Graduate Aptitude Test in Engineering

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: CE: CIVIL ENGINEERING 8th Feb Shift2
Number of Questions: 65
Total Marks: 100.0

Wrong answer for MCQ will result in negative marks, (-1/3) for 1 mark Questions and (-2/3) for 2 marks Questions.

General Aptitude

Number of Questions: 10
Section Marks: 15.0

Q.1 to Q.5 carry 1 mark each & Q.6 to Q.10 carry 2 marks each.

Question Number : 1 Question Type : MCQ

Choose the most appropriate word from the options given below to complete the following sentence.

The official answered _____ that the complaints of the citizen would be looked into.

(A) respectably (B) respectfully (C) reputably (D) respectively

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 2 Question Type : MCQ

Choose the statement where underlined word is used correctly.

(A) The minister insured the victims that everything would be all right.
(B) He ensured that the company will not have to bear any loss.
(C) The actor got himself ensured against any accident.
(D) The teacher insured students of good results.

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 3 Question Type : MCQ

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Which word is not a synonym for the word *vernacular*?

(A) regional (B) indigenous (C) indigent (D) colloquial

Options :

1. ✖ A
2. ✖ B
3. ✔ C
4. ✖ D

Question Number : 4 Question Type : MCQ

Mr. Vivek walks 6 meters North-east, then turns and walks 6 meters South-east, both at 60 degrees to east. He further moves 2 meters South and 4 meters West. What is the straight distance in metres between the point he started from and the point he finally reached?

(A) $2\sqrt{2}$
(B) 2
(C) $\sqrt{2}$
(D) $1/\sqrt{2}$

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 5 Question Type : MCQ

Four cards are randomly selected from a pack of 52 cards. If the first two cards are kings, what is the probability that the third card is a king?

(A) 4/52 (B) 2/50 (C) (1/52)×(1/52) (D) (1/52)×(1/51) ×(1/50)

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 6 Question Type : MCQ

The word similar in meaning to 'dreary' is

(A) cheerful
(B) dreamy
(C) hard
(D) dismal

Options :

1. ✖ A
2. ✖ B
3. ✖ C

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4. ✔ D

Question Number : 7 Question Type : MCQ

The given question is followed by two statements; select the most appropriate option that solves the question.

Capacity of a solution tank A is 70% of the capacity of tank B. How many gallons of solution are in tank A and tank B?

Statements:

(I) Tank A is 80% full and tank B is 40% full.
(II) Tank A if full contains 14,000 gallons of solution.

(A) Statement I alone is sufficient.
(B) Statement II alone is sufficient.
(C) Either statement I or II alone is sufficient.
(D) Both the statements I and II together are sufficient.

Options :

1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 8 Question Type : NAT

How many four digit numbers can be formed with the 10 digits 0, 1, 2, ..., 9 if no number can start with 0 and if repetitions are not allowed?

Correct Answer :

4536

Question Number : 9 Question Type : MCQ

Read the following table giving sales data of five types of batteries for years 2006 to 2012:

Year	Type I	Type II	Type III	Type IV	Type V
2006	75	144	114	102	108
2007	90	126	102	84	126
2008	96	114	75	105	135
2009	105	90	150	90	75
2010	90	75	135	75	90
2011	105	60	165	45	120
2012	115	85	160	100	145

Out of the following, which type of battery achieved highest growth between the years 2006 and 2012?

(A) Type V
(B) Type III
(C) Type II
(D) Type I

Options :

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1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 10 Question Type : MCQ

There are 16 teachers who can teach Thermodynamics (TD), 11 who can teach Electrical Sciences (ES), and 5 who can teach both TD and Engineering Mechanics (EM). There are a total of 40 teachers. 6 cannot teach any of the three subjects, i.e. EM, ES or TD. 6 can teach only ES. 4 can teach all three subjects, i.e. EM, ES and TD. 4 can teach ES and TD. How many can teach both ES and EM but not TD?

(A) 1 (B) 2 (C) 3 (D) 4

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Civil Engineering

Number of Questions:	55
Section Marks:	85.0

Q.11 to Q.35 carry 1 mark each & Q.36 to Q.65 carry 2 marks each.

Question Number : 11 Question Type : MCQ

While minimizing the function $f(x)$, necessary and sufficient conditions for a point, x_0 to be a minima are:

(A) $f'(x_0) > 0$ and $f''(x_0) = 0$ (B) $f'(x_0) < 0$ and $f''(x_0) = 0$

(C) $f'(x_0) = 0$ and $f''(x_0) < 0$ (D) $f'(x_0) = 0$ and $f''(x_0) > 0$

Options :

1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 12 Question Type : NAT

In Newton-Raphson iterative method, the initial guess value (x_{ini}) is considered as zero while finding the roots of the equation: $f(x) = -2 + 6x - 4x^2 + 0.5x^3$. The correction, Δx, to be added to x_{ini} in the first iteration is _____.

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Correct Answer :
0.3 to 0.4

Question Number : 13 Question Type : MCQ

Given, $i = \sqrt{-1}$, the value of the definite integral, $I = \int_0^{\pi/2} \frac{\cos x + i \sin x}{\cos x - i \sin x} dx$ is:

(A) 1 (B) -1 (C) i (D) $-i$

Options :
1. ✖ A
2. ✖ B
3. ✔ C
4. ✖ D

Question Number : 14 Question Type : MCQ

$\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^{2x}$ is equal to

(A) e^{-2} (B) e (C) 1 (D) e^2

Options :
1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 15 Question Type : MCQ

Let $\mathbf{A} = [a_{ij}]$, $1 \le i, j \le n$ with $n \ge 3$ and $a_{ij} = i.j$. The rank of A is:

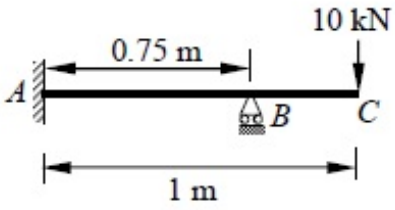
(A) 0 (B) 1 (C) $n-1$ (D) n

Options :
1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 16 Question Type : NAT

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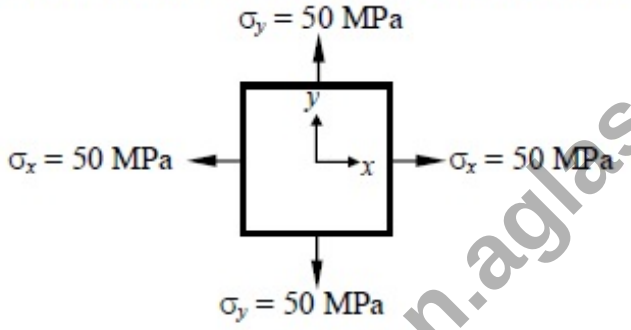
A horizontal beam ABC is loaded as shown in the figure below. The distance of the point of contraflexure from end A (in m) is _____.



Correct Answer :
0.25

Question Number : 17 Question Type : MCQ

For the plane stress situation shown in the figure, the maximum shear stress and the plane on which it acts are:

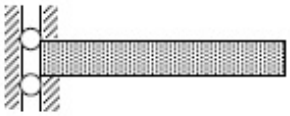


(A) −50 MPa, on a plane 45^0 clockwise *w.r.t.* x-axis
(B) −50 MPa, on a plane 45^0 anti-clockwise *w.r.t.* x-axis
(C) 50 MPa, at all orientations
(D) Zero, at all orientations

Options :
1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 18 Question Type : MCQ

A guided support as shown in the figure below is represented by three springs (horizontal, vertical and rotational) with stiffness k_x, k_y and k_θ respectively. The limiting values of k_x, k_y and k_θ are:



(A) ∞, 0, ∞ (B) ∞, ∞, ∞ (C) 0, ∞, ∞ (D) ∞, ∞, 0

Options :
1. ✔ A
2. ✖ B
3. ✖ C

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4. ✖ D

Question Number : 19 Question Type : MCQ

A column of size 450 mm × 600 mm has unsupported length of 3.0 m and is braced against side sway in both directions. According to IS 456: 2000, the minimum eccentricities (in mm) with respect to major and minor principal axes are:

(A) 20.0 and 20.0 (B) 26.0 and 21.0 (C) 26.0 and 20.0 (D) 21.0 and 15.0

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 20 Question Type : MCQ

Prying forces are:

(A) shearing forces on the bolts because of the joints
(B) tensile forces due to the flexibility of connected parts
(C) bending forces on the bolts because of the joints
(D) forces due the friction between connected parts

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 21 Question Type : MCQ

A steel member '*M*' has reversal of stress due to live loads, whereas another member '*N*' has reversal of stress due to wind load. As per IS 800: 2007, the maximum slenderness ratio permitted is:

(A) less for member '*M*' than that of member '*N*'
(B) more for member '*M*' than for member '*N*'
(C) same for both the members
(D) not specified in the Code

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 22 Question Type : MCQ

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If the water content of a fully saturated soil mass is 100%, the void ratio of the sample is:

(A) less than specific gravity of soil
(B) equal to specific gravity of soil
(C) greater than specific gravity of soil
(D) independent of specific gravity of soil

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 23 Question Type : MCQ

In friction circle method of slope stability analysis, if r defines the radius of the slip circle, the radius of friction circle is:

(A) $r \sin\phi$ (B) r (C) $r \cos\phi$ (D) $r \tan\phi$

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 24 Question Type : MCQ

Net ultimate bearing capacity of a footing embedded in a clay stratum

(A) increases with depth of footing only
(B) increases with size of footing only
(C) increases with depth and size of footing
(D) is independent of depth and size of footing

Options :

1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 25 Question Type : MCQ

Surcharge loading required to be placed on the horizontal backfill of a smooth retaining vertical wall so as to completely eliminate tensile crack is:

(A) $2c$ (B) $2c k_a$ (C) $2c\sqrt{k_a}$ (D) $2c/\sqrt{k_a}$

Options :

1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

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Question Number : 26 Question Type : MCQ

The relationship between the length scale ratio (L_r) and the velocity scale ratio (V_r) in hydraulic models, in which Froude dynamic similarity is maintained, is:

(A) $V_r = L_r$ (B) $L_r = \sqrt{V_r}$ (C) $V_r = L_r^{1.5}$ (D) $V_r = \sqrt{L_r}$

Options :

1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 27 Question Type : NAT

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 _____.

Correct Answer:

540

Question Number : 28 Question Type : MCQ

A hydraulic jump takes place in a frictionless rectangular channel. The pre-jump depth is y_p. The alternate and sequent depths corresponding to y_p are y_a and y_s respectively. The correct relationship among y_p , y_a and y_s is:

(A) $y_a < y_s < y_p$ (B) $y_p < y_s < y_a$
(C) $y_p < y_s = y_a$ (D) $y_p = y_s = y_a$

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 29 Question Type : MCQ

The relationship between porosity (η), specific yield (S_y) and specific retention (S_r) of an unconfined aquifer is:

(A) $S_y + S_r = \eta$ (B) $S_y + \eta = S_r$
(C) $S_r + \eta = S_y$ (D) $S_y + S_r + \eta = 1$

Options :

1. ✔ A
2. ✖ B
3. ✖ C

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4. ✖ D

Question Number : 30 Question Type : NAT

A groundwater sample was found to contain 500 mg/L total dissolved solids (TDS). TDS (in %) present in the sample is _____.

Correct Answer :
0.05

Question Number : 31 Question Type : MCQ

SO_2 and CO adversely affect

(A) oxygen carrying capacity of blood and functioning of lungs respectively
(B) functioning of the respiratory system and brain respectively
(C) functioning of the respiratory system and oxygen carrying capacity of blood respectively
(D) functioning of air passages and chest respectively

Options :
1. ✖ A
2. ✖ B
3. ✔ C
4. ✖ D

Question Number : 32 Question Type : MCQ

A superspeedway in New Delhi has among the highest super-elevation rates of any track on the Indian Grand Prix circuit. The track requires drivers to negotiate turns with a radius of 335 m and 33° banking. Given this information, the coefficient of side friction required in order to allow a vehicle to travel at 320 km/h along the curve is:

(A) 1.761 (B) 0.176 (C) 0.253 (D) 2.530

Options :
1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 33 Question Type : MCQ

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The following statements are made related to the lengths of turning lanes at signalised intersections:

(i) 1.5 times the average number of vehicles (by vehicle type) that would store in turning lane per cycle during the peak hour
(ii) 2 times the average number of vehicles (by vehicle type) that would store in turning lane per cycle during the peak hour
(iii) Average number of vehicles (by vehicle type) that would store in the adjacent through lane per cycle during the peak hour
(iv) Average number of vehicles (by vehicle type) that would store in all lanes per cycle during the peak hour

As per the IRC recommendations, the correct choice for design length of storage lanes is:

(A) Maximum of (ii and iii)
(B) Maximum of (i and iii)
(C) Average of (i and iii)
(D) Only (iv)

Options :

1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 34 Question Type : NAT

In a leveling work, sum of the Back Sight (B.S.) and Fore Sight (F.S.) have been found to be 3.085 m and 5.645 m respectively. If the Reduced Level (R.L.) of the starting station is 100.000 m, the R.L. (in m) of the last station is _____.

Correct Answer :

97.44

Question Number : 35 Question Type : MCQ

The combined correction due to curvature and refraction (in m) for a distance of 1 km on the surface of Earth is:

(A) 0.0673
(B) 0.673
(C) 7.63
(D) 0.763

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 36 Question Type : NAT

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The probability density function of a random variable, x is

$$f(x) = \frac{x}{4}\left(4 - x^2\right) \quad \text{for} \quad 0 \le x \le 2$$

$$= 0 \quad \text{otherwise}$$

The mean, μ_x of the random variable is _____.

Correct Answer :

1.06 to 1.07

Question Number : 37 Question Type : NAT

Consider the following second order linear differential equation

$$\frac{d^2y}{dx^2} = -12x^2 + 24x - 20$$

The boundary conditions are: at $x = 0$, $y = 5$ and at $x = 2$, $y = 21$

The value of y at $x = 1$ is _____.

Correct Answer :

18

Question Number : 38 Question Type : MCQ

The two Eigen values of the matrix $\begin{bmatrix} 2 & 1 \\ 1 & p \end{bmatrix}$ have a ratio of 3:1 for $p = 2$. What is another value of p for which the Eigen values have the same ratio of 3:1?

(A) -2 (B) 1 (C) 7/3 (D) 14/3

Options :

1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 39 Question Type : NAT

For step-size, $\Delta x = 0.4$, the value of following integral using Simpson's 1/3 rule is _____.

$$\int_0^{0.8} \left(0.2 + 25x - 200x^2 + 675x^3 - 900x^4 + 400x^5\right) dx$$

Correct Answer :

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1.36 to 1.37

Question Number : 40 Question Type : MCQ

In a system, two connected rigid bars AC and BC are of identical length, L with pin supports at A and B. The bars are interconnected at C by a frictionless hinge. The rotation of the hinge is restrained by a rotational spring of stiffness, k. The system initially assumes a straight line configuration, ACB. Assuming both the bars as weightless, the rotation at supports, A and B, due to a transverse load, P applied at C is:

(A) $\frac{PL}{4k}$ (B) $\frac{PL}{2k}$ (C) $\frac{P}{4k}$ (D) $\frac{Pk}{4L}$

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 41 Question Type : NAT

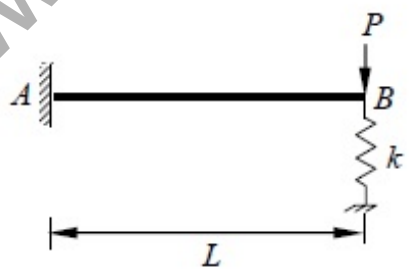
A simply supported reinforced concrete beam of length 10 m sags while undergoing shrinkage. Assuming a uniform curvature of 0.004 m^{-1} along the span, the maximum deflection (in m) of the beam at mid-span is _____.

Correct Answer :

0.05

Question Number : 42 Question Type : NAT

A steel strip of length, $L = 200$ mm is fixed at end A and rests at B on a vertical spring of stiffness, $k = 2$ N/mm. The steel strip is 5 mm wide and 10 mm thick. A vertical load, $P = 50$ N is applied at B, as shown in the figure. Considering $E = 200$ GPa, the force (in N) developed in the spring is _____.



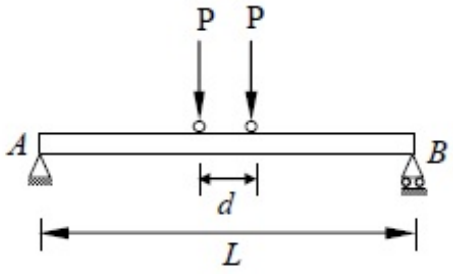
Correct Answer :

3.0 to 3.3

Question Number : 43 Question Type : NAT

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A simply supported beam AB of span, L = 24 m is subjected to two wheel loads acting at a distance, d = 5 m apart as shown in the figure below. Each wheel transmits a load, P = 3 kN and may occupy any position along the beam. If the beam is an I-section having section modulus, S = 16.2 cm^3, the maximum bending stress (in GPa) due to the wheel loads is _____.



Correct Answer :
1.78 to 1.79

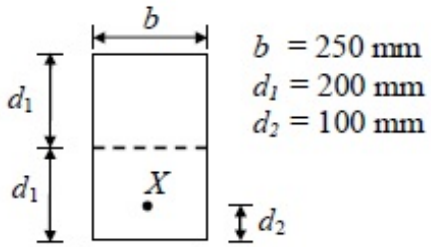
Question Number : 44 Question Type : NAT

According to the concept of Limit State Design as per IS 456: 2000, the probability of failure of a structure is _____.

Correct Answer:
0.09 to 0.10

Question Number : 45 Question Type : MCQ

In a pre-stressed concrete beam section shown in the figure, the net loss is 10% and the final pre-stressing force applied at X is 750 kN. The initial fiber stresses (in N/mm^2) at the top and bottom of the beam were:



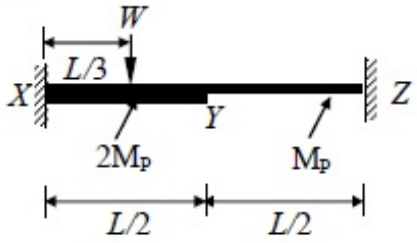
(A) 4.166 and 20.833
(B) −4.166 and −20.833
(C) 4.166 and −20.833
(D) −4.166 and 20.833

Options :
1. ✖ A
2. ✖ B
3. ✖ C
4. ✔ D

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Question Number : 46 Question Type : MCQ

A fixed end beam is subjected to a load, W at 1/3rd span from the left support as shown in the figure. The collapse load of the beam is:



(A) 16.5 M_p/L (B) 15.5 M_p/L (C) 15.0 M_p/L (D) 16.0 M_p/L

Options :

1. ✖ A
2. ✖ B
3. ✔ C
4. ✖ D

Question Number : 47 Question Type : NAT

A 588 cm^3 volume of moist sand weighs 1010 gm. Its dry weight is 918 gm and specific gravity of solids, G is 2.67. Assuming density of water as 1 gm/cm^3, the void ratio is _____.

Correct Answer:

0.70 to 0.72

Question Number : 48 Question Type : NAT

A 4 m thick layer of normally consolidated clay has an average void ratio of 1.30. Its compression index is 0.6 and coefficient of consolidation is 1 m^2/yr. If the increase in vertical pressure due to foundation load on the clay layer is equal to the existing effective overburden pressure, the change in the thickness of the clay layer is _____ mm

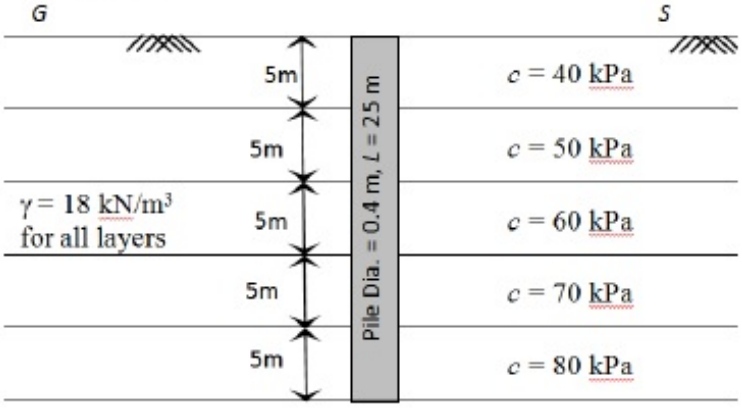
Correct Answer :

313.0 to 316.0

Question Number : 49 Question Type : NAT

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A pile of diameter 0.4 m is fully embedded in a clay stratum having 5 layers, each 5 m thick as shown in the figure below. Assume a constant unit weight of soil as 18 kN/m^3 for all the layers. Using λ-method ($\lambda = 0.15$ for 25 m embedment length) and neglecting the end bearing component, the ultimate pile capacity (in kN) is _____.



Correct Answer :
1620.0 to 1620.0

Question Number : 50 Question Type : MCQ

Stress path equation for tri-axial test upon application of deviatoric stress is, $q = 10\sqrt{3} + 0.5\,p$. The respective values of cohesion, c (in kPa) and angle of internal friction, ϕ are:

(A) 20 and 20°
(B) 20 and 30°
(C) 30 and 30°
(D) 30 and 20°

Options :
1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 51 Question Type : MCQ

A 6 m high retaining wall having a smooth vertical back face retains a layered horizontal backfill. Top 3 m thick layer of the backfill is sand having an angle of internal friction, $\phi = 30°$ while the bottom layer is 3 m thick clay with cohesion, c = 20 kPa. Assume unit weight for both sand and clay as 18 kN/m^3. The total active earth pressure per unit length of the wall (in kN/m) is:

(A) 150 (B) 216 (C) 156 (D) 196

Options :
1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 52 Question Type : NAT

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A field channel has cultivable commanded area of 2000 hectares. The intensities of irrigation for gram and wheat are 30% and 50% respectively. Gram has a kor period of 18 days, kor depth of 12 cm, while wheat has a kor period of 18 days and a kor depth of 15 cm. The discharge (in m^3/s) required in the field channel to supply water to the commanded area during the kor period is _____.

Correct Answer:
1.4 to 1.5

Question Number : 53 Question Type : NAT

A triangular gate with a base width of 2 m and a height of 1.5 m lies in a vertical plane. The top vertex of the gate is 1.5 m below the surface of a tank which contains oil of specific gravity 0.8. Considering the density of water and acceleration due to gravity to be 1000 kg/m^3 and 9.81 m/s^2 respectively, the hydrostatic force (in kN) exerted by the oil on the gate is _____.

Correct Answer :
29.3 to 29.5

Question Number : 54 Question Type : MCQ

The velocity components of a two dimensional plane motion of a fluid are: $u = \frac{y^3}{3} + 2x - x^2y$ and $v = xy^2 - 2y - \frac{x^3}{3}$.

The correct statement is:

(A) Fluid is incompressible and flow is irrotational
(B) Fluid is incompressible and flow is rotational
(C) Fluid is compressible and flow is irrotational
(D) Fluid is compressible and flow is rotational

Options :
1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 55 Question Type : MCQ

The average surface area of a reservoir in the month of June is 20 km^2. In the same month, the average rate of inflow is 10 m^3/s, outflow rate is 15 m^3/s, monthly rainfall is 10 cm, monthly seepage loss is 1.8 cm and the storage change is 16 million m^3. The evaporation (in cm) in that month is:

(A) 46.8 (B) 136.0 (C) 13.6 (D) 23.4

Options :
1. ✖ A

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2. ✖ B
3. ✖ C
4. ✔ D

Question Number : 56 Question Type : NAT

A pipe of 0.7 m diameter has a length of 6 km and connects two reservoirs A and B. The water level in reservoir A is at an elevation 30 m above the water level in reservoir B. Halfway along the pipe line, there is a branch through which water can be supplied to a third reservoir C. The friction factor of the pipe is 0.024. The quantity of water discharged into reservoir C is 0.15 m^3/s. Considering the acceleration due to gravity as 9.81 m/s^2 and neglecting minor losses, the discharge (in m^3/s) into the reservoir B is _____.

Correct Answer :
0.56 to 0.58

Question Number : 57 Question Type : NAT

A landfill is to be designed to serve a population of 200000 for a period of 25 years. The solid waste (SW) generation is 2 kg/person/day. The density of the un-compacted SW is 100 kg/m^3 and a compaction ratio of 4 is suggested. The ratio of compacted fill (i.e. SW + cover) to compacted SW is 1.5. The landfill volume (in million m^3) required is _____.

Correct Answer :
13.6 to 13.8

Question Number : 58 Question Type : NAT

A water treatment plant of capacity, 1 m^3/s has filter boxes of dimensions 6 m × 10 m. Loading rate to the filters is 120 $m^3/day/m^2$. When two of the filters are out of service for back washing, the loading rate (in $m^3/day/m^2$) is _____.

Correct Answer:
144

Question Number : 59 Question Type : MCQ

Ultimate BOD of a river water sample is 20 mg/L. BOD rate constant (natural log) is 0.15 day^{-1}. The respective values of BOD (in %) exerted and remaining after 7 days are:

(A) 45 and 55
(B) 55 and 45
(C) 65 and 35
(D) 75 and 25

Options :

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1. ✖ A
2. ✖ B
3. ✔ C
4. ✖ D

Question Number : 60 Question Type : NAT

In a wastewater treatment plant, primary sedimentation tank (PST) designed at an overflow rate of 32.5 $m^3/day/m^2$ is 32.5 m long , 8.0 m wide and liquid depth of 2.25 m. If the length of the weir is 75 m, the weir loading rate (in $m^3/day/m$) is _____.

Correct Answer:
112.0 to 113.0

Question Number : 61 Question Type : NAT

The relation between speed u (in km/h) and density k (number of vehicles / km) for a traffic stream on a road is $u = 70 - 0.7k$. The capacity on this road is _____ vph (vehicles/hour).

Correct Answer:
1750

Question Number : 62 Question Type : MCQ

Match the information related to tests on aggregates given in Group-I with that in Group-II.

Group-I	Group-II
P. Resistance to impact	1. Hardness
Q. Resistance to wear	2. Strength
R. Resistance to weathering action	3. Toughness
S. Resistance to crushing	4. Soundness

(A) P-1, Q-3, R-4, S-2
(B) P-3, Q-1, R-4, S-2
(C) P-4, Q-1, R-3, S-2
(D) P-3, Q-4, R-2, S-1

Options :
1. ✖ A
2. ✔ B
3. ✖ C
4. ✖ D

Question Number : 63 Question Type : MCQ

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In Marshall method of mix design, the coarse aggregate, fine aggregate, fines and bitumen having respective values of specific gravity 2.60, 2.70, 2.65 and 1.01, are mixed in the relative proportions (% by weight) of 55.0, 35.8, 3.7 and 5.5 respectively. The theoretical specific gravity of the mix and the effective specific gravity of the aggregates in the mix respectively are:

(A) 2.42 and 2.63 (B) 2.42 and 2.78 (C) 2.42 and 2.93 (D) 2.64 and 2.78

Options :

1. ✔ A
2. ✖ B
3. ✖ C
4. ✖ D

Question Number : 64 Question Type : MCQ

The bearings of two inaccessible stations, S_1 (Easting 500 m, Northing 500 m) and S_2 (Easting 600 m, Northing 450 m) from a station S_3 were observed as 225^0 and $153^0\ 26'$ respectively. The independent Easting (in m) of station S_3 is:

(A) 450.000 (B) 570.710 (C) 550.000 (D) 650.000

Options :

1. ✖ A
2. ✖ B
3. ✔ C
4. ✖ D

Question Number : 65 Question Type : NAT

Two Pegs A and B were fixed on opposite banks of a 50 m wide river. The level was set up at A and the staff readings on Pegs A and B were observed as 1.350 m and 1.550 m, respectively. Thereafter the instrument was shifted and set up at B. The staff readings on Pegs B and A were observed as 0.750 m and 0.550 m, respectively. If the R.L. of Peg A is 100.200 m, the R.L. (in m) of Peg B is _____

Correct Answer:

100

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