

Telangana State Council Higher Education

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 :	Civil Engineering 10th June 2024 Shift 2
Subject Name :	Civil Engineering
Creation Date :	2024-06-11 14:24:51
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Share Answer Key With Delivery Engine :	Yes
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Civil Engineering

Group Number :	1
Group Id :	38382331
Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	120

Mathematics

Section Id :	38382393
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10

Number of Questions to be attempted :	10
Section Marks :	10
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	38382393
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 3838234561 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

$$\text{Let } A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}, P = \begin{bmatrix} -1 & 1 & 1 \\ 0 & -1 & 2 \\ 1 & 1 & 1 \end{bmatrix}. \det(P^{-1}AP - 2I) =$$

Options :

1. ✓ -16
2. ✗ 24
3. ✗ -12
4. ✗ 7

Question Number : 2 Question Id : 3838234562 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

If the linear transformation $X = BY$ transforms X^TAX to Y^TPY , then $P =$

Options :

1. ✗ BAB , if B is an orthogonal matrix
2. ✓ BAB , if B is a symmetric matrix
3. ✗ $B^{-1}AB$, if B is a symmetric matrix
4. ✗ $A^{-1}BA$, if A is a non-singular matrix

Question Number : 3 Question Id : 3838234563 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

If E is the region bounded by a closed curve C in xy plane, then $\iint_E dx dy =$

Options :

1. ✓ $\oint_C \left(-\frac{y}{2}i + \frac{x}{2}j \right) \cdot d\vec{R}$

2. ✗ $\oint_C \left(\frac{x}{2}i - \frac{y}{2}j \right) \cdot d\vec{R}$

3. ✗ $\oint_C (xi + yj) \cdot d\vec{R}$

4. ✗ $\oint_C (-yi + xj) \cdot d\vec{R}$

Question Number : 4 Question Id : 3838234564 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The maximum value of $f(x, y) = x^2 y^3 (1 - x - y)$ is

Options :

1. ✗ $\frac{1}{72}$

2. ✗ $\frac{1}{48}$

3. ✓ $\frac{1}{432}$

4. ✗ $\frac{1}{54}$

Question Number : 5 Question Id : 3838234565 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The substitution which reduces the differential equation $t^2 \frac{d^2 y}{dt^2} + 5t \frac{dy}{dt} + 7y = 0$ to

$$\frac{d^2 y}{dx^2} + 4 \frac{dy}{dx} + 7y = 0 \text{ is}$$

Options :

1. ✘ $x = e^t$
2. ✘ $t = \log y$
3. ✔ $t = e^x$
4. ✘ $x = \log y$

Question Number : 6 Question Id : 3838234566 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If $L(f(t)) = F(s)$, then $L((\cosh 2t)f(t))$ is

Options :

1. ✘ Average of $F(s-2)$ and $F(s+2)$
2. ✔ Sum of $F(s-2)$ and $F(s+2)$
3. ✘ Product of $F(s-2)$ and $F(s+2)$
4. ✘ Geometric mean of $F(s-2)$ and $F(s+2)$

Question Number : 7 Question Id : 3838234567 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The real part of an analytic function $f(z) = u + iv$, where $v(x, y) = \left(\frac{e^{-y} - e^y}{2} \right) \sin x$ is

Options :

1. ✘ $\cos x \sinh y + C$
2. ✔ $\cos x \cosh y + C$

3. ✘ $-\cos x \sinh y + C$

4. ✘ $-\cos x \cosh y + C$

Question Number : 8 Question Id : 3838234568 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If the probability density function of a continuous random variable X is $f(x)$, $-\infty < x < \infty$ and if the median of X is M, then

Options :

1. ✘ $\int_{-M}^M f(x)dx = \frac{1}{2}$

2. ✔ $\int_{-\infty}^M f(x)dx = \int_M^{\infty} f(x)dx = \frac{1}{2}$

3. ✘ $\int_{-\infty}^{-M} f(x)dx = \int_{-M}^{\infty} f(x)dx = \int_{-M}^M f(x)dx$

4. ✘ $\int_{-\infty}^{\infty} f(x)dx = \frac{1}{2}$

Question Number : 9 Question Id : 3838234569 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A card is drawn from a pack of cards successively 5 times by replacing the card drawn in the pack of cards. What is the mean of the number of red cards drawn?

Options :

1. ✘ 3

2. ✔ 2.5

3. ✘ 3.5

4. ✘ 2

Question Number : 10 Question Id : 3838234570 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

When the IVP $\frac{dy}{dx} = y + x$, $y(0) = 1$ is solved by Rung-kutta fourth order method to

find $y(0.2)$, the approximate value of $y(0.2)$ by taking step size $h = 0.2$ is

Options :

1. ✘ 1.3502

2. ✔ 1.2428

3. ✘ 1.3141

4. ✘ 0.9998

Civil Engineering

Section Id :	38382394
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	110
Number of Questions to be attempted :	110
Section Marks :	110
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	38382394
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 3838234571 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

A man weighing W newtons entered a lift which moves with an acceleration of ' a ' m/s^2 .

When lift is moving downward, the force exerted by the man on the floor of the lift is

Options :

1. ✔ $W\left(1 - \frac{a}{g}\right)$

2. ✘ $W\left(1 + \frac{a}{g}\right)$

3. ✘ $W\left(1 - \frac{g}{a}\right)$

4. ✘ $W\left(1 + \frac{g}{a}\right)$

Question Number : 12 Question Id : 3838234572 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The magnitude of the resultant of two equal forces each of magnitude F is $\sqrt{2}F$. Then the angle between their line of action is

Options :

1. ✘ 120°

2. ✘ 60°

3. ✘ 45°

4. ✔ 90°

Question Number : 13 Question Id : 3838234573 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The equation of motion of a particle starting from rest along a straight line is $x = t^3 - 3t^2 + 5$. The ratio of the accelerations after 5 s and 3 s will be

Options :

1. ✔ 2

2. ✘ 3

3. ✘ 4

4. ✘ 5

Question Number : 14 Question Id : 3838234574 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A tennis player returns a ball by hitting it with a racket. If the force exerted by the racket on the ball is increased, then the impulse imparted to the ball

Options :

1. ✘ Decreases
2. ✘ Remains constant
3. ✔ Increases
4. ✘ Becomes zero

Question Number : 15 Question Id : 3838234575 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Radius of gyration is that distance which when squared and multiplied with total mass of the body gives

Options :

1. ✘ centre of mass
2. ✔ mass moment of inertia
3. ✘ slenderness ratio
4. ✘ mean distance of mass

Question Number : 16 Question Id : 3838234576 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In the stress-strain curve of a ductile material, the point at which the material begins to deform plastically is known as

Options :

1. ✘ Elastic Limit
2. ✔ Yield Point

3. ✖ Ultimate Tensile Strength

4. ✖ Modulus of Elasticity

Question Number : 17 Question Id : 3838234577 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

What is the ratio of maximum shear stress to average shear stress for a circular section?

Options :

1. ✔ $\frac{4}{3}$

2. ✖ $\frac{3}{4}$

3. ✖ $\frac{3}{2}$

4. ✖ $\frac{2}{3}$

Question Number : 18 Question Id : 3838234578 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If the shear force diagram of a simply supported beam is parabolic, then the load on the beam is

Options :

1. ✔ linearly varying distributed load

2. ✖ concentrated load at mid span

3. ✖ external moment acting at mid span

4. ✖ uniformly distributed load

Question Number : 19 Question Id : 3838234579 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A steel column has a length of 4 meters and a square cross-section with moment of inertia $1.6 \times 10^{-4} \text{ m}^4$. If the column is pinned at both ends and the modulus of elasticity of steel is 200 GPa, what is the critical buckling load? (take π^2 value as 10)

Options :

1. ✘ 200 kN
2. ✘ 10000 kN
3. ✘ 40000 kN
4. ✔ 20000 kN

Question Number : 20 Question Id : 3838234580 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In the simple bending theory, the stress distribution assumed across the cross-section of a beam is

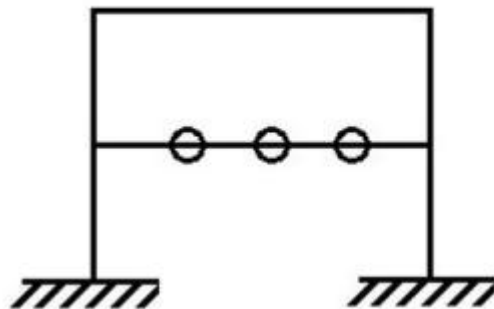
Options :

1. ✘ Uniform
2. ✔ Linear
3. ✘ Parabolic
4. ✘ Exponential

Question Number : 21 Question Id : 3838234581 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Choose the correct options for the structure shown below



Options :

1. ✘ Stable
2. ✘ Statically Unstable
3. ✘ Geometrically Unstable
4. ✔ Internally Unstable

Question Number : 22 Question Id : 3838234582 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In a cable suspension bridge the cable is assumed to be

Options :

1. ✘ Perfectly flexible
2. ✘ Perfectly inflexible
3. ✔ Inextensible
4. ✘ Perfectly flexible and extensible

Question Number : 23 Question Id : 3838234583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If the deflection at the free end of a uniformly loaded cantilever beam is 15mm and the slope of the deflection curve at the free end is 0.02 radian, then the length of the beam is

Options :

1. ✘ 0.8 m
2. ✔ 1.0 m
3. ✘ 1.2 m
4. ✘ 1.5m

Question Number : 24 Question Id : 3838234584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The displacement method is also referred to as

Options :

1. ✘ Minimum strain energy method
2. ✔ Slope-deflection method
3. ✘ Method of consistent deformation
4. ✘ Maxwell-Mohr method

Question Number : 25 Question Id : 3838234585 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Which statement best describes the role of carryover factors in the Moment Distribution Method?

Options :

1. ✘ Carryover factors distribute moments from one end of a member to the other
2. ✘ Carryover factors redistribute moments from fixed ends to free ends
3. ✔ Carryover factors account for the effects of support conditions on adjacent members
4. ✘ Carryover factors adjust support reactions to match applied loads

Question Number : 26 Question Id : 3838234586 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Wrought iron contains carbon up to

Options :

1. ✔ 0.25%
2. ✘ 1.00%
3. ✘ 1.50%
4. ✘ 2.00%

Question Number : 27 Question Id : 3838234587 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Age of a tree may be ascertained by

Options :

1. ✘ Radius of its stem
2. ✘ Circumference of its stem
3. ✘ Number of branches
4. ✔ Number of annual rings

Question Number : 28 Question Id : 3838234588 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Which chemical process is responsible for the long-term strength gain of concrete?

Options :

1. ✔ Hydration
2. ✘ Carbonation
3. ✘ Sulphate attack
4. ✘ Alkali-aggregate reaction

Question Number : 29 Question Id : 3838234589 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Which one of the following relates to determination of critical path in PERT?

Options :

1. ✘ Activity-oriented slack
2. ✔ Event-oriented slack
3. ✘ Event-oriented float

4. ✖ Activity-oriented float

Question Number : 30 Question Id : 3838234590 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

In PERT analysis, the time estimates of activities and probability of their occurrence follow

Options :

1. ✖ Normal distribution
2. ✖ Gamma distribution
3. ✔ Beta distribution
4. ✖ Poisson's distribution

Question Number : 31 Question Id : 3838234591 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

The maximum area of tension reinforcement in beams shall not exceed ____ of the total area

Options :

1. ✖ 0.15%
2. ✖ 1.5%
3. ✔ 4%
4. ✖ 1%

Question Number : 32 Question Id : 3838234592 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

Cantilever retaining walls can safely be used for a height not more than

Options :

1. ✖ 2 m
2. ✖ 4 m

3. ✘ 5 m

4. ✔ 6 m

Question Number : 33 Question Id : 3838234593 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Maximum distance between expansion joints in structures as per IS: 456 – 2000 is

Options :

1. ✘ 20 m

2. ✘ 30 m

3. ✔ 45 m

4. ✘ 60 m

Question Number : 34 Question Id : 3838234594 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The minimum head room over a stair must be

Options :

1. ✔ 210 cm

2. ✘ 205 cm

3. ✘ 200 cm

4. ✘ 220 cm

Question Number : 35 Question Id : 3838234595 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The span to overall depth ratio of a simply supported two-way slab with mild steel reinforcement is

Options :

1. ✘ 40

2. ✖ 25

3. ✔ 35

4. ✖ 20

Question Number : 36 Question Id : 3838234596 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Minimum thickness of web in a plate girder, when the plate is accessible and also exposed to weather is

Options :

1. ✖ 5 mm

2. ✔ 6 mm

3. ✖ 8 mm

4. ✖ 10 mm

Question Number : 37 Question Id : 3838234597 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The use of tie plates in laced columns is

Options :

1. ✖ Prohibited

2. ✖ Not Prohibited

3. ✔ Permitted at start and end of lacing system only

4. ✖ Permitted between two parts of the lacing

Question Number : 38 Question Id : 3838234598 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The least permissible clear dimension of the web of thickness 't' in the panel of a plate girder is restricted to

Options :

1. ✘ 150 t
2. ✘ 160 t
3. ✘ 170 t
4. ✔ 180 t

Question Number : 39 Question Id : 3838234599 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

What is the net sectional area of steel plate 40cm wide and 10mm thick with one bolt, if diameter of bolt hole is 18mm?

Options :

1. ✔ 38.2 cm²
2. ✘ 24.8 cm²
3. ✘ 57.8 cm²
4. ✘ 46.5 cm²

Question Number : 40 Question Id : 3838234600 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

For a steel built up column subjected to an axial force of 1200 kN, the lacing system is to be designed for resisting transverse shear of

Options :

1. ✘ 10 kN
2. ✘ 20 kN
3. ✔ 30 kN
4. ✘ 40 kN

Question Number : 41 Question Id : 3838234601 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In a liquid limit test, the moisture content at 10 blows was 70% and that at 100 blows was 20%. The flow index of soil is

Options :

1. ✘ 20%
2. ✘ 35%
3. ✔ 50%
4. ✘ 70%

Question Number : 42 Question Id : 3838234602 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A soil which was compacted at 10% moisture content has bulk unit weight of 22 kN/m^3 . Then its dry unit weight is

Options :

1. ✘ 22 kN/m^3
2. ✔ 20 kN/m^3
3. ✘ 24.2 kN/m^3
4. ✘ 11 kN/m^3

Question Number : 43 Question Id : 3838234603 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

For determining the moisture content of a soil sample, the following data is available. Weight of container = 260 g, Weight of soil sample and container = 320 g, Weight of soil sample (dried) and container = 310 g. The moisture content of soil sample is

Options :

1. ✘ 15%

2. ✘ 18%

3. ✔ 20%

4. ✘ 25%

Question Number : 44 Question Id : 3838234604 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A pycnometer of volume 500 cm^3 was used in specific gravity test and following data is observed. Weight of dry empty pycnometer = 125 g, weight of dry soil and pycnometer = 500 g, weight of dry soil and distilled water filled in pycnometer up to top = 850 g. Then the specific gravity of soil solids is

Options :

1. ✘ 2.00

2. ✘ 2.25

3. ✔ 2.50

4. ✘ 2.75

Question Number : 45 Question Id : 3838234605 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If the voids of a soil mass contain full of air only, then the soil is termed as

Options :

1. ✔ Dry soil

2. ✘ Partially saturated soil

3. ✘ Air entrained soil

4. ✘ Dehydrated soil

Question Number : 46 Question Id : 3838234606 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

When the degree of saturation is zero, the soil mass under consideration represents

Options :

1. ✘ One phase system with only soil solids
2. ✔ Two phase system with soil solids and air
3. ✘ Two phase system with soil solids and water
4. ✘ Three phase system with soil solids, water and air

Question Number : 47 Question Id : 3838234607 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

The active earth pressure of a soil is proportional to (where ϕ is the angle of internal friction of soil)

Options :

1. ✘ $\tan (45^\circ - \phi)$
2. ✘ $\tan^2 (45^\circ + \phi / 2)$
3. ✔ $\tan^2 (45^\circ - \phi / 2)$
4. ✘ $\tan (45^\circ + \phi)$

Question Number : 48 Question Id : 3838234608 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1

The water content at which soil just begins to crumble when rolled into threads of 3 mm in diameter is known

Options :

1. ✘ Liquid Limit
2. ✔ Plastic Limit

3. ✘ Shrinkage Limit

4. ✘ Permeability Limit

Question Number : 49 Question Id : 3838234609 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The lateral earth pressure on a retaining wall is called as passive earth pressure, when

Options :

1. ✘ Wall is moving vertically downwards

2. ✘ Wall is at rest

3. ✘ Wall moves away from backfill

4. ✔ Wall moves towards backfill

Question Number : 50 Question Id : 3838234610 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Minimum size of the particles of silty soil is

Options :

1. ✔ 0.002 mm

2. ✘ 0.04 mm

3. ✘ 0.06 mm

4. ✘ 0.08 mm

Question Number : 51 Question Id : 3838234611 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

General shear failure is common in which of the following soils?

Options :

1. ✘ loose silt
2. ✘ soft clay
3. ✘ loose sand
4. ✔ dense sand

Question Number : 52 Question Id : 3838234612 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

As per the BIS:1904 (1986), the maximum permissible settlement for raft foundations on sand is

Options :

1. ✘ 25 mm
2. ✘ 40 mm
3. ✔ 40 mm to 65 mm
4. ✘ 65 mm to 100 mm

Question Number : 53 Question Id : 3838234613 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In a plate load test on clay soil, the ratio of ultimate bearing capacity of footing to the ultimate bearing capacity of plate is

Options :

1. ✘ 2
2. ✘ 1.5
3. ✔ 1
4. ✘ 2.5

Question Number : 54 Question Id : 3838234614 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Which factor does not contribute to the instability of slopes?

Options :

1. ✘ Saturation of soil
2. ✔ Presence of vegetation
3. ✘ Rock type
4. ✘ Consistency of soil

Question Number : 55 Question Id : 3838234615 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The bearing capacity of soil supporting a footing of size $3\text{m} \times 3\text{m}$ will not be affected by the presence of water table located at a depth below the base of footing of

Options :

1. ✘ 6 m
2. ✘ 2 m
3. ✔ 3 m
4. ✘ 4.5 m

Question Number : 56 Question Id : 3838234616 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The intensity of active earth pressure at a depth of 10 metres in dry cohesionless sand with an angle of internal friction of 30° and with a weight of 1.8 t/m^3 is

Options :

1. ✘ 4 t/m^2
2. ✘ 5 t/m^2

3. ✓ 6 t/m²

4. ✗ 7 t/m²

Question Number : 57 Question Id : 3838234617 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If the actual value of the standard penetration number, SPT N measured in fine sands below the water table is 19, then the corrected value of SPT N for dilatancy is

Options :

1. ✗ 15

2. ✓ 17

3. ✗ 19

4. ✗ 4

Question Number : 58 Question Id : 3838234618 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

What is the purpose of pile caps in deep foundation systems?

Options :

1. ✗ To provide lateral support to the piles

2. ✓ To distribute the load from the superstructure to the piles

3. ✗ To increase the length of the piles

4. ✗ To resist uplift forces

Question Number : 59 Question Id : 3838234619 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The negative skin friction on a pile develops when

Options :

1. ✓ the soil surrounding the pile settles more than the pile
2. ✗ pile is driven in sand
3. ✗ the ground water table rises
4. ✗ the soil near the pile tip is clay

Question Number : 60 Question Id : 3838234620 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Bishop's simplified method of slices satisfies

Options :

1. ✗ only the moments equilibrium
2. ✗ only the vertical forces equilibrium
3. ✓ all the statics equations, except the horizontal forces equilibrium
4. ✗ only the horizontal forces equilibrium

Question Number : 61 Question Id : 3838234621 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A pitot tube is used to measure

Options :

1. ✗ Pressure
2. ✓ Velocity of flow
3. ✗ Difference in pressure
4. ✗ Density

Question Number : 62 Question Id : 3838234622 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If the atmospheric pressure on the surface of an oil tank (sp. gr. 0.8) is 0.1 kg/cm^2 , the pressure at a depth of 2.5 m, is

Options :

1. ✘ 1 metre of water
2. ✘ 2 metres of water
3. ✔ 3 metres of water
4. ✘ 3.5 metres of water

Question Number : 63 Question Id : 3838234623 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A square lamina (each side equal to 2m) is submerged vertically in water such that the upper edge of the lamina is at a depth of 0.5 m from the free surface. What would be the total water pressure (in kN) on the lamina? (take $\gamma_w = 10 \text{ kN/m}^3$)

Options :

1. ✘ 20 kN
2. ✘ 40 kN
3. ✔ 60 kN
4. ✘ 80 kN

Question Number : 64 Question Id : 3838234624 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

An ideal flow of a liquid obeys

Options :

1. ✔ Continuity equation
2. ✘ Newton's law of viscosity
3. ✘ Newton's second law of motion

4. ✘ Dynamic viscosity law

Question Number : 65 Question Id : 3838234625 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In which of the following cases, the hydraulic jump is not possible?

Options :

1. ✘ Initial speed > critical speed
2. ✔ Initial speed < critical speed
3. ✘ Initial speed = critical speed
4. ✘ Independent

Question Number : 66 Question Id : 3838234626 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

For critical flow conditions in rectangular channels, which of the following is the correct relationship between critical depth (y_c) and specific energy (E)

Options :

1. ✔ $y_c = \frac{2}{3}E$
2. ✘ $y_c = \frac{4}{5}E$
3. ✘ $y_c = \frac{3}{4}E$
4. ✘ $y_c = E$

Question Number : 67 Question Id : 3838234627 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A Pelton wheel develops 5520 kW under a head of 225 m at an overall efficiency of 80% when revolving at a speed of 300 rpm. Then the unit speed is

Options :

1. ✘ 10
2. ✘ 15
3. ✔ 20
4. ✘ 25

Question Number : 68 Question Id : 3838234628 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the following is not a common use of unit hydrographs?

Options :

1. ✘ Extending flood flow records based on rainfall
2. ✘ Flood forecasting and warning systems
3. ✔ Estimation of time of concentration
4. ✘ Design of hydraulic structures

Question Number : 69 Question Id : 3838234629 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A crop requires 1000 mm of water for a base period of 100 days. The duty of water in hectares per cumec is

Options :

1. ✘ 1000
2. ✔ 864
3. ✘ 100
4. ✘ 1728

Question Number : 70 Question Id : 3838234630 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

In a ghat area, the average annual rainfall observed is 500 mm. Then the average annual runoff in millimetres as per the Inglis and DeSouza's formula is

Options :

1. ✓ 120
2. ✗ 195
3. ✗ 500
4. ✗ 145

Question Number : 71 Question Id : 3838234631 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Wind blowing over the water surface in the reservoir developed a wave of height 2m. Then the wave force in kN/m on the upper portion of gravity dam is

Options :

1. ✗ 100
2. ✗ 50
3. ✓ 80
4. ✗ 40

Question Number : 72 Question Id : 3838234632 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If wheat requires about 75 mm of water after every 28 days, and the base period for wheat is 140 days, the value of delta for wheat is

Options :

1. ✗ 2100 mm

2. ✘ 75 mm

3. ✔ 375 mm

4. ✘ 750 mm

Question Number : 73 Question Id : 3838234633 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

From a sieve analysis test on a soil sample, the mean size of particles observed is 1mm. The Lacey's silt factor is

Options :

1. ✔ 1.76

2. ✘ 17.6

3. ✘ 176

4. ✘ 0.176

Question Number : 74 Question Id : 3838234634 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The difference in level between the top of a bank and full supply level (FSL) in a canal, is called

Options :

1. ✘ Berm

2. ✔ Free Board

3. ✘ Height of Bank

4. ✘ Bed Width

Question Number : 75 Question Id : 3838234635 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

When a canal and a drainage approach each other at the same level, the structure so provided is called as

Options :

1. ✘ Aqueduct
2. ✘ Syphon
3. ✔ Level Crossing
4. ✘ Inlet and Outlet

Question Number : 76 Question Id : 3838234636 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Economic height of a dam is the height corresponding to which

Options :

1. ✔ Cost of the dam per unit storage is minimum
2. ✘ Amount of silting is less
3. ✘ Cost of dam per unit storage is maximum
4. ✘ Free board provided is least

Question Number : 77 Question Id : 3838234637 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Turbidity of raw water is a measure of

Options :

1. ✔ Suspended Solids
2. ✘ Acidity of Water
3. ✘ B.O.D
4. ✘ C.O.D

Question Number : 78 Question Id : 3838234638 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The biochemical oxygen demand is computed by

Options :

1. ✘ Dissolved oxygen / Dilution factor
2. ✘ Dissolved oxygen + Dilution factor
3. ✘ Dissolved oxygen – Dilution factor
4. ✔ Dissolved oxygen × Dilution factor

Question Number : 79 Question Id : 3838234639 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The population of a city in 2000 is 50, 000. The average increase in population per decade from the previous records of population is 5000 and average percentage increase per decade is 20%. The population of the city based on geometrical increase method, in the year 2020 will be

Options :

1. ✘ 56,000
2. ✘ 64,000
3. ✔ 72,000
4. ✘ 80,000

Question Number : 80 Question Id : 3838234640 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

To detect the turbidity of the order of 0 to 10 ppm or 10 mg/l, the instrument used is

Options :

1. ✘ Turbidimeter

2. ✘ Jackson Turbidimeter
3. ✘ Hallige Turbidimeter.
4. ✔ Baylis Turbidimeter

Question Number : 81 Question Id : 3838234641 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If 2% solution of a sewage sample is incubated for 5 days at 20°C and depletion of oxygen was found to be 5 ppm, then the B.O.D. of sewage is

Options :

1. ✘ 200 ppm
2. ✘ 225 ppm
3. ✔ 250 ppm
4. ✘ 275 ppm

Question Number : 82 Question Id : 3838234642 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The width of a rectangular sewer is twice its depth, while discharging is 3 m³/s. Then the width of the sewer is (Take velocity $V = 1.5$ m/s)

Options :

1. ✘ 2 m
2. ✘ 0.5 m
3. ✔ 1 m
4. ✘ 1.5 m

Question Number : 83 Question Id : 3838234643 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The periodicity, with which rapid gravity filters need cleaning is of the order of

Options :

1. ✘ 1 – 2 Years
2. ✘ 10 – 15 Days
3. ✘ 1 – 3 Months
4. ✔ 24 – 48 Hours

Question Number : 84 Question Id : 3838234644 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Activated carbon is added to water treatment for removing

Options :

1. ✘ colour
2. ✔ tastes and odours
3. ✘ turbidity
4. ✘ corrosiveness

Question Number : 85 Question Id : 3838234645 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The design technique, adopted in design of large water supply networks, as an aid to simplify and separate the smaller loops is

Options :

1. ✘ Hardy cross method
2. ✘ Circle method
3. ✘ Electrical analyser method
4. ✔ Equivalent pipe method

Question Number : 86 Question Id : 3838234646 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the following is a type of air pollution that can cause respiratory problems?

Options :

1. ✓ Smog
2. ✗ Acid rain
3. ✗ Eutrophication
4. ✗ Ozone depletion

Question Number : 87 Question Id : 3838234647 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The concentration of which air pollutant is commonly measured in parts per billion (ppb)?

Options :

1. ✗ Carbon Monoxide (CO)
2. ✗ Sulphur Dioxide (SO₂)
3. ✓ Nitrogen Dioxide (NO₂)
4. ✗ Lead (Pb)

Question Number : 88 Question Id : 3838234648 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which method is commonly used for disposal of hazardous solid waste?

Options :

1. ✗ Landfilling
2. ✓ Incineration

3. ✘ Composting

4. ✘ Recycling

Question Number : 89 Question Id : 3838234649 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the following statements is true regarding the concept of "Reduce, Reuse, Recycle" in solid waste management?

Options :

1. ✘ It prioritizes landfilling as the primary method of waste disposal
2. ✔ It emphasizes minimizing waste generation and maximizing resource recovery
3. ✘ It encourages burning of waste for energy generation
4. ✘ It focuses solely on composting organic waste

Question Number : 90 Question Id : 3838234650 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

What is the permissible limit of noise pollution in residential areas during daytime, as per the Environmental Protection Agency (EPA) standards?

Options :

1. ✔ 45 dB
2. ✘ 55 dB
3. ✘ 65 dB
4. ✘ 75 dB

Question Number : 91 Question Id : 3838234651 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A constant value of coefficient of lateral friction as recommended by IRC is

Options :

1. ✓ 0.15
2. ✗ 0.40
3. ✗ 0.35
4. ✗ 0.30

Question Number : 92 Question Id : 3838234652 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

What is the primary purpose of providing super-elevation on horizontal curves?

Options :

1. ✗ To improve drainage
2. ✗ To enhance aesthetics
3. ✓ To reduce the effect of centrifugal force on vehicles
4. ✗ To increase the speed limit on curve

Question Number : 93 Question Id : 3838234653 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The design of horizontal and vertical alignments, super elevation and gradient is worst affected by

Options :

1. ✗ Length of vehicle
2. ✗ Width of vehicle
3. ✓ Speed of vehicle
4. ✗ Height of vehicle

Question Number : 94 Question Id : 3838234654 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The camber prescribed by the I.R.C. for cement concrete or high type bituminous roads in percentage is

Options :

1. ✘ 3.0 – 4.0

2. ✔ 1.7 – 2.0

3. ✘ 2.5 – 3.0

4. ✘ 2.0 – 2.5

Question Number : 95 Question Id : 3838234655 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The ratio of passenger car unit of pedal cycle to passenger car unit of car is

Options :

1. ✘ 1.0

2. ✔ 0.5

3. ✘ 4 to 6

4. ✘ 2.8

Question Number : 96 Question Id : 3838234656 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

If the super elevation of the highway provided is zero, then the design speed of highway having a curve of 200 m and coefficient of friction 0.10 is

Options :

1. ✘ 40 kmph

2. ✔ 50 kmph

3. ✘ 55 kmph

4. ✘ 60 kmph

Question Number : 97 Question Id : 3838234657 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

As per the Indian practice the width of road way (in meters) for major district roads on plain and rolling terrain is

Options :

1. ✔ 9

2. ✘ 12

3. ✘ 7.5

4. ✘ 6.25

Question Number : 98 Question Id : 3838234658 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

As per the Indian Railways, the maximum height and maximum width of the rolling stock for Broad Gauge (BG) is _____ mm and _____ mm respectively.

Options :

1. ✘ 3455 mm and 3250 mm

2. ✘ 4830 mm and 3600 mm

3. ✔ 4140 mm and 3250 mm

4. ✘ 3455 mm and 2745 mm

Question Number : 99 Question Id : 3838234659 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

According to I.C.A.O. the slope of transitional surface at right angles to the centre line of runway, is

Options :

1. ✘ 1 in 4
2. ✘ 1 in 5
3. ✘ 1 in 6
4. ✔ 1 in 7

Question Number : 100 Question Id : 3838234660 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The best direction of a runway is along the direction of

Options :

1. ✔ Longest line on wind rose diagram
2. ✘ Shortest line on the wind rose diagram
3. ✘ Line clear of wind rose diagram
4. ✘ Independent of the wind direction

Question Number : 101 Question Id : 3838234661 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the below is not a type of force acting on the cement concrete pavement?

Options :

1. ✘ Environmental changes
2. ✘ Drying shrinkage
3. ✘ Traffic load
4. ✔ Ductile load

Question Number : 102 Question Id : 3838234662 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The top 500 mm of soil sub grade should be compacted at its

Options :

1. ✓ optimum moisture content
2. ✗ maximum dry density
3. ✗ dry density
4. ✗ saturated density

Question Number : 103 Question Id : 3838234663 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

What is the most commonly used overlay?

Options :

1. ✗ Flexible over rigid
2. ✗ Rigid over flexible
3. ✓ Flexible over flexible
4. ✗ Rigid over rigid

Question Number : 104 Question Id : 3838234664 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Which of the below axles are not to be considered in the design of rigid pavements?

Options :

1. ✗ Tandem axle
2. ✗ Single axle
3. ✗ Rear axle
4. ✓ Front axle

Question Number : 105 Question Id : 3838234665 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the following is not an environmental factor to be considered for the design of pavements?

Options :

1. ✓ Formation width
2. ✗ Height of embankment
3. ✗ Depth of cutting
4. ✗ Depth of water table

Question Number : 106 Question Id : 3838234666 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the following is not an application of travel time and delay study?

Options :

1. ✗ Collection of rating data
2. ✗ Problem location identification
3. ✗ Economic analysis
4. ✓ Determining relation between mean speed and flow

Question Number : 107 Question Id : 3838234667 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Fixed delay does not depend on which of the following factor?

Options :

1. ✗ Traffic signals
2. ✓ Traffic volume

3. ✘ Markers

4. ✘ Level crossing

Question Number : 108 Question Id : 3838234668 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

What is the primary factor affecting the capacity of urban roads during peak hours?

Options :

1. ✘ Vehicle type

2. ✔ Traffic signals

3. ✘ Pavement condition

4. ✘ Pedestrian crossings

Question Number : 109 Question Id : 3838234669 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The enoscope is used to determine

Options :

1. ✘ travel time

2. ✘ running speed

3. ✔ spot speed

4. ✘ average speed

Question Number : 110 Question Id : 3838234670 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which traffic sign is represented by a rectangular shape with a red border and a black diagonal line?

Options :

1. ✘ No U-turn
2. ✔ No overtaking
3. ✘ No entry
4. ✘ No parking

Question Number : 111 Question Id : 3838234671 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

When distances are small, which of the following error is negligible in surveying?

Options :

1. ✘ Error due to defective joint
2. ✘ Atmospheric refraction
3. ✘ Wind vibrations
4. ✔ Earth's curvature

Question Number : 112 Question Id : 3838234672 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

A 50 m tape is held 2 m out of line, then its true length is

Options :

1. ✔ 49.96 m
2. ✘ 48.96 m
3. ✘ 49.02 m
4. ✘ 48.02 m

Question Number : 113 Question Id : 3838234673 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

The least count of a self-reading levelling staff is

Options :

1. ✘ 0.5 mm
2. ✘ 0.15 cm
3. ✘ 5.0 cm
4. ✔ 5.0 mm

Question Number : 114 Question Id : 3838234674 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

A level when set up 25 m from peg A and 50 m from peg B reads 2.847 on a staff held on A and 3.462 on a staff held on B, keeping the bubble at its centre while reading. If the reduced levels of A and B are 283.665 m and 284.295 m respectively, the collimation error per 100 m is

Options :

1. ✘ 0.015 m
2. ✘ 0.030 m
3. ✘ 0.045 m
4. ✔ 0.060 m

Question Number : 115 Question Id : 3838234675 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1

Profile levelling is usually done for determining

Options :

1. ✘ Contours of an area
2. ✘ Capacity of a reservoir

3. ✓ Elevations along a straight line

4. ✘ Boundaries of property

Question Number : 116 Question Id : 3838234676 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

Which of the following is not the characteristic of contours?

Options :

1. ✘ The contour lines of different elevations cannot cross each other

The contour lines of different elevations can unite to form one line only in the case of

2. ✘ a vertical cliff

3. ✘ The contour lines close together indicate steep slope

The contour lines cross a valley at right angles but they do not cross a watershed line

4. ✓ at right angle

Question Number : 117 Question Id : 3838234677 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The angle between the direction of star and the direction of earth's axis of rotation is called as

Options :

1. ✓ Co-declination

2. ✘ Co-latitude

3. ✘ Declination

4. ✘ Latitude

Question Number : 118 Question Id : 3838234678 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

If θ and δ be the latitude of an observer and declination of a heavenly body respectively, the upper culmination of the body will be south of zenith, if its zenith distance is

Options :

1. ✘ $\delta - \theta$
2. ✔ $\theta - \delta$
3. ✘ $\theta + \delta$
4. ✘ $(1/2) (\theta - \delta)$

Question Number : 119 Question Id : 3838234679 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The orthogonal projection of the perspective centre on a tilted photograph is called as

Options :

1. ✘ Nadir
2. ✘ Isocentre
3. ✔ Principal Point
4. ✘ Plumb Point

Question Number : 120 Question Id : 3838234680 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1

The point where vertical line passing through the perspective centre intersects the plane of the photograph, is known as

Options :

1. ✔ Photo Plumb Point
2. ✘ Plumb Point
3. ✘ Nadir Point

4. ✖ Isocentre