

TG PGECET 2025

Hall Ticket Number	
Candidate Name	
Test Center Name	
Test Date	16/06/2025
Test Time	2:00 PM - 4:00 PM
Subject	Civil Engineering

Section : Mathematics

Q.1 Let S be an open surface bounded by a closed curve 'C' and $\vec{F}$ is a continuous differentiable vector point function, then $\int_S \text{Curl} \vec{F} \cdot \vec{N} dS =$

Ans

- ✓ 1. $\int_C \vec{F} \cdot d\vec{R}$
- ✗ 2. $\int_C \text{div } \vec{F} dV$
- ✗ 3. $\int_C \vec{F} \cdot \vec{N} d\vec{R}$
- ✗ 4. $\int_S \vec{F} \cdot \vec{N} dS$

Question ID : 3084112524

Chosen Option : 2

Q.2 If $y(x) = x \cos 2x$ is a particular solution of $y'' + ay = -4 \sin 2x$, then $a =$

Ans

- ✗ 1. 1
- ✗ 2. -4
- ✗ 3. 2
- ✓ 4. 4

Question ID : 3084112525

Chosen Option : 3

Q.3 The probability density function of an exponential distribution with mean 2 is

Ans

✗ 1. $f(x) = \begin{cases} 2e^{-2x} & \text{for } x \geq 0 \\ 0 & \text{for } x < 0 \end{cases}$

✗ 2. $f(x) = \begin{cases} \frac{1}{2}e^{-2x} & \text{for } x \geq 0 \\ 0 & \text{for } x < 0 \end{cases}$

✓ 3. $f(x) = \begin{cases} \frac{1}{2}e^{-x/2} & \text{for } x \geq 0 \\ 0 & \text{for } x < 0 \end{cases}$

✗ 4. $f(x) = \begin{cases} 2e^{-x/2} & \text{for } x \geq 0 \\ 0 & \text{for } x < 0 \end{cases}$

Question ID : 3084112528

Chosen Option : 2

Q.4 The coefficient of $(z - \pi)^2$ in the Taylor's series expansion around π of

$$f(z) = \begin{cases} \frac{\sin z}{z - \pi} & \text{if } z \neq \pi \\ -1 & \text{if } z = \pi \end{cases}$$

Ans

✗ 1. 0

✓ 2. $\frac{1}{6}$

✗ 3. $\frac{1}{2}$

✗ 4. 1

Question ID : 3084112527

Chosen Option : 4

Q.5
$$\begin{vmatrix} \frac{bc}{a^2} & \frac{c}{a} & \frac{b}{a} \\ \frac{c}{b} & -\frac{ac}{b^2} & \frac{a}{b} \\ \frac{b}{c} & \frac{a}{c} & -\frac{ab}{c^2} \end{vmatrix} =$$

Ans ☒ 1. 4

☒ 2. $\frac{abc}{a+b+c}$

☒ 3. abc

☒ 4. 0

Question ID : 3084112522

Chosen Option : 3

Q.6 Let S be the set of all values of x for which the product of eigen values of the matrix

$\begin{bmatrix} 3 & 4 \\ x & 1 \end{bmatrix}$ are negative, then among the following which does not belong to the set S is

Ans ☒ 1. $\pi + e$

☒ 2. $\frac{\pi}{e}$

☒ 3. $\frac{e}{\pi}$

☒ 4. $\pi - e$

Question ID : 3084112521

Chosen Option : 4

Q.7 If three real numbers a, b, c are such that $2a + 3b + 6c = 0$, then a root of

$ax^2 + bx + c = 0$ lies

Ans ☒ 1. between 0 and 1

☒ 2. between 2 and 3

☒ 3. between 3 and 6

☒ 4. between 1 and 2

Question ID : 3084112523

Chosen Option : 1

Q.8

A possible solution of $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$ is $y(x, t) =$

Ans

✗ 1. $(Ae^{mx} + Bxe^{mx})(Ce^{mct} + Dte^{-mct}), m > 0$

✗ 2. $(Ae^{px} + Be^{-px})(C \cos pct + D \sin pct), p > 0$

✗ 3. $(Ax^2 + Bx + C)(Dt^2 + Et + F)$

✓ 4. $(A \cos px + B \sin px)(C \cos pct + D \sin pct), p > 0$

Question ID : 3084112526

Chosen Option : 3

Q.9 The iterative formula to find the root of $x^2 - 5 = 0$ using Newton-Raphson method is

Ans

✗ 1. $x_{n+1} = \frac{x_n^2 + 5}{x_n}$

✗ 2. $x_{n+1} = \frac{x_n^2 - 5}{x_n}$

✗ 3. $x_{n+1} = \frac{x_n^2 - 5}{2x_n}$

✓ 4. $x_{n+1} = \frac{x_n^2 + 5}{2x_n}$

Question ID : 3084112530

Chosen Option : 3

Q.10 A continuous random variable 'x' has probability density function

$$f(x) = \begin{cases} \frac{3}{5} e^{-\frac{3}{5}x} & , x > 0 \\ 0 & , x \leq 0 \end{cases}$$

The cumulative probability function F(x) is given by

Ans

✓ 1. $F(x) = \begin{cases} 0 & , x \leq 0 \\ 1 - e^{-\frac{3}{5}x} & , x > 0 \end{cases}$

✗ 2. $F(x) = \begin{cases} 1 & , x \leq 0 \\ 1 - e^{-\frac{3}{5}x} & , x > 0 \end{cases}$

✗ 3. $F(x) = \begin{cases} -\frac{9}{25} e^{-\frac{3}{5}x} & , x > 0 \\ 0 & , x \leq 0 \end{cases}$

✗ 4. $F(x) = \begin{cases} 1 & , x \leq 0 \\ -\frac{9}{25} e^{-\frac{3}{5}x} & , x > 0 \end{cases}$

Question ID : 3084112529

Chosen Option : 3

Section : Civil Engineering

Q.11 An image of the top of the hill is 96 mm from the principal point of the photograph. The elevation of the top of the hill is 500 m and the flying height is 4000 m above the datum. The relief displacement will be

Ans ✗ 1. 768 mm

✓ 2. 12 mm

✗ 3. 8 mm

✗ 4. 88 mm

Question ID : 3084112637

Chosen Option : 2

Q.12 Match List-1 with List-2 and choose the correct option

List-1 (Method of traffic volume counts)		List-2 (Equipment used)	
A	Manual Count	I	Video-recorder
B	Combination of manual and mechanical methods	II	Pneumatic tube
C	Automatic devices	III	Watch
D	Photographic Method	IV	Multiple pen recorder

- Ans
- ✗ 1. A-III, B-IV, C-I, D-II
 - ✗ 2. A-IV, B-III, C-II, D-I
 - ✗ 3. A-IV, B-III, C-I, D-II
 - ✓ 4. A-III, B-IV, C-II, D-I

Question ID : 3084112621

Chosen Option : 4

Q.13 The following are the sewage treatment processes:

- I. Primary sedimentation
- II. Screening
- III. Grit removal
- IV. Secondary sedimentation

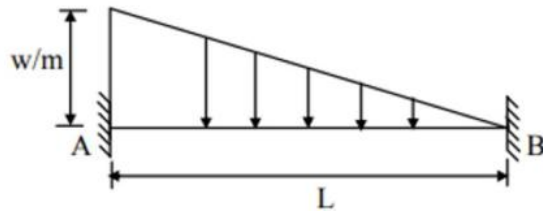
When only preliminary treatment is to be given for sewage, select the required treatment processes including their correct sequence:

- Ans
- ✗ 1. II, III, I only
 - ✓ 2. II, III only
 - ✗ 3. I, II, III, IV
 - ✗ 4. III, I, II, IV

Question ID : 3084112603

Chosen Option : 4

Q.14 A fixed beam is loaded as shown in figure. The fixed end moment at support A is



Ans

- ✓ 1. $\frac{wL^2}{20}$
- ✗ 2. $\frac{wL^2}{8}$
- ✗ 3. $\frac{wL^2}{30}$
- ✗ 4. $\frac{wL^2}{10}$

Question ID : 3084112543

Chosen Option : 1

Q.15 Five days BOD of 10% diluted sample having $D_o = 6.7 \text{ mg/l}$, $D_5 = 2 \text{ mg/l}$ and consumption of oxygen in blank = 0.5 mg/l , will be

- ✗ 1. 62 mg/l
- ✗ 2. 22 mg/l
- ✗ 3. 82 mg/l
- ✓ 4. 42 mg/l

Question ID : 3084112604

Chosen Option : 2

Q.16 It was noted that on a section of road, the free speed was 80 kmph and the jam density was 70 vph. The maximum flow in vph that could be expected on this road is

- ✓ 1. 1400
- ✗ 2. 2800
- ✗ 3. 800
- ✗ 4. 5600

Question ID : 3084112624

Chosen Option : 4

Q.17 In the case of a rectangular beam subjected to a transverse shear force, the ratio of maximum shear stress to average shear stress is

- Ans
- ☒ 1. 1.25
 - ☒ 2. 0.75
 - ☒ 3. 1.50
 - ☒ 4. 1.00

Question ID : 3084112537
Chosen Option : 1

Q.18 Two circular footings of diameters D_1 and D_2 are resting on the surface of a purely cohesive soil. The ratio $\frac{D_1}{D_2} = 2$. If the ultimate load carrying capacity of the footing of diameter D_1 is 200 Kpa, then the ultimate bearing capacity (in Kpa) of the footing of diameter D_2 will be

- Ans
- ☒ 1. 571
 - ☒ 2. 314
 - ☒ 3. 200
 - ☒ 4. 100

Question ID : 3084112576
Chosen Option : 4

Q.19 When two roads with two-lane, two-way traffic, cross at an uncontrolled intersection, the total number of potential major conflict points would be

- Ans
- ☒ 1. 16
 - ☒ 2. 24
 - ☒ 3. 4
 - ☒ 4. 32

Question ID : 3084112623
Chosen Option : 3

Q.20 A surface longitudinally centered on the extended runway centre line and extending outward and upward is called

- Ans
- ☒ 1. Horizontal surface
 - ☒ 2. Approach surface
 - ☒ 3. Conical surface
 - ☒ 4. Primary surface

Question ID : 3084112619
Chosen Option : 2

Q.21 A vehicle was stopped in two seconds by fully Jamming the breaks. The skid marks measured is 9.8 meters. The average skid resistance coefficient will be

- Ans
- ☒ 1. 0.7
 - ☒ 2. 0.5
 - ☒ 3. 0.25
 - ☒ 4. 0.4

Question ID : 3084112611
Chosen Option : 2

Q.22 During a sampling operation, the drive sampler is advanced 600 mm and the length of the sample recovered is 525 mm. What is the recovery ratio of the sample?

- Ans
- ☒ 1. 0.143
 - ☒ 2. 0.140
 - ☒ 3. 0.875
 - ☒ 4. 0.125

Question ID : 3084112579
Chosen Option : 2

Q.23 Radius of relative stiffness of cement concrete pavement doesn't depend upon which one of the following?

- Ans
- ☒ 1. Modulus of elasticity of cement concrete
 - ☒ 2. Poisson's ratio of concrete
 - ☒ 3. Wheel load
 - ☒ 4. Modulus of subgrade reaction

Question ID : 3084112628
Chosen Option : 2

Q.24 A fixed beam of uniform section is carrying a point load at its midspan. If the moment of inertia of the middle half length is now reduced to half its previous value, then the fixed end moments will

- Ans
- ☒ 1. Increase
 - ☒ 2. Change their directions
 - ☒ 3. Remain constant
 - ☒ 4. Decrease

Question ID : 3084112545
Chosen Option : 1

Q.25 What is the principle of stereoscopy in photogrammetry?

- Ans
- ☐ 1. Overlapping images with different scales
 - ☐ 2. Overlapping images with different exposures
 - ☒ 3. Overlapping with parallax
 - ☐ 4. Overlapping images with different angles

Question ID : 3084112638
Chosen Option : 3

Q.26 In the case of a pile foundation, negative skin friction may occur at load which is

- Ans
- ☐ 1. Lower than the designed load
 - ☐ 2. Equal to the designed load
 - ☒ 3. Of any magnitude
 - ☐ 4. Higher than the designed load

Question ID : 3084112577
Chosen Option : 4

Q.27 Consider the following statements regarding uniform flow in a channel:

Statement-I: The depth of flow and wetted area are constant at every section along the channel reach

Statement-II: The velocity of flow and discharge are varying along the channel reach

Statement-III: The total energy line, water surface and the channel bottom are all parallel

Which of the above statement(s) is/are correct?

- Ans
- ☐ 1. I and II only
 - ☐ 2. II and III only
 - ☒ 3. I and III only
 - ☐ 4. III only

Question ID : 3084112592
Chosen Option : 2

Q.28 A stratified soil deposit has three layers of thicknesses: $z_1=4$, $z_2=1$, $z_3=2$ units and the corresponding permeabilities $k_1=2$, $k_2=1$ and $k_3=4$ units, respectively. The average permeability (m/s units) perpendicular to the bedding planes will be

- Ans
- ☐ 1. 16
 - ☒ 2. 2
 - ☐ 3. 4
 - ☐ 4. 8

Question ID : 3084112570
Chosen Option : 3

Q.29 In a clayey soil having 50 kN/m^2 as unit cohesion and 18 kN/m^3 as unit weight, an excavation is made with a vertical face. Taking Taylor's stability number as 0.261, what is the maximum depth of excavation so that the vertical face remains stable?

- Ans
- ☒ 1. 7.06 m
 - ☒ 2. 12.4 m
 - ☒ 3. 5.30 m
 - ☒ 4. 10.6 m

Question ID : 3084112565
Chosen Option : 2

Q.30 For a vertical stiffened web of a plate girder, the lesser clear dimension of the panel should not exceed ('t' is the thickness of the web)

- Ans
- ☒ 1. 85 t
 - ☒ 2. 200 t
 - ☒ 3. 250 t
 - ☒ 4. 180 t

Question ID : 3084112559
Chosen Option : 4

Q.31 If the equality of back sight distance and foresight cannot be maintained, in challenging environments, which one of the following levelling types is most important part of geodetic surveying?

- Ans
- ☒ 1. Reciprocal levelling
 - ☒ 2. Trigonometric levelling
 - ☒ 3. Spirit levelling
 - ☒ 4. Ordinary levelling

Question ID : 3084112633
Chosen Option : 1

Q.32 Which one of the following relates to determination of critical path in PERT?

- Ans
- ☒ 1. Event-oriented float
 - ☒ 2. Activity-oriented float
 - ☒ 3. Activity-oriented Slack
 - ☒ 4. Event-oriented slack

Question ID : 3084112550
Chosen Option : 4

Q.33 If three coplanar forces P, Q, R are acting on a body and is said to be in equilibrium. The angle included between P & Q, Q & R and R & P are 90° , 120° and 150° respectively. Then the forces P, Q, R are in the ratio of

- Ans
- ☒ 1. $2:\sqrt{3}:2$
 - ☒ 2. $2:2\sqrt{3}:\sqrt{3}$
 - ☒ 3. $\sqrt{3}:1:2$
 - ☒ 4. $2:1:\sqrt{3}$

Question ID : 3084112531
Chosen Option : 2

Q.34 Two-point problem and three-point problem are methods of

- Ans
- ☒ 1. Resection and orientation
 - ☒ 2. Traversing
 - ☒ 3. Orientation
 - ☒ 4. Resection

Question ID : 3084112634
Chosen Option : 2

Q.35 Statement-I: The rate of equilibrium superelevation on a road is directly proportional to the square of vehicle velocity
Statement-II: The rate of equilibrium superelevation on a road is inversely proportional to the radius of the horizontal curve
Statement-III: The rate of equilibrium superelevation on a road is directly proportional to the square of the radius of the horizontal curve
Which of the above statements are correct?

- Ans
- ☒ 1. II and III only
 - ☒ 2. I and III only
 - ☒ 3. I, II and III
 - ☒ 4. I and II only

Question ID : 3084112612
Chosen Option : 2

Q.36 The spacing of tile drains to relieve water-logged land is directly proportional to the

- Ans
- ☒ 1. Depth of the drain below the water level
 - ☒ 2. Depth of the impervious strata from the drain
 - ☒ 3. Coefficient of permeability of the soil to be drained
 - ☒ 4. Depth of drain below the ground surface

Question ID : 3084112595
Chosen Option : 3

Q.37 The total momentum of a system of masses (i.e., moving bodies) in any one direction remains constant, unless acted upon by an external force in that direction.

This statement is called

- Ans
- ☒ 1. Principle of conservation of energy
 - ☒ 2. Newton's first law of motion
 - ☒ 3. Newton's second law of motion
 - ☒ 4. Principle of conservation of momentum

Question ID : 3084112535

Chosen Option : 3

Q.38 The stages in the production of the concrete are

- Ans
- ☒ 1. Batching, mixing, transporting, placing, curing, compacting, finishing
 - ☒ 2. Batching, mixing, transporting, compacting, placing, curing, finishing
 - ☒ 3. Batching, mixing, transporting, placing, compacting, curing, finishing
 - ☒ 4. Batching, transporting, mixing, placing, compacting, curing, finishing

Question ID : 3084112547

Chosen Option : 3

Q.39 Consider the following statements:

Statement-I: Wind rose diagram is used for the purpose of Runway orientation

Statement-II: Wind rose diagram is used for the purpose of Estimating the runway capacity

Statement-III: Wind rose diagram is used for the purpose of Geometric design of holding apron

Which of these statement(s) is/are correct?

- Ans
- ☒ 1. I only
 - ☒ 2. I and II only
 - ☒ 3. I and III only
 - ☒ 4. II and III only

Question ID : 3084112618

Chosen Option : 2

Q.40 Grade compensation of curves in Indian Railways for BG is

- Ans
- ☒ 1. 0.04% per degree of curve
 - ☒ 2. 0.06% per degree of curve
 - ☒ 3. 0.02% per degree of curve
 - ☒ 4. 0.40% per degree of curve

Question ID : 3084112617

Chosen Option : 2

Q.41 Dewatering increases the slope stability of a cohesionless soil mainly because

- a. It causes change in pH
- b. It reduces pore water pressure

Choose the correct reason

- Ans
- ☒ 1. a only
 - ☒ 2. b only
 - ☒ 3. Neither a nor b
 - ☒ 4. Both a and b

Question ID : 3084112574

Chosen Option : 4

Q.42 A rigid body of 400 N rests on a 30° inclined plane is about to impend down along the inclined plane without any external force. The coefficient of friction between the body and the inclined plane is 0.575. The drag force is

- Ans
- ☒ 1. 400 N
 - ☒ 2. 100 N
 - ☒ 3. 200 N
 - ☒ 4. 800 N

Question ID : 3084112534

Chosen Option : 3

Q.43 Which one of the following Remote Sensing Systems employ detector?

- Ans
- ☒ 1. Scanning
 - ☒ 2. Monitoring
 - ☒ 3. Framing
 - ☒ 4. Electromagnetic Spectrum

Question ID : 3084112640

Chosen Option : 4

Q.44 If h is the difference in heights between end points of a chain of length L , the required slope correction is

Ans

✓ 1. $\frac{h^2}{2L}$

✗ 2. $\frac{2h}{L}$

✗ 3. $\frac{h^2}{L}$

✗ 4. $\frac{h}{L}$

Question ID : 3084112635
Chosen Option : 2

Q.45 The relationship between void ratio (e), degree of saturation (S), water content (w) and specific gravity of soil solids (G) is

Ans

✗ 1. $e = \frac{wS}{G}$

✗ 2. $e = \frac{G}{Sw}$

✗ 3. $e = \frac{w}{SG}$

✓ 4. $e = \frac{wG}{S}$

Question ID : 3084112562
Chosen Option : 2

Q.46 Which of the following is/are correct with respect to compaction of the soil?

- a. Increase in shear strength and bearing capacity
- b. Increase in slope stability
- c. Decrease in settlement of soil
- d. Decrease in permeability

Ans

✓ 1. a, b, c and d

✗ 2. a and b only

✗ 3. b and c only

✗ 4. a only

Question ID : 3084112571
Chosen Option : 1

Q.47 Which of the following phenomena in a pipe flow is termed as water hammer?

Ans ☒ 1. The rise of negative pressure

☒ 2.

The size of pressure in a pipe due to gradual closure of valve

☒ 3.

The sudden rise of pressure in a pipe due to sudden closure of valve

☒ 4. Zero pressure in a pipe flow

Question ID : 3084112584

Chosen Option : 3

Q.48 To uniquely determine the position of the user using GPS, one needs to receive signals from at least

Ans ☒ 1. 4 satellites

☒ 2. 2 satellites

☒ 3. 3 satellites

☒ 4. 1 satellite

Question ID : 3084112639

Chosen Option : 2

Q.49 Which one of the following traffic signal systems is useful when there is continuous operation of group of vehicles along the main road?

Ans ☒ 1. Simultaneous system

☒ 2. Flexible Progressive System

☒ 3. Simple Progressive System

☒ 4. Alternate System

Question ID : 3084112622

Chosen Option : 4

Q.50 Which one of the following sewage treatment units has a Parshall flume?

Ans ☒ 1. Trickling filter

☒ 2. Oxidation ditch

☒ 3. Aerated lagoon

☒ 4. Grit chamber

Question ID : 3084112602

Chosen Option : 2

Q.51 While driving a large number of piles in loose sand

Ans ☒ 1. Driving of piles can be done in any random order

☒ 2.

It is advantageous to follow a sequence of pile driving such that alternately inner and outer piles are driven

☒ 3.

It is advantageous to follow a sequence of pile driving such that the piles near the periphery are driven first and inner piles are driven later

☒ 4.

It is advantageous to follow a sequence of pile driving such that the inner piles are driven first and then proceed outwards.

Question ID : 3084112578

Chosen Option : 4

Q.52 The percentage of degree of consolidation (U) in one dimensional consolidation theory by Terzaghi is (initial excess pore pressure = u_i ; pore water pressure at any instant of time = u)

Ans

☒ 1. $U = \left(1 + \frac{u}{u_i}\right) \times 100$

☒ 2. $U = \left(\frac{u_i}{u}\right) \times 100$

☒ 3. $U = \left(1 - \frac{u}{u_i}\right) \times 100$

☒ 4. $U = \left(\frac{u}{u_i}\right) \times 100$

Question ID : 3084112572

Chosen Option : 2

Q.53 How much bleaching powder is needed to chlorinate 5000 litres of water whose chlorine demand is 2 mg/l, assuming that the bleaching powder has 25% of available chlorine?

Ans ☒ 1. 4 g

☒ 2. 40 g

☒ 3. 140 g

☒ 4. 400 g

Question ID : 3084112599

Chosen Option : 3

Q.54 In a flownet, which of the following statement is true

Ans ☒ 1.

Flow lines and equipotential lines intersect orthogonally

☒ 2. Flow rate through each flow channel is different

☒ 3. Flow rate through each flow channel is constant

☒ 4.

Flow lines and equipotential lines intersect at oblique angles

Question ID : 3084112583

Chosen Option : 3

Q.55 If a simply supported concrete beam, prestressed with a force of 2500kN is designed by Load balancing concept for an effective span of 10 m and to carry a total load of 40 kN/m, the central dip of the cable profile should be

Ans ☒ 1. 100 mm

☒ 2. 400 mm

☒ 3. 200 mm

☒ 4. 300 mm

Question ID : 3084112555

Chosen Option : 3

Q.56 Match List-1 with List-2 and choose the correct option

List-1 (Floods)		List-2 (Parameters)	
A	Standard Project Flood (SPF)	I	Includes catastrophic floods
B	Maximum Probable Flood (MPF)	II	Includes floods of severe conditions
C	Design Flood	III	Peak flow obtained from observed data
D	Maximum Flood	IV	Flood of desired recurrence interval

Ans ☒ 1. A-I, B-II, C-III, D-IV

☒ 2. A-II, B-I, C-IV, D-III

☒ 3. A-I, B-II, C-IV, D-III

☒ 4. A-II, B-I, C-III, D-IV

Question ID : 3084112591

Chosen Option : 3

Q.57 Benkleman beam deflection method is used for design of

Ans ☒ 1. Flexible overlays on rigid pavements

☒ 2. Rigid overlays on rigid pavements

☒ 3. Rigid overlays on flexible pavements

☒ 4. Flexible overlays on flexible pavements

Question ID : 3084112629

Chosen Option : 4

Q.58 The gross bearing capacity of a footing is 450 Kpa. If the footing is 1.5 m wide and is at a depth of 1 m in a clayey soil which has a unit weight of $20 \frac{\text{kN}}{\text{m}^3}$ then the net bearing capacity is

- Ans ☒ 1. 430 kPa
☒ 2. 410 kPa
☒ 3. 420 kPa
☒ 4. 440 kPa

Question ID : 3084112580
 Chosen Option : 2

Q.59 In a tilted aerial photograph, if the swing is 230° , then the rotation angle is equal to

- Ans ☒ 1. 50°
☒ 2. 25°
☒ 3. 130°
☒ 4. 140°

Question ID : 3084112636
 Chosen Option : 3

Q.60 Which of the following is not a factor in the design of tension members?

- Ans ☒ 1. Type of fabrication
☒ 2. Length of the connection
☒ 3. Connection eccentricity
☒ 4. Gross area of the cross section

Question ID : 3084112556
 Chosen Option : 1

Q.61 Match List-1 with List-2 and choose the correct option

List-1 (Type of Soil)		List-2 (Mode of transportation and deposition)	
A	Lacustrine Soils	I	Transportation by wind
B	Alluvial Soils	II	Transportation by running water
C	Aeolian Soils	III	Deposited at the bottom of lakes
D	Marine Soils	IV	Deposited in sea water

- Ans ☒ 1. A-I, B-III, C-II, D-IV
☒ 2. A-III, B-II, C-I, D-IV
☒ 3. A-I, B-II, C-III, D-IV
☒ 4. A-III, B-II, C-IV, D-I

Question ID : 3084112567
 Chosen Option : 1

Q.62 The total, neutral and effective vertical stresses (in t/m^2) at a depth of 5m below the surface of a fully saturated soil deposit with a saturated density of $2 t/m^3$ would, respectively be

- Ans
- ☐ 1. 5, 5 and 10
 - ☐ 2. 5, 10 and 5
 - ☒ 3. 10, 5 and 5
 - ☐ 4. 10, 5 and 10

Question ID : 3084112569
Chosen Option : 3

Q.63 Consider the following statements for selecting building stones:

Statement-I : Seasoning of stones is essential and is done by soaking in water

Statement-II : Specific gravity of stone is to be more than 2.7

Statement-III : Porosity of stone affects its durability

Statement-IV : Climatic conditions decide the type of stone to be used in construction

Which of the above statements are correct?

- Ans
- ☐ 1. I, II and III only
 - ☐ 2. II, III and IV only
 - ☐ 3. I, II and IV only
 - ☒ 4. I, III and IV only

Question ID : 3084112546
Chosen Option : 1

Q.64 If carbon monoxide is released at the rate of $0.03m^3 / min$ from a gasoline engine and 50 ppm is the threshold limit for an 8 hour exposure, the quantity of air which dilutes the contaminant to a safe level will be

- Ans
- ☐ 1. $60m^3 / min$
 - ☐ 2. $60m^3 / s$
 - ☒ 3. $600m^3 / min$
 - ☐ 4. $600m^3 / s$

Question ID : 3084112607
Chosen Option : 3

Q.65 In a soil specimen, 70% of particles are passing through 4.75mm IS sieve and 4% of particles are passing through 75 μ IS sieve. Its uniformity coefficient is 8 and coefficient of curvature is 2. As per IS classification, this soil is classified as

- Ans
- ☒ 1. SP
 - ☒ 2. SW
 - ☒ 3. GW
 - ☒ 4. GP

Question ID : 3084112568
Chosen Option : 2

Q.66 The centre of buoyancy always

- Ans
- ☒ 1. Remains below the center of gravity
 - ☒ 2. Coincides with the centroid of the volume of fluid displaced
 - ☒ 3. Coincides with the center of gravity
 - ☒ 4. Remains above the center of gravity

Question ID : 3084112538
Chosen Option : 2

Q.67 In a hydraulic jump, the depths on the two sides are 0.4m and 1.4m. The head loss in the jump is nearly

- Ans
- ☒ 1. 0.90 m
 - ☒ 2. 0.45 m
 - ☒ 3. 0.65 m
 - ☒ 4. 0.80 m

Question ID : 3084112585
Chosen Option : 3

Q.68 The following is not the characteristic of a Force

- Ans
- ☒ 1. Line of action
 - ☒ 2. Magnitude
 - ☒ 3. Resultant force
 - ☒ 4. Point of application

Question ID : 3084112533
Chosen Option : 3

Q.69 For a sleeper density of $(n + 5)$, the number of sleepers required for constructing a Broad Gauge (BG) railway track of length 650 m is

- Ans
- ☐ 1. 975
 - ☐ 2. 900
 - ☐ 3. 880
 - ☒ 4. 918

Question ID : 3084112616
Chosen Option : 2

Q.70 How does the bulk modulus of elasticity of a fluid change with increasing pressure?

- Ans
- ☐ 1. It becomes zero
 - ☐ 2. It decreases with increase in pressure
 - ☒ 3. It increases with increase in pressure
 - ☐ 4. It remains constant

Question ID : 3084112582
Chosen Option : 3

Q.71 Which of the following statement (s) is/are true pertaining to draft tube of Francis Turbine?

Statement-I: It permits a suction head to be established at the runner exit.

Statement-II: It makes possible to install the turbine above the tail race level without loss of head.

Statement-III: It converts a large proportion of velocity energy from the runner into useful pressure energy.

- Ans
- ☒ 1. I, II and III
 - ☐ 2. I and II only
 - ☐ 3. III only
 - ☐ 4. II and III only

Question ID : 3084112587
Chosen Option : 2

Q.72 Consider the following statements regarding waste stabilization ponds:

- Statement-I: The pond has a symbiotic process of waste stabilization through algae on one hand and bacteria on the other
- Statement-II: The oxygen in the pond is provided by algae through photosynthesis
- Statement-III: The detention period is of the order of two to three days
- Statement-IV: The bacteria which develop in the pond are aerobic bacteria
- Which of the above statements are correct?

Ans

- ✓ 1. I and II only
- ✗ 2. III and IV only
- ✗ 3. II and III only
- ✗ 4. I and IV only

Question ID : 3084112605
Chosen Option : 1

Q.73 The characteristic compressive strength of M20 concrete is 20 MPa. The number of cubes having 28 days compressive strength greater than 20 MPa out of 100 cubes made from this concrete are

Ans

- ✓ 1. 95
- ✗ 2. 50
- ✗ 3. 20
- ✗ 4. 80

Question ID : 3084112553
Chosen Option : 1

Q.74 As per the latest IRC guidelines for designing flexible pavement of CBR method, the load parameter required is

Ans

- ✗ 1. Number of vehicles (all types) during design life
- ✓ 2. Cumulative standard axles in MSA
- ✗ 3. Number of commercial vehicles per day
- ✗ 4. Equivalent single axle load

Question ID : 3084112627
Chosen Option : 1

Q.75 For a given activity, the optimistic time, pessimistic time and the most probable time estimates are 5, 17 and 8 days respectively. The expected time of the activity is

Ans

- ✗ 1. 8 days
- ✓ 2. 9 days
- ✗ 3. 10 days
- ✗ 4. 15 days

Question ID : 3084112549
Chosen Option : 4

Q.76 The Magnetic bearing of a line AB is $132^{\circ} 45'$, if the magnetic declination is $10^{\circ} 20' W$, the true bearing of the line is

- Ans
- ✓ 1. $122^{\circ} 25'$
 - ✗ 2. $143^{\circ} 5'$
 - ✗ 3. $122^{\circ} 30'$
 - ✗ 4. $121^{\circ} 25'$

Question ID : 3084112631
Chosen Option : 1

Q.77 The surface tension in a soap bubble of 20 mm diameter, when the inside pressure is 2.0 N/m^2 above atmospheric pressure, is

- Ans
- ✗ 1. 0.01 N/m
 - ✗ 2. 0.0125 N/m
 - ✓ 3. $5 \times 10^{-3} \text{ N/m}$
 - ✗ 4. 0.0025 N/m

Question ID : 3084112581
Chosen Option : 3

Q.78 Aerosol is

- Ans
- ✗ 1. Carbon particles of microscopic size
 - ✗ 2. Diffused liquid particles
 - ✗ 3. Finely divided particles of ash
 - ✓ 4.

Dispersion of small solid or liquid particles in gaseous media

Question ID : 3084112606
Chosen Option : 4

Q.79 Consider the following statements

Statement-I: A grillage base is checked for bending

Statement-II: A grillage base is checked for shear

Statement-III: A grillage base is checked for compression

Statement-IV: A grillage base is checked for web crippling

Choose the correct statements?

- Ans
- ✗ 1. I and IV only
 - ✗ 2. I and III only
 - ✗ 3. II, III and IV only
 - ✓ 4. I, II and IV only

Question ID : 3084112558
Chosen Option : 3

Q.80 If the semicircular plane area of radius 2 m is symmetric about y-axis, then the moment of inertia about its centroidal axis parallel to its base diameter is

- Ans
- ☐ 1. 0.44 m^4
 - ☐ 2. 0.88 m^4
 - ☒ 3. 1.76 m^4
 - ☐ 4. 3.52 m^4

Question ID : 3084112532
Chosen Option : 4

Q.81 A temporary bench mark has been established at the soffit of a chajja on a window opening and its known elevation is 102.405 m above mean sea level. The backsight used to establish the height of the instrument is by an inverted staff reading of 1.80 m. A foresight reading with the same staff, held normally, is 1.215 m on a recently constructed plinth. The elevation of the plinth is

- Ans
- ☐ 1. 95.42 m
 - ☒ 2. 99.39 m
 - ☐ 3. 105.99 m
 - ☐ 4. 102.42 m

Question ID : 3084112632
Chosen Option : 3

Q.82 Which one of the following is NOT a property of an admixture?

- Ans
- ☐ 1. Improves durability
 - ☒ 2. Increases permeability
 - ☐ 3. Improves workability
 - ☐ 4. Increases strength

Question ID : 3084112548
Chosen Option : 2

Q.83 Lug angles

- Ans
- ☐ 1. Are always equal angles
 - ☒ 2. Reduce the length of joint
 - ☐ 3. Are necessarily unequal angles
 - ☐ 4. Increase the shear resistance of joint

Question ID : 3084112557
Chosen Option : 3

Q.84 What is the condition for stability of truss with b number of members, r number of external support reactions and with j number of joints?

- Ans
- ☐ 1. $b + r < 2j$
 - ☐ 2. $b + r < j$
 - ☐ 3. $b + r > 2j$
 - ☒ 4. $b + r = 2j$

Question ID : 3084112542
Chosen Option : 2

Q.85 A grit chamber of dimensions $12.0 \text{ m} \times 1.50 \text{ m} \times 0.80 \text{ m}$ liquid depth has a flow of $720 \text{ m}^3 / \text{hr}$. Its surface loading rate and detention time are, respectively

- Ans
- ☐ 1. $40 \text{ m}^3 / \text{hr} / \text{m}^2$ and 12 minutes
 - ☐ 2. $4000 \text{ m}^3 / \text{hr} / \text{m}^2$ and 1.2 minutes
 - ☒ 3. $40000 \text{ Lph} / \text{m}^2$ and 1.2 minutes
 - ☐ 4. $40000 \text{ Lph} / \text{m}^2$ and 40 minutes

Question ID : 3084112601
Chosen Option : 2

Q.86 For carrying out bituminous patch work during the rainy season, the most suitable binder is

- Ans
- ☐ 1. Cutback bitumen
 - ☐ 2. Road Tar
 - ☐ 3. Hot bitumen
 - ☒ 4. Bituminous emulsion

Question ID : 3084112625
Chosen Option : 2

Q.87 The discharge capacity required at the outlet to irrigate 3000 ha of sugarcane having a kor depth of 173 mm and a kor period of 30 days is

- Ans
- ☐ 1. $0.20 \text{ m}^3 / \text{s}$
 - ☐ 2. $1.0 \text{ m}^3 / \text{s}$
 - ☒ 3. $2.0 \text{ m}^3 / \text{s}$
 - ☐ 4. $20 \text{ m}^3 / \text{s}$

Question ID : 3084112593
Chosen Option : 3

Q.88 The torsional resisting capacity of a RC section

Ans ✓ 1.

Increases with the increase in stirrup and longitudinal steels

✗ 2. Decreases with increase in longitudinal bars

✗ 3. Decreases with decrease in stirrup spacing

✗ 4. Does not depend upon stirrup and longitudinal steels

Question ID : 3084112554

Chosen Option : 1

Q.89 Which one of the following pairs is not correctly matched?

Ans ✓ 1. Eddy's theorem : Torsion of shafts

✗ 2. Macaulay's method : Deflection of beam

✗ 3. Euler's method : Theory of column

✗ 4. Lamé's constants : Thick cylinder

Question ID : 3084112539

Chosen Option : 4

Q.90 A heterotroph is an organism that obtains

Ans ✓ 1.

its cell carbon as well as its energy from organic matter

✗ 2. its cell carbon from an inorganic source

✗ 3.

its energy from the oxidation of simple inorganic compounds

✗ 4. its energy from a natural ecosystem

Question ID : 3084112608

Chosen Option : 3

Q.91 The principle involved in collection and sampling of particulate matter in which the particles are drawn through a device by deflecting them from their original paths is called

Ans ✓ 1. Electrostatic precipitation

✗ 2. Filtration

✗ 3. Gravitational settling

✗ 4. Impaction

Question ID : 3084112609

Chosen Option : 2

Q.92 A retaining wall retains a sand strata with $\phi = 30^\circ$ up to its top. If a uniform surcharge of 12 t/m^2 is subsequently put on the sand strata, then the increase in the lateral earth pressure intensity on the retaining wall will be

- Ans
- ☒ 1. 1 t/m^2
 - ☒ 2. 2 t/m^2
 - ☒ 3. 8 t/m^2
 - ☒ 4. 4 t/m^2

Question ID : 3084112573
Chosen Option : 3

Q.93 For a two-way road the minimum length of the overtaking zone is

- Ans
- ☒ 1. 3 times of OSD
 - ☒ 2. OSD
 - ☒ 3. 4 times of OSD
 - ☒ 4. 2 times of OSD

Question ID : 3084112615
Chosen Option : 3

Q.94 Consider the following statements:

- Statement-I: Secondary consolidation results due to prolonged dissipation of excess hydrostatic pressure.
- Statement-II: Primary consolidation happens under expulsion of both air and water from voids in early stages.
- Statement-III: Initial consolidation in the case of fully saturated soils is mainly due to compression of solid particles.
- Statement-IV: Primary consolidation happens more quickly in coarse-grained soils than in fine-grained soils.

Which of the above statements are correct?

- Ans
- ☒ 1. I and II only
 - ☒ 2. II and III only
 - ☒ 3. I and IV only
 - ☒ 4. III and IV only

Question ID : 3084112564
Chosen Option : 2

Q.95 A point of contraflexure is a point where the

- Ans
- ☒ 1. Bending moment is zero
 - ☒ 2. Shear force is zero
 - ☒ 3.

On either side of which the nature of the shear force changes

- ☒ 4. Deflection is maximum

Question ID : 3084112544
Chosen Option : 4

Q.96 Groundwater flows through an aquifer with a cross-sectional area of $1.0 \times 10^4 \text{ m}^2$ and a length of 1500 m. Hydraulic heads are 300 m and 250 m at the groundwater entry and exit points in the aquifer, respectively. Groundwater discharges into a stream at the rate of $750 \text{ m}^3/\text{day}$. Then the hydraulic conductivity of the aquifer is

- Ans
- ☒ 1. 4.25 m/day
 - ☒ 2. 1.50 m/day
 - ☒ 3. 2.25 m/day
 - ☒ 4. 3.50 m/day

Question ID : 3084112594
Chosen Option : 3

Q.97 For a material, the modulus of rigidity is 100 GPa and the modulus of elasticity is 250 GPa. The value of Poisson's ratio is

- Ans
- ☒ 1. 0.30
 - ☒ 2. 0.35
 - ☒ 3. 0.20
 - ☒ 4. 0.25

Question ID : 3084112536
Chosen Option : 3

Q.98 Which one of the following heads is defined as "the head against which a centrifugal pump has to work"?

- Ans
- ☒ 1. Delivery head
 - ☒ 2. Suction head
 - ☒ 3. Manometric head
 - ☒ 4. Static head

Question ID : 3084112586
Chosen Option : 2

Q.99 The Standard Penetration Test (SPT) 'N' value of a soil is used to determine

- a. Consistency of clay
- b. Undrained shear strength of soft sensitive clays
- c. Relative density of sands
- d. Drained shear strength of fine loose sand

Which of these options are correct?

- Ans
- ☒ 1. c and d only
 - ☒ 2. a and c only
 - ☒ 3. a and b only
 - ☒ 4. b and d only

Question ID : 3084112575

Chosen Option : 1

Q.10 A summit curve is formed at the intersection of a 3% up gradient and 5% down gradient.

0 To provide a stopping distance of 128 m, the length of summit curve needed will be

- Ans
- ☒ 1. 298 m
 - ☒ 2. 322 m
 - ☒ 3. 271 m
 - ☒ 4. 340 m

Question ID : 3084112614

Chosen Option : 3

Q.10 Which one of the following terms refers to the time between the end of the excess
1 rainfall and the end of the direct runoff hydrograph?

- Ans
- ☒ 1. Concentration time
 - ☒ 2. Recession time
 - ☒ 3. Time-to-peak
 - ☒ 4. Lag time

Question ID : 3084112588

Chosen Option : 3

Q.10 Design strength for M 25 concrete in direct compression, bending compression and
2 flexural tension are respectively

- Ans
- ☒ 1. 25 MPa, 11.15 MPa and 2.57 MPa
 - ☒ 2. 25 MPa, 11.15 MPa and 3 MPa
 - ☒ 3. 10 MPa, 11.15 MPa and 3.5 MPa
 - ☒ 4. 10 MPa, 12.15 MPa and 3.5 MPa

Question ID : 3084112552

Chosen Option : 2

Q.10 A transition curve is provided on a circular curve on a highway to provide

3

1. Gradual introduction of centrifugal force
2. Minimum stopping sight distance
3. Gradual introduction of super elevation
4. Comfort and security to passengers

The correct answer is

- Ans
- ☐ 1. 1, 2 and 4 only
 - ☐ 2. 1, 2 and 3 only
 - ☐ 3. 2, 3 and 4 only
 - ☒ 4. 1, 3 and 4 only

Question ID : 3084112613

Chosen Option : 4

Q.10 The capacity of a service reservoir in a campus should cater to

4

- Ans
- ☐ 1. Balancing storage only

☒ 2.

Sum total of balancing storage, breakdown storage and fire reserve

- ☐ 3. Sum total of breakdown storage and fire reserve
- ☐ 4. Sum total of balancing storage and fire reserve

Question ID : 3084112596

Chosen Option : 1

Q.10 A direct-runoff hydrograph due to isolated storm was triangular in shape with a base
5 of 80 h and peak of $200\text{m}^3/\text{s}$. If the catchment area is 1440km^2 , the effective rainfall
of the storm is

- Ans
- ☐ 1. 20 cm
 - ☐ 2. 5 cm
 - ☐ 3. 10 cm
 - ☒ 4. 2 cm

Question ID : 3084112590

Chosen Option : 3

Q.10₆ If the load, warping and frictional stresses in a cement concrete slab are 210 N/mm^2 , 290 N/mm^2 and 10 N/mm^2 respectively, the critical combination of stresses during summer mid-day is

- Ans
- ☒ 1. 390 N/mm^2
 - ☒ 2. 290 N/mm^2
 - ☒ 3. 490 N/mm^2
 - ☒ 4. 590 N/mm^2

Question ID : 3084112630
Chosen Option : 1

Q.10₇ An RCC column of 4 m length is rigidly connected to the slab and to the foundation. Its cross-section is $(400 \times 400) \text{ mm}^2$. The column will behave as a/an

- Ans
- ☒ 1. Long column
 - ☒ 2. Intermediate column
 - ☒ 3. Linkage
 - ☒ 4. Short column

Question ID : 3084112551
Chosen Option : 4

Q.10₈ In a fillet weld, the weakest section is the

- Ans
- ☒ 1. Side parallel to force
 - ☒ 2. Side perpendicular to force
 - ☒ 3. Smaller side of the fillet
 - ☒ 4. Throat of the fillet

Question ID : 3084112560
Chosen Option : 3

Q.10₉ A point load applied at Shear center induces

- Ans
- ☒ 1. Zero shear force
 - ☒ 2. Pure twisting
 - ☒ 3. Pure bending
 - ☒ 4. Zero bending

Question ID : 3084112540
Chosen Option : 4

Q.11
0 What is meant by Thixotropy?

Ans ☒ 1.

Property of a material which is manifested by its resistance to flow

☒ 2.

The ratio of the unconfined compression strength in the natural or undisturbed state to that in the re-moulded state

☒ 3.

The phenomenon that the soil gains strength with the passage of time

☒ 4.

The compressive stress at failure, giving due allowance to the reduction in area of cross-section

Question ID : 3084112566

Chosen Option : 2

Q.11
1 For a plane truss member, length is 2 m, modulus of elasticity is 200GPa and area of cross-section is 200mm^2 . The stiffness matrix coefficient K_{11} with reference to its local axis is

Ans ☒ 1. 200 N/m

☒ 2. 2×10^7 N/m

☒ 3. 400 N/m

☒ 4. 4×10^7 N/m

Question ID : 3084112541

Chosen Option : 2

Q.11
2 Match List-1 with List-2 and choose the correct option

List-1 (Test)		List-2 (Purpose)	
A	Impact Test	I	Bitumen adhesion
B	Los Angeles abrasion test	II	Toughness
C	Crushing Test	III	Hardness
D	Stripping Test	IV	Strength

Ans ☒ 1. A-IV, B-I, C-II, D-III

☒ 2. A-II, B-III, C-IV, D-I

☒ 3. A-II, B-I, C-IV, D-III

☒ 4. A-IV, B-III, C-II, D-I

Question ID : 3084112620

Chosen Option : 4

Q.11 The bulk unit weight and water content of a soil are 22 kN/m^3 and 10% respectively.

3 The dry unit weight of the same soil in kN/m^3 is

- Ans
- ☒ 1. 1.8
 - ☒ 2. 2.0
 - ☒ 3. 1.7
 - ☒ 4. 1.9

Question ID : 3084112563
Chosen Option : 2

Q.11 Consider the following statements in respect of effect of air pollutants on vegetation:

- 4
- Statement-I: Necrosis refers to killing of the tissue
 - Statement-II: Chlorosis refers to loss or reduction of green plant pigment
 - Statement-III: Leaf abscission refers to the dropping of leaves
 - Statement-IV: Leaf epinasty refers to a downward curvature of a leaf due to a higher rate of growth on the upper surface

Which of the above statements are correct?

- Ans
- ☒ 1. I, II and IV only
 - ☒ 2. I and III only
 - ☒ 3. I, II, III and IV
 - ☒ 4. II, III and IV only

Question ID : 3084112610
Chosen Option : 1

Q.11 Consider the following statements:

- 5
- Statement-I : When a soil sample is dried beyond its shrinkage limit, the volume of the soil slowly decreases.
 - Statement-II : Plastic limit is always lower than the liquid for any type of soil.
 - Statement-III : At the liquid limit, the soil behaves like a liquid and possesses no shear strength at all.
 - Statement-IV : When subjected to drying, the volume of the soil remains unchanged once the water content of the soil goes below its shrinkage limit.

Which of the above statements are correct?

- Ans
- ☒ 1. I and IV only
 - ☒ 2. I and III only
 - ☒ 3. II and IV only
 - ☒ 4. II and III only

Question ID : 3084112561
Chosen Option : 2

Q.11 If the length dimension of a square filter bed is increased to two times (while the rate of filtration remains unchanged), the amount of water filtered would become

- Ans
- ☒ 1. 2 times
 - ☒ 2. 4 times
 - ☒ 3. 16 times
 - ☒ 4. 1 time

Question ID : 3084112598
Chosen Option : 4

Q.11 Zero hardness of water is achieved by

- Ans
- ☒ 1. Lime-soda process
 - ☒ 2. Excess alum dosage
 - ☒ 3. Excess lime treatment
 - ☒ 4. Ion exchange treatment

Question ID : 3084112600
Chosen Option : 4

Q.11 The Penman's evapotranspiration equation is based on

- Ans
- ☒ 1. Energy balance and mass transfer approach
 - ☒ 2. Water budget method
 - ☒ 3. Mass transfer method
 - ☒ 4. Energy balance method

Question ID : 3084112589
Chosen Option : 3

Q.11 Consider the following statements with reference to pavements:

- 9
- Statement-I: Flexible pavements are more suitable than rigid pavements in regions where subgrade strength is uneven
- Statement-II: Load carrying capacity of rigid pavements depends more on the properties of concrete than the strength of subgrade
- Statement-III: Compared to flexible pavements, rigid pavements are more affected by temperature variations
- Which of the following statement(s) is/are correct?

- Ans
- ☒ 1. II and III only
 - ☒ 2. I and III only
 - ☒ 3. I and II only
 - ☒ 4. III only

Question ID : 3084112626
Chosen Option : 2

Q.12 A certain water needs alum treatment to the extent of 10 PPM. How much alum, in quintals per day, would be needed to treat 10 MLD of water?

- Ans
- ☐ 1. 10
 - ☐ 2. 1000
 - ☐ 3. 100
 - ☒ 4. 1.0

Question ID : 3084112597
Chosen Option : 2