✖ gravity head only
4. ✖ velocity head only

Question Number : 128 Question Id : 63068075062 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The hydraulic grade line (HGL) and the energy grade line (EGL) for a frictionless flow in the duct shown in the following figure are _____, respectively.



Options :

1. ✔ of gradually increasing height and straight
2. ✖ of gradually decreasing height and straight

3. ✖ of gradually increasing height and gradually increasing height
4. ✖ straight and straight

Question Number : 129 Question Id : 63068075063 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The power available at the outlet of a pipe is (where Q is the discharge through the pipe, V is the velocity of flow, L and D are the length and the diameter of the pipe, respectively, w is the specific weight, f is the friction factor and g is the acceleration due to gravity):

Options :

1. ✔ $w\left(\frac{\pi D^2}{4}\times V\right)\left(H-\frac{fLV^2}{2gD}\right)$
2. ✖ $w\left(\frac{\pi D^2}{2}\times V\right)\left(H-\frac{fLV^2}{2gD}\right)$
3. ✖ $w\left(\frac{\pi D^3}{4L}\times V\right)\left(H-\frac{fLV^2}{2gD}\right)$
4. ✖ $w\left(\frac{\pi D^3}{2L}\times V\right)\left(H-\frac{fLV^2}{2gD}\right)$

Question Number : 130 Question Id : 63068075064 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The water from a reservoir at a high altitude is conveyed by a pipeline. The efficiency of power transmission in this case is given by (where Q is the volume flow rate, R is the hydraulic resistance of the pipeline and H is the potential head of water in the reservoir):

Options :

1. ✔ $\eta_p = 1-\frac{RQ^2}{H}$
2. ✖ $\eta_p = 1-\frac{H}{RQ^2}$
3. ✖ $\eta_p = 1-\frac{RQ^3}{H^2}$
4. ✖ $\eta_p = 1-\frac{H^2}{RQ^3}$

Question Number : 131 Question Id : 63068075065 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The efficiency of power transmission through a pipe, at the condition of maximum power delivered, is (where H is the total head supplied at the entrance to the pipe and hf is the loss of head due to friction):

Options :

1. ✖ 1/2
2. ✖ 1/4
3. ✖ 1/3
4. ✔ 2/3

Question Number : 132 Question Id : 63068075066 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time :

N.A Minimum Instruction Time : 0

Correct Marks : 1

Corresponding to the maximum power transmitted through a pipeline, the efficiency of power transmission is:

Options :

1. ✖ 50.0%
2. ✖ 56.7%
3. ✔ 66.7%
4. ✖ 76.7%

Question Number : 133 Question Id : 63068075067 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The relation between force F and jet velocity V, for a high-velocity jet impinging on a stationary flat vertical plate (neglecting friction), is:

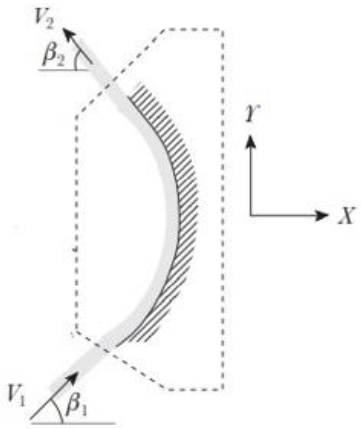
Options :

1. ✖ $F \propto V^{1/2}$
2. ✖ $F \propto V^{3/2}$
3. ✔ $F \propto V^{2}$
4. ✖ $F \propto V^{3}$

Question Number : 134 Question Id : 63068075068 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Which of the following statements is true about force F due to a high-velocity jet impingement on a stationary curved plate (neglecting friction) as shown in the given figure?



Options :

1. ✔ Force in X-direction is dependent on $V_1\cos\beta_1$
2. ✖ Force in X-direction is dependent on $V_2\sin\beta_2$
3. ✖ Force in Y-direction is dependent on $V_1\cos\beta_1$
4. ✖ Force in Y-direction is dependent on $V_2\cos\beta_2$

Question Number : 135 Question Id : 63068075069 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The force, F, generated when a jet strikes at the middle of one of the flat plates mounted on a wheel is (where V is the jet velocity and u is the tangential velocity of the wheel at the middle of the plate, D is the diameter of the wheel at the middle of the plate and A is the area of the plate):

Options :

1. ✔ $F = \rho A V (V-u)$

2. ✖ $F = \rho A V^2$
3. ✖ $F = \rho A V u$
4. ✖ $F = \rho A u^2$

Question Number : 136 Question Id : 63068075070 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A number of flat plates are mounted on a wheel and the jet strikes at the middle of the plate. The efficiency of this wheel is (where V is the jet velocity and u is the tangential velocity of the wheel at the middle of the plate):

Options :

1. ✖ $\frac{u^2}{2V(V-u)}$
2. ✖ $\frac{2V(V-u)}{u^2}$
3. ✖ $\frac{V^2}{2u(V-u)}$
4. ✔ $\frac{2u(V-u)}{V^2}$

Question Number : 137 Question Id : 63068075071 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

A number of flat plates are mounted on a wheel and the jet strikes at the middle of the plate. The efficiency of this wheel is maximum when (where V is the jet velocity and u is the tangential velocity of the wheel at the middle of the plate):

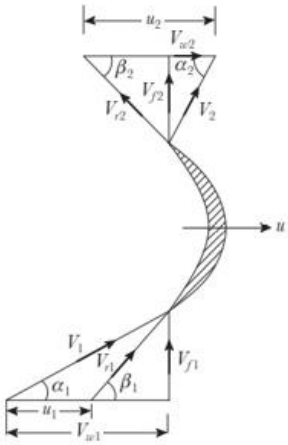
Options :

1. ✖ $u = \frac{V}{\sqrt{2}}$
2. ✔ $u = \frac{V}{2}$
3. ✖ $u = \frac{\sqrt{2}V}{3}$
4. ✖ $u^2 = 2V(V-u)$

Question Number : 138 Question Id : 63068075072 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The jet at a velocity V_1 at an angle α_1 strikes a curved blade moving with a velocity u, as shown in the following figure. The Euler's head is given by:



Options :

1. ✔ $\frac{V_{w1}u_1 - V_{w2}u_2}{g}$

2. ✖ $\frac{V_{w1}u_2 - V_{w2}u_1}{g}$

3. ✖ $\frac{V_{f1}u_1 - V_{f2}u_2}{g}$

4. ✖ $\frac{V_{f1}u_2 - V_{f2}u_1}{g}$

Question Number : 139 Question Id : 63068075073 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Based on the two statements given below, choose the correct answer.

Statement A: Reaction turbines are low-head, high-flow devices.

Statement B: In a reaction turbine, flow enters at the larger-diameter section and discharges through the eye.

Options :

1. ✔ Both statements A and B are correct.
2. ✖ Statement A is correct, but statement B is incorrect.
3. ✖ Statement A is incorrect, but statement B is correct.
4. ✖ Both statements A and B are incorrect.

Question Number : 140 Question Id : 63068075074 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Head coefficient C_H of a turbine is (where H = head, D = impeller diameter, g = acceleration due to gravity, n = shaft speed):

Options :

1. ✔ $\frac{gH}{n^2D^2}$

2. ✖ $\frac{n^2D^2}{gH}$

3. ✖ $\frac{gH^2}{n^3D^3}$

4. ✖ $\frac{n^3D^3}{gH^2}$

Question Number : 141 Question Id : 63068075075 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Power coefficient C_P of a turbine is (where bhp = available power, D = impeller diameter, ρ = fluid density, n = shaft speed):

Options :

1. ✖ $\frac{\rho n^5D^3}{bhp}$

2. ✖ $\frac{bhp}{\rho n^5D^3}$

3. ✖ $\frac{\rho n^3D^5}{bhp}$

4. ✔ $\frac{bhp}{\rho n^3D^5}$

Question Number : 142 Question Id : 63068075076 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The power specific speed N_{sp} for a turbine is (where bhp = available power, H = head, ρ = fluid density, g = acceleration due to gravity, n = shaft speed):

Options :

1. ✔ $\frac{n(bhp)^{1/2}}{\rho^{1/2}(gH)^{5/4}}$

2. ✖ $\frac{\rho^{1/2}(gH)^{5/4}}{n(bhp)^{1/2}}$

3. ✖ $\frac{n(bhp)^{3/2}}{\rho^{3/2}(gH)^{7/4}}$

4. ✖ $\frac{\rho^{3/2}(gH)^{7/4}}{n(bhp)^{3/2}}$

Question Number : 143 Question Id : 63068075077 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The peripheral-velocity factor for an impulse turbine is given by $\phi = \frac{u}{(2gH)^{1/2}}$. The maximum efficiency for an impulse turbine occurs at an approximate value of ϕ equal to _____ (where u = bucket linear velocity, H = head, g = acceleration due to gravity).

Options :

1. ✖ 0.27
2. ✖ 0.37
3. ✔ 0.47
4. ✖ 0.57

Question Number : 144 Question Id : 63068075078 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For a centrifugal pump, the ratio of the power available at the impeller to the power available at the shaft of the pump is known as:

Options :

1. ✖ overall efficiency
2. ✖ volumetric efficiency
3. ✖ hydraulic efficiency
4. ✔ mechanical efficiency

Question Number : 145 Question Id : 63068075079 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For a centrifugal pump, the ratio of the actual flow rate to the theoretical flow rate is known as:

Options :

1. ✖ overall efficiency
2. ✔ volumetric efficiency
3. ✖ hydraulic efficiency
4. ✖ mechanical efficiency

Question Number : 146 Question Id : 63068075080 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For a centrifugal pump, for the blade exit angle less than 90°, the pump head _____.

Options :

1. ✔ decreases with increasing discharge
2. ✖ remains constant with increasing discharge
3. ✖ increases with increasing discharge
4. ✖ first increases and then decreases with increasing discharge

Question Number : 147 Question Id : 63068075081 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The efficiency of a typical centrifugal pump is maximum at:

Options :

1. ✖ zero discharge
2. ✖ 40% of maximum discharge
3. ✔ 60% of maximum discharge
4. ✖ maximum discharge

Question Number : 148 Question Id : 63068075082 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

Capacity coefficient C_Q of a pump is (where Q = discharge, D = impeller diameter, n = shaft speed):

Options :

1. ✖ $\frac{Q}{n^2D^3}$

2. ✖ $\frac{nD^3}{Q}$

3. ✔ $\frac{Q}{nD^3}$

4. ✖ $\frac{n^2D^3}{Q}$

Question Number : 149 Question Id : 63068075083 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

The head required at the centrifugal pump inlet to keep the liquid from cavitating or boiling is known as:

Options :

1. ✖ minimum head
2. ✖ threshold head
3. ✖ ultimate head
4. ✔ net positive-suction head

Question Number : 150 Question Id : 63068075084 Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1

For a fluid flowing through a centrifugal pump having density ρ, discharge Q, circumferential speed u_1, tip speed u_2, and absolute circumferential velocity components of the flow V_{t1} and V_{t2}, the power delivered to the fluid is given by:

Options :

1. ✖ $\rho Q(u_1V_{t1} - u_2V_{t2})$

2. ✔ $\rho Q(u_2V_{t2} - u_1V_{t1})$

3. ✖ $\rho Q(u_1V_{t2} - u_2V_{t1})$

4. ✖ $\rho Q(u_2V_{t1} - u_1V_{t2})$