Question Paper Preview

Question Paper Name:	Civil Engineering 3rd May 2019 S1
Subject Name:	Civil Engineering
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Share Answer Key With Delivery Engine:	Yes
Actual Answer Key:	Yes

Civil Engineering

Display Number Panel:	Yes
Group All Questions:	No

Question Number : 1 Question Id : 250107961 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The system $x+y+z=3$, $x+2y+3z=4$, $x+4y+kz=6$ will not have unique solution, if $k =$ _____.

Options :

1. 0

2. 5

3. 6

4. 7

Question Number : 2 Question Id : 250107962 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $u = x^2 - 2y$, $v = x + y$ then $\dfrac{\partial(u,v)}{\partial(x,y)}$ _____.

Options :

1. $(x+1)^2$

2. $3(x+1)$

3. $2(x+1)$

4. $(x+1)$

Question Number : 3 Question Id : 250107963 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The magnitude of the vector drawn perpendicular to the surface $x^2 + 2y^2 + z^2 = 7$ at $(1, -1, 2)$ is _____.

Options :

1. $\dfrac{2}{3}$

2. $\dfrac{3}{2}$

3. 3

4. 6

Question Number : 4 Question Id : 250107964 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The complimentary function of the differential equation $x^2 \dfrac{d^2 y}{dx^2} - x \dfrac{dy}{dx} + y = 2x \log x$

is _____.

Options :

1. $x\left(C_1 - C_2 \log x\right)$

2. $x\left(C_1+C_2\log x\right)$

3. $e^x\left(C_1+C_2\log x\right)$

4. $e^x\left(C_1-C_2\log x\right)$

Question Number : 5 Question Id : 250107965 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is the one dimensional wave equation?

Options :

1. $\dfrac{\partial^2 f}{\partial x^2}+\dfrac{\partial^2 f}{\partial y^2}=0$

2. $\dfrac{\partial^2 f}{\partial x^2}=A\dfrac{\partial f}{\partial t}$

3. $\dfrac{\partial^2 f}{\partial x^2}=A^2\dfrac{\partial^2 f}{\partial t^2}$

4. $\dfrac{\partial^2 f}{\partial x^2}+\dfrac{\partial^2 f}{\partial y^2}+\dfrac{\partial^2 f}{\partial z^2}=0$

Question Number : 6 Question Id : 250107966 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of $\int_C \dfrac{1}{z(z-2)}dz$, C: $|z-2|=1$, is ___.

Options :

1. 0

2. πi

3. $-\pi i$

4. $2\pi i$

Question Number : 7 Question Id : 250107967 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If E_1 and E_2 are two events with $P(E_1) = \frac{1}{3}$, $P(E_2) = \frac{1}{4}$, $P(E_1 \cup E_2) = \frac{1}{2}$ then

$P\left(\dfrac{E_2}{E_1}\right) = $ _____.

Options :

1. $\dfrac{1}{2}$

2. $\dfrac{1}{12}$

3. $\dfrac{1}{4}$

4. $\dfrac{3}{4}$

Question Number : 8 Question Id : 250107968 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If a random variable has Poisson distribution such that $P(X = 1) = P(X = 2)$ then $P(X = 4) = $ _____.

Options :

1. 2

2. $\dfrac{1}{e}$

3. $\dfrac{2e}{3}$

4. $\dfrac{2}{3e^2}$

In the numerical solution of $y'=x-y$, $y(0)=1$ by Picard's method the first approximation $y_1 =$

Options :

1. $1+x+\dfrac{x^2}{4}$

2. $1-x+\dfrac{x^2}{2}$

3. $1+x+\dfrac{x^2}{2}$

4. $1+x-\dfrac{x^2}{2}$

Newton's iterative formula for finding the reciprocal of a number N is

Options :

1. $x_n \left(1 - N x_n\right)$

2. $x_n \left(2 + N x_n\right)$

3. $x_n \left(2 - N x_n\right)$

4. $x_n \left(2 - \dfrac{x_n}{N}\right)$

Question Number : 11 Question Id : 250107971 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Variation of longitudinal stress along the length of a tapering bar vertically hanging on its own weight is _____.

Options :

1. parabolic

2. cubic

3. linear

4. hyperbolic

Question Number : 12 Question Id : 250107972 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A beam of triangular cross section with base 'b' and height 'h' is subjected to a shear force F. The shear stress at the level of neutral axis is

Options :

$$\frac{8F}{3bh}$$

1.

$$\frac{4F}{3bh}$$

2.

$$\frac{3F}{8bh}$$

3.

$$\frac{3F}{4bh}$$

4.

Question Number : 13 Question Id : 250107973 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the number of members in a frame is more than the requirement, then it is named as_____.

Options :

perfect frame

1.

redundant frame

2.

portal frame

3.

deficient frame

4.

Question Number : 14 Question Id : 250107974 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Minimum grade of concrete required for a reinforced concrete structure in severe exposure conditions is_____.

Options :

1. M 30

2. M 35

3. M 25

4. M 40

Question Number : 15 Question Id : 250107975 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the plate girder, the vertical stiffeners are provided when the ratio of clear depth to the thickness of web exceeds

Options :

1. 55

2. 65

3. 75

4. 85

Question Number : 16 Question Id : 250107976 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A cantilever beam curved in plan subjected to lateral loads will develop at any section

Options :

1. bending moment and shearing force.

2. bending moment and twisting moment.

twisting moment and shearing force.

3.

bending moment, twisting moment and shearing force.

4.

Question Number : 17 Question Id : 250107977 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A thin walled cylindrical pressure vessel having radius of 0.5 m and wall thickness of 25 mm is subjected to an internal pressure of 700 kPa. The hoop stress developed is

Options :

1. 14 MPa

2. 1.4 MPa

3. 0.14 MPa

4. 0.014 MPa

Question Number : 18 Question Id : 250107978 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The axial load carrying capacity of a long column of given material, cross-sectional area, A, and length, L is governed by

Options :

1. strength of its material only

2. its flexural rigidity only

3. its slenderness ratio only

4. both flexural rigidity and slenderness ratio

Question Number : 19 Question Id : 250107979 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A beam fixed at the ends and subjected only to lateral loads is statistically indeterminate and the degree of indeterminacy is

Options :

1. One

2. Two

3. Three

4. Four

Question Number : 20 Question Id : 250107980 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Maximum size of fillet weld for a plate of square edge is

Options :

1. 1.5 mm less than the thickness of the plate

2. one half of the thickness of the plate

3. thickness of the plate itself

4. 1.5 mm more than the thickness of the plate

Question Number : 21 Question Id : 250107981 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The modulus of rupture of concrete gives _____.

Options :

1. direct tensile strength of the concrete

2. direct compressive strength of the concrete

3. tensile strength of the concrete under bending

4. characteristic strength of the concrete

Question Number : 22 Question Id : 250107982 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The ratio of the stiffness of a beam at the near end when the far end is hinged to the stiffness of the beam at the near end when the far end is fixed is

Options :

1. 1/2

2. 3/4

3. 1

4. 4/3

Question Number : 23 Question Id : 250107983 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Ultimate strain of concrete at failure (as per IS 456-2000) is

Options :

1. 0.35

2. 0.00035

3. 0.035

4. 0.0035

If H is the height of building, sway due to lateral loads shall not exceed _____.

Options :

1. $\dfrac{H}{500}$

2. $\dfrac{H}{200}$

3. $\dfrac{H}{300}$

4. $\dfrac{H}{1000}$

In the design of members, if live load and wind load are considered the permissible stresses may be increased by _____.

Options :

1. 10%

2. 33.33%

3. 50%

4. 100%

When ends of compression members are not faced for complete bearing, the splices should be designed to transmit _____ % forces to which they are subjected.

Options :

1. 50

2. 100

3. 25

4. 75

In general, the range for the ratio of depth to span of a plate girder is

Options :

1. $\dfrac{1}{10}$ to $\dfrac{1}{12}$

2. $\dfrac{1}{20}$ to $\dfrac{1}{30}$

3. $\dfrac{1}{5}$ to $\dfrac{1}{10}$

4. $\dfrac{1}{12}$ to $\dfrac{1}{20}$

The maximum shear stress in MPa for the state of stress at a point in a strained material shown in following figure is _____.

150 N/mm²
100 N/mm²
200 N/mm²
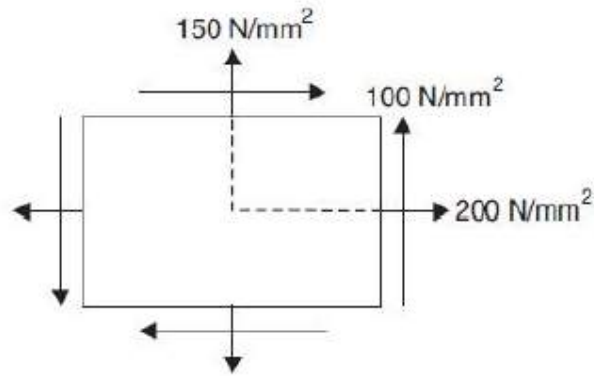
Options :

1. $(10625)^{0.5}$

2. $(9375)^{0.5}$

3. $(10000)^{0.5}$

4. $(625)^{0.5}$

For the beam details presented in the following figure, the vertical reaction at support A is

20 kN
10 kN/m
A
B
1 m
4 m
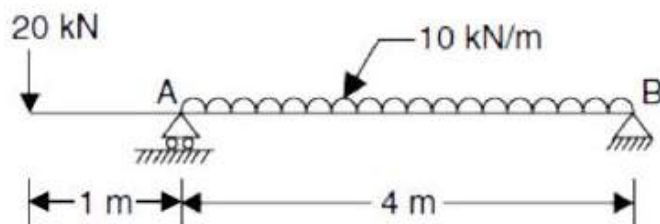
Options :

1. 15 kN

2. 25 kN

3. 60 kN

45 kN
4.

Question Number : 30 Question Id : 250107990 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In Kani's method, an overhang can be conveniently dealt with by considering it as a member with

Options :

1. infinite length

2. zero length

3. infinite area

4. zero area

Question Number : 31 Question Id : 250107991 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If effective depth and the neutral axis depth of a singly reinforced beam are 300 mm and 120 mm respectively, the lever arm of the beam is

Options :

1. 300 mm

2. 260 mm

3. 340 mm

4. 120 mm

Question Number : 32 Question Id : 250107992 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For double angles placed back-to-back and connected to each side of a gusset carrying direct tension, the effective sectional area is equal to gross sectional area of

Options :

1. the section

2. the section plus area of bolt holes

3. the section minus area of bolt holes

4. the section minus one half of area of bolt holes

Question Number : 33 Question Id : 250107993 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The minimum thickness of unstiffened web plates in steel beams should be

Options :

1. 6 mm

2. $\frac{1}{85}$ of clear distance between the flange angles

3. $\frac{1}{100}$ of depth of the beam

4. $\frac{1}{325}$ of span of beam

Question Number : 34 Question Id : 250107994 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A solid shaft is subjected to a torque of 200 N-m. If it is rotating at 150 rpm, the power transmitted by shaft in kW will be

Options :

1. π

2. 2π

3. $\pi/2$

4. 3π

Question Number : 35 Question Id : 250107995 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The horizontal deflection at C for the frame loaded and supported as shown in the following figure is
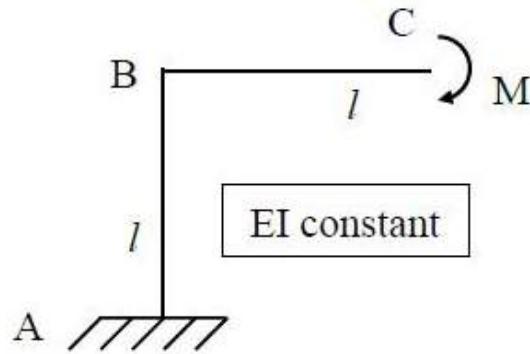
Options :

1. $\dfrac{Ml^2}{4EI}$

2. $\dfrac{Ml^2}{2EI}$

3. $\dfrac{Ml^2}{3EI}$

4. $\dfrac{Ml^2}{EI}$

A temperature rise in a two hinged symmetric and parabolic arched rib causes

Options :

1. a uniform bending moment in the rib

2. no bending moment in the rib

3. a maximum bending moment at the crown of the arch

4. a minimum bending moment at the crown of the arch

The force in the member 'X' of the truss supported and loaded as shown in the following figure is
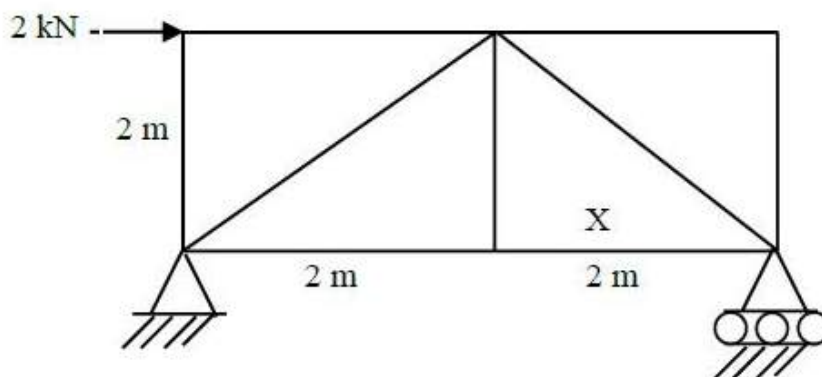
Options :

1. √2 kN , Tension

2. √2 kN , Compression

3. 1 kN, Tension

4. 1 kN, Compression

The ratio of average shear stress to the maximum shear stress in a beam with a square cross-section is

Options :

1. 1

2. $\dfrac{2}{3}$

3. $\dfrac{3}{2}$

4. 2

Plastic modulus for a circular section of diameter 'd' is

Options :

1. $\dfrac{d^3}{3}$

2. $\dfrac{d^3}{6}$

3. $\dfrac{d^3}{2}$

4. $\dfrac{2d^3}{3}$

Usual number of columns to support the ring beam of an elevated cylindrical steel tank is

Options :

1. not less than 4

2. not more than 12

3. neither less than 4 nor more than 12

4. neither less than 3 nor more than 9

Saturated and dry unit weights of soil are 20 kN/m^3 and 15 kN/m^3 respectively. The water content of the soil in the saturated state would be

Options :

1. 25%

2. 33.33%

3. 50%

4. 66.66%

A stratified soil deposit has three layers of thicknesses 4, 1 and 2 m and the corresponding permeability coefficients are 2, 1 and 4 mm/s respectively. The average permeability coefficient perpendicular to the bedding plane is

Options :

1. 4 mm/s

2. 2 mm/s

3. 8 mm/s

4. 16 mm/s

In a triaxial test, the cell pressure and deviator stress at failure for a sand specimen are 50 kPa and 100 kPa respectively. The angle of internal friction of the specimen is

Options :

1. 15°

2. 30°

3. 45°

4. 60°

The constant of proportionality between seepage velocity and hydraulic gradient is

Options :

1. seepage coefficient

2. coefficient of percolation

3. coefficient of transmissibility

4. coefficient of permeability

A clay deposit experiences a total consolidation settlement of 40 mm under single drainage. With double drainage, it experiences a total settlement of

Options :

1. 160 mm

2. 20 mm

3. 40 mm

4. 80 mm

A cylindrical sample of clayey soil fails under an axial vertical stress of 300 kN/m^2 when it is laterally unconfined. The failure plane makes an angle of 45° with the horizontal. The cohesion of the sample is

Options :

1. 75 kN/m^2

2. 150 kN/m^2

3. 300 kN/m^2

4. 212 kN/m^2

**Question Number : 47 Question Id : 2501071007 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical**

A soil described as ML in Indian Standard soil classification system is

Options :

1. well graded soil

2. plastic fines soil

3. peat

4. low plastic silt

**Question Number : 48 Question Id : 2501071008 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical**

The initial and final void ratios of a clay sample in a consolidation test are 1 and 0.5 respectively. If initial thickness of the sample is 2.4 cm, then its final thickness will be

Options :

1. 1.3 cm

2. 1.8 cm

3. 1.9 cm

4. 2.2 cm

**Question Number : 49 Question Id : 2501071009 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical**

Which of the following types of submerged soils is susceptible to liquefaction under earthquake shocks?

Options :

1. Dense sand

2. Soft clay

3. Loose silt

4. Fissured clay

The earth pressure exerted on bridge abutment is

Options :

1. active

2. passive

3. at rest

4. constant always and everywhere

A building is supported on a shallow foundation in sand at 1 m below ground level. The water table is at 5 m below the ground surface. For which one of the following foundations, will the net bearing capacity of the soil be maximum?

Options :

1. 2 m wide strip footing

2. 2 m diameter circular footing

3. 2 m × 2 m square footing

4. 4 m × 1 m rectangular footing

Question Number : 52 Question Id : 2501071012 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When movement of a wall under the earth pressure from the backfill was prevented, the coefficient of earth pressure was recorded as 0.5. The ratio of the coefficient of passive and active earth pressures of the backfill is

Options :

1. $\dfrac{1}{3}$

2. 3

3. $\dfrac{1}{9}$

4. 9

Question Number : 53 Question Id : 2501071013 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A soil has % passing of 75 micron sieve more than 60%, liquid limit of 40% and plasticity index of 20%. Then the soil is classified as

Options :

1. MI

2. CI

3. MH

4. CH

Question Number : 54 Question Id : 2501071014 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A clay sample has unconfined compressive strength of 20 kPa in remoulded state. If the sensitivity of soil is 3, then its undrained cohesion in undisturbed state is

Options :

1. 60 kPa

2. 30 kPa

3. 20 kPa

4. 120 kPa

Question Number : 55 Question Id : 2501071015 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A 3 m high wall with vertical back is retaining a cohesionless soil with an angle of internal friction of 30° and unit weight of 20 kN/m³. The active earth thrust on back of the wall per m run is

Options :

1. 10 kN

2. 20 kN

3. 30 kN

4. 40 kN

Question Number : 56 Question Id : 2501071016 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Secondary consolidation settlement is more than primary consolidation

Options :

1. inorganic clays

2. inorganic silts

3. organic soils

4. both organic and inorganic clays

The units of intrinsic permeability are

Options :

1. cm/s

2. cm^2/s

3. cm^2

4. cm^3/s

The active earth pressure on back of a smooth vertical retaining wall may be reduced by

Options :

1. compacting the backfill

2. using fine sand as fill material

3. saturating the backfill

4. applying surcharge on backfill

The settlement of a 0.3 m × 0.3 m test plate under a load of 200 kN/m^2 in saturated clay is 6 mm. The settlement of a 1.5 m × 1.5 m square footing in the same soil under the same load intensity is

Options :

1. 6 mm

2. 30 mm

3. 12 mm

4. 16.7 mm

The shear test that takes less time for conduction of consolidated drained test is

Options :

1. triaxial test

2. vane shear test

3. direct shear test

4. unconfined compression test

One litre of a certain fluid weighs 8 N. Its specific volume is

Options :

1. 2.03×10^{-2} m³/N

2. 20.3×10^{-2} m³/N

3. 1.23×10^{-2} m³/N

4. 12.3×10^{-2} m³/N

Uniform flow in open channels is characterised by

Options :

1. changing depth of flow

2. constant discharge passing down the channel

3. constant depth of flow

4. constant slope of the channel bottom

In a triangular notch, if there is an error of 5% in observing the head, the error in the computed discharge is

Options :

1. 7.5%

2. 5%

3. 2.0%

4. 12.5%

Which of the following velocity potentials satisfy the continuity equation?

Options :

1. x^2y

2. $x^2 - y^2$

3. $\cos x$

4. $x^2 + y^2$

If a 1 : 9 scale geometrically similar model of an open channel is built-up for a velocity of 3 m/s, the corresponding prototype velocity is

Options :

1. 1 m/s

2. 3 m/s

3. 27 m/s

4. 9 m/s

Question Number : 66 Question Id : 2501071026 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An artesian aquifer has a thickness of 24 m. The coefficient of permeability of the aquifer is 36 m/day. The transmissibility of the aquifer is

Options :

1. $0.001 \text{ m}^2/\text{s}$

2. $0.01 \text{ m}^2/\text{s}$

3. $1.0 \text{ m}^2/\text{s}$

4. $1.5 \text{ m}^2/\text{s}$

Question Number : 67 Question Id : 2501071027 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The maximum velocity in a steady laminar flow in a circular pipe is 2 m/s. The average velocity is

Options :

1. 0.5 m/s

2. 0.87 m/s

3. 1 m/s

4. 1.5 m/s

The best hydraulic trapezoidal section has a uniform flow depth of √3 m. The bed width of the channel is

Options :

1. 1 m

2. 2 m

3. 3 m

4. 4 m

Water turbines arranged in the decreasing order of their specific speeds are

Options :

1. Propeller turbine, Francis turbine, Pelton wheel

2. Pelton wheel, Francis turbine, Kaplan turbine

3. Kaplan turbine, Pelton wheel, Francis turbine

4. Francis turbine, Kaplan turbine, Pelton wheel

A nozzle is so shaped that the average flow velocity changes linearly from 1.5 m/s at the beginning to 15 m/s at its end in a distance of 0.375 m. The magnitude of the convective acceleration in 'm/s^2' at the end of the nozzle is

Options :

1. 540

2. 450

3. 400

4. 500

Question Number : 71 Question Id : 2501071031 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The flow of water (mass density = 1000 kg/m^3 and kinematic viscosity = 10^{-6} m^2/s) in a commercial pipe, having equivalent roughness k_s of 0.12 mm, yields an average shear stress at the pipe boundary of 600 N/m^2. The value of $\frac{k_s}{\delta'}$ (δ' being the thickness of laminar sub-layer) for the pipe is

Options :

1. 0.25

2. 0.50

3. 6.0

4. 8.0

Question Number : 72 Question Id : 2501071032 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A velocity field is given as $\overline{V} = 2y\overline{i} + 3x\overline{j}$ where x and y are in metres. The acceleration of a fluid particle at (x, y) = (1, 1) in x-direction is
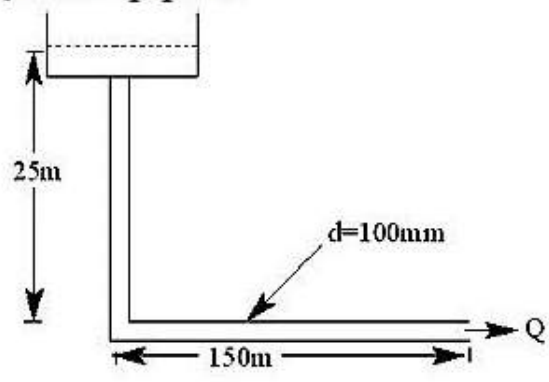
Options :

1. 0 m/s^2

2. 5.00 m/s^2

3. 6.00 m/s^2

4. 8.48 m/s^2

A fire protection system is supplied from a water tower with a bent pipe as shown in the following figure. If the pipe friction, f is 0.03, ignoring all minor losses, the maximum discharge, Q in the pipe is

Options :

1. $31.7 \text{ } l/s$

2. $24.0 \text{ } l/s$

3. $15.9 \text{ } l/s$

4. $12.0 \text{ } l/s$

If the peak of a 3 hour unit hydrograph is 1200 m^3/s, the flood hydrograph peak for a net rainfall of 100 mm and a base flow of 150 cumecs is

Options :

1. $12000 \text{ m}^3/\text{s}$

2. $12100 \text{ m}^3/\text{s}$

3. $12150 \text{ m}^3/\text{s}$

4. $10500 \text{ m}^3/\text{s}$

Question Number : 75 Question Id : 2501071035 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If H is head of water under which turbine is working, then the unit speed of the turbine runner is proportional to

Options :

1. $\sqrt{H}$

2. $\dfrac{1}{\sqrt{H}}$

3. H

4. $\dfrac{1}{H}$

Question Number : 76 Question Id : 2501071036 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The type of centrifugal pump preferred for a specific speed of 20 rpm is

Options :

1. medium speed pump with radial flow at outlet

2. slow speed pump with radial flow at outlet

3. high speed pump with axial flow at outlet

4. high speed pump with radial flow at outlet

Question Number : 77 Question Id : 2501071037 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If D is the diameter of impeller, the power required to drive a centrifugal pump is proportional to

Options :

1. D^4

2. D^3

3. D^2

4. D

Question Number : 78 Question Id : 2501071038 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In an open channel of wide rectangular section with constant Manning's 'n' value, the bed slope is 1.2×10^{-3}, the local friction coefficient at a section is 1.05×10^{-3} and the local Froude number of flow is 0.8. The local rate of variation of depth with longitudinal distance along the flow direction is

Options :

1. 0.4166×10^{-3}

2. -11.5×10^{-3}

3. 6.25×10^{-3}

$$0.75 \times 10^{-3}$$

4.

Question Number : 79 Question Id : 2501071039 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When the canal runs above the drain, the cross drainage work provided is

Options :

1. aqueduct

2. super passage

3. canal siphon

4. level crossing

Question Number : 80 Question Id : 2501071040 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The line joining the points of equal rainfall magnitude is called

Options :

1. Isovel

2. Isohyet

3. Isochrone

4. Isobar

Question Number : 81 Question Id : 2501071041 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the risk of a flood occurring in the next 10 years is expected to be 10%, then the return period for design should be

Options :

$$1 + (0.9)^{0.1}$$
1.

$$1 - (0.9)^{0.1}$$
2.

$$\frac{1}{(1 - 0.9^{0.1})}$$
3.

$$\frac{1}{(1 + 0.9^{0.1})}$$
4.

Question Number : 82 Question Id : 2501071042 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A crop requires a total depth of 10 cm of water for a base period of 100 days. The duty of water is

Options :

8640 ha/cumec.
1.

86400 ha/cumec.
2.

86.4 ha/cumec.
3.

8.64 ha/cumec.
4.

Question Number : 83 Question Id : 2501071043 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The magnitudes of rainfall in five successive days on a catchment area are 3, 5, 9, 6 and 1 cm. The direct runoff from the catchment is 11 cm. The ϕ-index in cm/day for the storm is

Options :

1
1.

2. 3

3. 5

4. 9

Rippl's mass curve is an integral curve of

Options :

1. hyetograph

2. hydrograph

3. flow duration

4. S-curve

In a weir on a pervious foundation, sheet piles are provided on both upstream and downstream of the weir to reduce uplift pressure and to prevent piping. Which of the following statements is true?

Options :

1. Upstream sheet pile is more effective in reducing uplift and piping.

2. Downstream sheet pile is more effective in reducing uplift and piping.

3. Upstream and downstream sheet piles are more effective in reducing uplift and piping respectively.

Upstream and downstream sheet piles are more effective in reducing piping and uplift respectively.

4.

A hydraulic turbine has a discharge of 5 m³/s, when operating under a head of 20 m with a speed of 500 rpm. If it is to operate under a head of 15 m, for the same discharge, the rotational speed in 'rpm' will approximately be

Options :

1. 433

2. 403

3. 627

4. 388

For steady incompressible flow through a closed – conduit of uniform cross-section, the direction of flow will always be

Options :

1. from higher to lower elevation

2. from higher to lower pressure

3. from higher to lower viscosity

4. from higher to lower piezometric head

A 15 cm length of steel rod with relative density of 7.4 is submerged in a two layer fluid. The bottom layer is mercury and the top layer is water. The height of top surface of the rod above the liquid interface in 'cm' is

Options :

1. 8.24

2. 7.82

3. 7.64

4. 7.38

A sprinkler irrigation system is suitable when

Options :

1. the land gradient is steep and the soil is easily erodible

2. the soil is having low permeability

3. the water table is low

4. the crops to be grown have deep roots

A flood wave with a known inflow hydrograph is routed through an uncontrolled reservoir. The outflow hydrograph will have

Options :

1. attenuated peak with reduced time base.

2. attenuated peak with increased time base.

3. increased peak with increased time base.

4. increased peak with reduced time base.

Turbidity for domestic water is undesirable because

Options :

1. it is unaesthetic

2. it causes change of taste

3. it gives apparent colour

4. it prevents light penetration and hence photosynthesis

A minimum amount of Dissolved Oxygen desirable in any water body is not less than

Options :

1. 1 mg/l

2. 2 mg/l

3. 3 mg/l

4. 4 mg/l

Effluent from which of the following units requires no other treatment than disinfection is?

Options :

1. rapid sand filter

2. slow sand filter

3. pressure filter

4. both rapid and slow sand filters

Fresh sludge has moisture content of 99% and after thickening, its moisture content reduced to 96%. The reduction in volume of sludge is

Options :

1. 3%

2. 5%

3. 75%

4. 97.5%

The minimum size of smoke particle is

Options :

1. 0.2×10^{-3} mm

$$0.5 \times 10^{-3} \text{ mm}$$

2.

$$0.8 \times 10^{-3} \text{ mm}$$

3.

$$1 \times 10^{-3} \text{ mm}$$

4.

Question Number : 96 Question Id : 2501071056 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which one of the following is the biological method of disposal of solid waste?

Options :

1. landfills

2. shredding

3. pulverization

4. composting

Question Number : 97 Question Id : 2501071057 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

MPN index is a measure of

Options :

1. Coliform bacteria

2. BOD_5

3. DO

4. Hardness

Particulate matter (fly ash) carried in effluent gases from the furnaces burning fossil fuels are better removed by

Options :

1. cotton bag house filter

2. electrostatic precipitators

3. cyclone

4. wet scrubbers

Two samples of water A and B have pH values of 4.4 and 6.4 respectively. Then how many times sample A is more acidic than sample B?

Options :

1. 0

2. 50

3. 100

4. 200

A completely mixed activated sludge process is used to treat a wastewater flow of 1 million litres per day (1 MLD) having a BOD_5 of 200 mg/l. The biomass concentration in the aeration tank is 2000 mg/l and the concentration of the net biomass leaving the system is 50 mg/l. If the aeration tank has a volume of 200 m^3, hydraulic retention time of the wastewater in aeration tank is

1. 0.2 h

2. 4.8 h

3. 10 h

4. 24 h

Question Number : 101 Question Id : 2501071061 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Two biodegradable components of municipal solid waste are

Options :

1. plastics and wood

2. cardboard and glass

3. leather and tin cans

4. food waste and garden trimmings

Question Number : 102 Question Id : 2501071062 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In an atmosphere under super-adiabatic lapse rate conditions, the emission from a chimney produces a plume described as

Options :

1. coning

2. lofting

looping

3.

fumigation

4.

As per IS 10500-2012, the minimum limiting value for the free residual chlorine (to be applicable only when water is chlorinated and tested at consumer end) when protection against viral infection is required should be

Options :

1. $0.2 \ mg/l$

2. $0.5 \ mg/l$

3. $0.7 \ mg/l$

4. $1.2 \ mg/l$

The principle particle removal mechanisms in granular medium filters (rapid sand filter) used for water treatment will be

Options :

1. straining, sedimentation, interception, inertial impaction and adsorption.

2. straining, biochemical oxidation, interception, and adsorption.

3. straining, sedimentation, interception, oxidation, and adsorption.

straining, sedimentation, interception, inertial impaction, gravel mounding, and charge neutralization.

4.

Question Number : 105 Question Id : 2501071065 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following substances are the intermediate products during an anaerobic digestion?

Options :

1. Methane and Carbon dioxide

2. Lipids, Proteins, Lactates and Ethanol

3. Proteins, Carbohydrates, Methane and Hydrogen

4. Amino acids, Methanol, Methyl amines, Acetates, Carbon dioxide, and Hydrogen

Question Number : 106 Question Id : 2501071066 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

As per general standards for discharge of environmental pollutants Part-A : Effluents, (Schedule VI of Environmental (Protection) Act, 1986), the allowable maximum 3 days Biochemical Oxygen Demand at 27°C of the treated effluent that can be discharged into Inland surface water is

Options :

1. $10 \, mg/l$

2. $30 \, mg/l$

3. $45 \, mg/l$

$60 \ mg/l$

4.

Which of the following air pollutants under mild dose will cause epinasty and leaf abscission in plants?

Options :

1. Sulphur dioxide

2. Ozone

3. Ethylene

4. PAN

If P represents the pressure of sound wave and P_{ref} represents the reference pressure, then sound pressure level, SPL is

Options :

1. $20 \log_{10}\left(\dfrac{P}{P_{ref}}\right)$

2. $\dfrac{1}{20} \log_{10}\left(\dfrac{P}{P_{ref}}\right)$

3. $20 \log_{10}\left(\dfrac{P_{ref}}{P}\right)$

$$\frac{1}{20} \log_{10} \left(\frac{P_{ref}}{P} \right)$$

4.

Question Number : 109 Question Id : 2501071069 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The type of transition curve generally provided on hill roads is

Options :

1. circular

2. cubic parabola

3. lemniscate

4. spiral

Question Number : 110 Question Id : 2501071070 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a breaking test, a vehicle travelling at 36 kmph was stopped at a breaking distance of 8 m. The average value of the vehicle skid resistance is

Options :

1. 0.64

2. 0.48

3. 0.16

4. 0.32

Question Number : 111 Question Id : 2501071071 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

While aligning a hill road with a ruling gradient of 6%, a horizontal curve of 75 m radius is encountered. The compensated gradient at the curve is

Options :

1. 1%

2. 2%

3. 4%

4. 5%

**Question Number : 112 Question Id : 2501071072 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical**

Light reflecting devices used to guide the driver along the proper alignment are called

Options :

1. rumble strips

2. delineators

3. attenuators

4. litter bin

**Question Number : 113 Question Id : 2501071073 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical**

The shape of warning sign boards is

Options :

1. circular

2. triangular

3. rectangular

octagonal
4.

The intermediate sight distance required for the road with design speed of 65 kmph, friction coefficient of 0.36 and reaction time of 2.5 s is

Options :

1. 91.4 m

2. 182.8 m

3. 45.7 m

4. 54.2 m

'Floating Car Method' is adopted in

Options :

1. traffic volume studies

2. parking studies

3. speed and delay studies

4. accident studies

The sensitivity of an instrument having a bubble tube with a division of 2 mm and radius of 0.8 m is

Options :

1. $\dfrac{1}{4}$

2. $\dfrac{1}{90}$

3. $\dfrac{1}{900}$

4. $\dfrac{1}{400}$

Question Number : 117 Question Id : 2501071077 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The method of plane table surveying commonly used for establishing the instrument station is

Options :

1. radiation

2. resection

3. intersection

4. traversing

Question Number : 118 Question Id : 2501071078 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Size of theodolite is specified by the diameter of

Options :

upper plate

1.

lower plate

2.

tripod

3.

size of telescope

4.

Question Number : 119 Question Id : 2501071079 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The magnetic bearing of a line is 32° and the magnetic declination is 10° 15′ W. The true bearing is

Options :

21° 45′ E

1.

42° 15′ E

2.

42° 15′ W

3.

21° 45′ W

4.

Question Number : 120 Question Id : 2501071080 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

As per IRC, the minimum length of transition curve for a mountain terrain road with radius of curve 100 m and design speed of vehicle 100 kmph is

Options :

270 m

1.

200 m

2.

3. 170 m

4. 100 m