# 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.

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|---|---|
| **Question Paper Name :** | Mining Engineering 31st May 2023 Shift 1 |
| **Subject Name :** | Mining Engineering |
| **Creation Date :** | 2023-05-31 13:36:40 |
| **Duration :** | 120 |
| **Total Marks :** | 120 |
| **Display Marks:** | No |
| **Share Answer Key With Delivery Engine :** | Yes |
| **Actual Answer Key :** | Yes |
| **Calculator :** | None |
| **Magnifying Glass Required? :** | No |
| **Ruler Required? :** | No |
| **Eraser Required? :** | No |
| **Scratch Pad Required? :** | No |
| **Rough Sketch/Notepad Required? :** | No |
| **Protractor Required? :** | No |
| **Show Watermark on Console? :** | Yes |
| **Highlighter :** | No |
| **Auto Save on Console?** | Yes |
| **Change Font Color :** | No |
| **Change Background Color :** | No |

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|---|---|
| **Change Theme :** | No |
| **Help Button :** | No |
| **Show Reports :** | No |
| **Show Progress Bar :** | No |

## Mining Engineering

| | |
|---|---|
| **Group Number :** | 1 |
| **Group Id :** | 28393670 |
| **Group Maximum Duration :** | 0 |
| **Group Minimum Duration :** | 120 |
| **Show Attended Group? :** | No |
| **Edit Attended Group? :** | No |
| **Break time :** | 0 |
| **Group Marks :** | 120 |
| **Is this Group for Examiner? :** | No |
| **Examiner permission :** | Cant View |
| **Show Progress Bar? :** | No |

## Mathematics

| | |
|---|---|
| **Section Id :** | 283936190 |
| **Section Number :** | 1 |
| **Section type :** | Online |
| **Mandatory or Optional :** | Mandatory |
| **Number of Questions :** | 10 |
| **Number of Questions to be attempted :** | 10 |
| **Section Marks :** | 10 |
| **Enable Mark as Answered Mark for Review and** | |

| | |
|---|---|
| **Response :** | Yes **Clear** |
| **Maximum Instruction Time :** | 0 |
| **Sub-Section Number :** | 1 |
| **Sub-Section Id :** | 283936190 |
| **Question Shuffling Allowed :** | Yes |
| **Is Section Default? :** | null |

**Question Number : 1 Question Id : 2839369761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If $A=\begin{pmatrix}1 & 2 & 1\\ -1 & 1 & 1\\ 2 & 1 & 3\end{pmatrix}$, then $\left|A^{-1}\right|=$

**Options :**

1. ✔ $\frac{1}{9}$

2. ✖ $9$

3. ✖ $3$

4. ✖ $\frac{1}{3}$

**Question Number : 2 Question Id : 2839369762 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Let a $3\times3$ matrix $A$ have eigenvalues $1, 2, -1$. The determinant of the matrix $A^8$ is

**Options :**

1. ✖ 128

2. ✔ 256

3. ✖ 64

4. ✖ 32

**Question Number : 3 Question Id : 2839369763 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

$$\lim_{x\to0}\frac{\tan^3(2x)}{x^3}=$$

**Options :**

1. ✖ 1

2. ✖ 0

3. ✔ 8

4. ✖ does not exist

**Question Number : 4 Question Id : 2839369764 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The series $\sum_{n=1}^{\infty} \frac{1}{(2n-1)(2n+1)}$ converges to

**Options :**

1. ✔ $\frac{1}{2}$

2. ✖ $1$

3. ✖ $\frac{1}{4}$

4. ✖ $0$

**Question Number : 5 Question Id : 2839369765 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If $y_1 = e^x$ is one of the two linearly independent solutions of $y'' + 3y' - 4y = 0$, then the other independent solution is

**Options :**

1. ✖ $xe^x$

2. ✔ $e^{-4x}$

3. ✖ $xe^{-4x}$

4. ✖ $e^{2x}$

**Question Number : 6 Question Id : 2839369766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The differential equation of the family of curves $y = Ax + \frac{B}{x^2}$ is

**Options :**

1. ✖ $x^2y'' - 2xy' + 2y = 0$

2. ✖ $x^2y'' - 2xy' - 2y = 0$

3. ✔ $x^2y'' + 2xy' - 2y = 0$

4. ✖ $x^2y'' + 2xy' + 2y = 0$

**Question Number : 7 Question Id : 2839369767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

: N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

The standard deviation of the first 10 natural numbers is

Options :

1. ✔ 2.87

2. ✖ 5.5

3. ✖ 2.35

4. ✖ 4.87

Question Number : 8 Question Id : 2839369768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time

: N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Two lines of regression are $x+2y-5=0$ and $2x+3y-8=0$. If the mean values of x and y are respectively $\bar{x}$ and $\bar{y}$, then $3\bar{x}+5\bar{y}=$

Options :

1. ✖ 21

2. ✖ 26

3. ✔ 13

4. ✖ 11

**Question Number : 9 Question Id : 2839369769 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The order of convergence of the Newton-Raphson method is

**Options :**

1. ✔ 2

2. ✖ 1

3. ✖ 1.618

4. ✖ 3

**Question Number : 10 Question Id : 2839369770 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If $S$ is any closed surface enclosing a volume $V$ and $\overline{F} = 3x\bar{i} + 5y\bar{j} + 7z\bar{k}$ , then $\iint_S \overline{F} \cdot \bar{n}\, ds =$

**Options :**

1. ✖ $V$

2. ✖ $60V$

3. ✔ $15V$

4. ✖ $5V$

# Mining Engineering

| | |
|---|---|
| **Section Id :** | 283936191 |
| **Section Number :** | 2 |
| **Section type :** | Online |
| **Mandatory or Optional :** | Mandatory |
| **Number of Questions :** | 110 |
| **Number of Questions to be attempted :** | 110 |
| **Section Marks :** | 110 |
| **Enable Mark as Answered Mark for Review and Response :** | Yes **Clear** |
| **Maximum Instruction Time :** | 0 |
| **Sub-Section Number :** | 1 |
| **Sub-Section Id :** | 283936191 |
| **Question Shuffling Allowed :** | Yes |
| **Is Section Default? :** | null |

**Question Number : 11 Question Id : 2839369771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The metamorphized form of sandstone is

**Options :**

1. ✔ Quartzite

2. ✖ Gneiss

3. ✖ Schist

4. ✖ Marble

**Question Number : 12 Question Id : 2839369772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Folds are the structural features resulting from

**Options :**

1. ✔ Ductile deformation of earth's crust

2. ✖ Brittle deformation of earth's crust

3. ✖ High impact tectonic stresses of earth's crust

4. ✖ Fracturing of earth's crust

**Question Number : 13 Question Id : 2839369773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Metal Zinc can be extracted from which mineral ?

**Options :**

1. ✖ Galena

2. ✔ Sphalerite

3. ✖ Chalcopyrite

4. ✖ Wolframite

**Question Number : 14 Question Id : 2839369774 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In the Moh's scale of hardness, the minerals in their increasing sequence of hardness are

**Options :**

1. ✖ calcite, gypsum, topaz, diamond

2. ✖ topaz, gypsum, calcite, diamond

3. ✖ calcite, gypsum, diamond, topaz

4. ✔ gypsum, calcite, topaz, diamond

**Question Number : 15 Question Id : 2839369775 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following is a foliated metamorphic rock?

**Options :**

1. ✖ Slate

2. ✖ Marble

3. ✖ Quartzite

4. ✔ Schist

**Question Number : 16 Question Id : 2839369776 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The drilling technique applicable for mineral exploration is

**Options :**

1. ✖ Percussive drilling

2. ✖ Tricone roller drilling

3. ✖ Rotary-percussive drilling

4. ✔ Diamond core drilling

**Question Number : 17 Question Id : 2839369777 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following explosive is more oxygen balanced?

**Options :**

1. ✖ PETN ($C_5H_8N_4O_{12}$)

2. ✖ Nitroglycerin ($C_3H_5N_3O_9$)

3. ✔ Ammonium Nitrate ($NH_4NO_3$)

4. ✖ Tri Nitro Toulene (TNT)

**Question Number : 18 Question Id : 2839369778 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Parallel holes at right angles to the face with some uncharged holes are associated with the following shot hole pattern

**Options :**

1. ✖ Drag cut

2. ✖ Wedge cut

3. ✖ Pyramid cut

4. ✔ Burn cut

**Question Number : 19 Question Id : 2839369779 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

GPS atomic clocks becomes faster due to reduction of gravity to g/4 and slower due to fast rotational speed of satellite. Considering these effects, compared to clocks on earth GPS atomic clocks are

**Options :**

1. ✔ faster by 38 μs

2. ✖ slower by 38 μs

3. ✖ faster by 45μs

4. ✖ slower by 45μs

**Question Number : 20 Question Id : 2839369780 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

: N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

Which of the following mine plan has generally minimum scale or RF?

Options :

1. ✔ Key plan

2. ✖ Surface plan

3. ✖ Ventilation plan

4. ✖ Geological plan

Question Number : 21 Question Id : 2839369781 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 1 Wrong Marks : 0

A 20 m steel tape used in a mine survey, is found to be 20 cm short, when compared with a standard tape. If the measured volume of a dump using the tape is 4000 $m^3$, its actual volume in $m^3$ is

Options :

1. ✔ 3881

2. ✖ 3902

3. ✖ 3920

4. ✖ 4121

**Question Number : 22 Question Id : 2839369782 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The bearing of side AB of a regular hexagon ABCDEF is S50º 10′E. If the station C is easterly from the station B, the whole circle bearing of the side BC is

**Options :**

1. ✖ 65º 15′ 25″

2. ✖ 69º 50′ 25″

3. ✖ 69º 15′ 25″

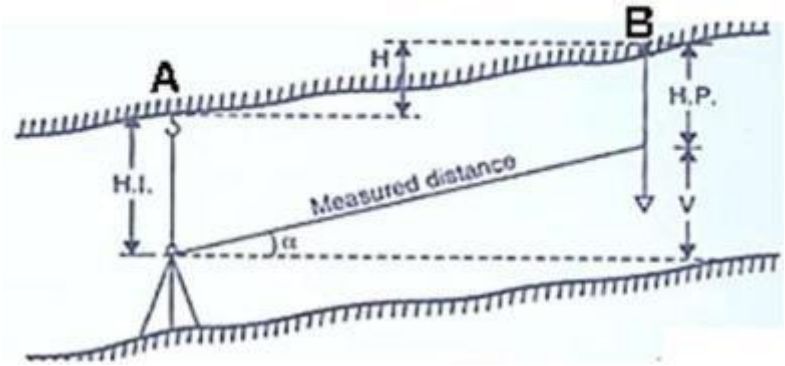
4. ✔ 69º 50′ 0"

**Question Number : 23 Question Id : 2839369783 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

RL of B in the figure shown below is




**Options :**

1. ✔ RL of A – HI + v + HP

2. ✖ RL of A – HI – v + HP

3. ✖ RL of A – HI – v - HP

4. ✖ RL of A – HI + v – HP

**Question Number : 24 Question Id : 2839369784 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A declination of 3º east means

**Options :**

1. ✔ magnetic north is 3º east of true north

2. ✖ magnetic north is 3º west of true north

3. ✖ true north is $3^0$ east of magnetic north

4. ✖ true south is $3^0$ east of magnetic south

**Question Number : 25 Question Id : 2839369785 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A wave is transmitted from the point A towards a reflector at point B. The wave is reflected back to point A from point B. The whole number of wavelengths ($\lambda$ = 20 m) travelled by the wave is 6 with phase difference of $180^0$, then the distance between A and B is

**Options :**

1. ✖ 130 m

2. ✔ 65 m

3. ✖ 120 m

4. ✖ 60 m

**Question Number : 26 Question Id : 2839369786 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

From an elevated point ‘A’, when a stone is thrown vertically, it attains an upward velocity of ‘v’ at a height of ‘h’ from point ‘A’. While falling, its downward velocity becomes ‘2v’ at a distance ‘h’ below the point ‘A’, then the maximum height attained by the stone from point ‘A’ is

**Options :**

1. ✔ $\frac{5h}{3}$

2. ✖ $\frac{4h}{3}$

3. ✖ $\frac{6h}{7}$

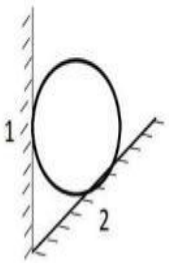
4. ✖ $2h$

**Question Number : 27 Question Id : 2839369787 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

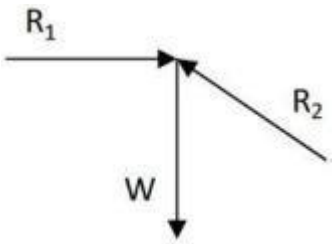
**Correct Marks : 1 Wrong Marks : 0**

A ball of weight W is supported on smooth walls as shown in the figure. $R_1$ and $R_2$ are reactions from the walls 1 and 2, then the free body diagram of the ball is

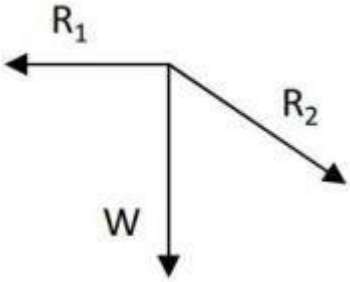



**Options :**

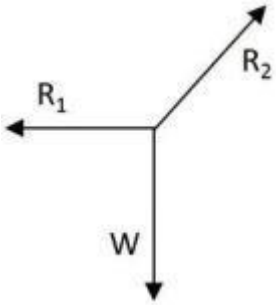
1. ✖



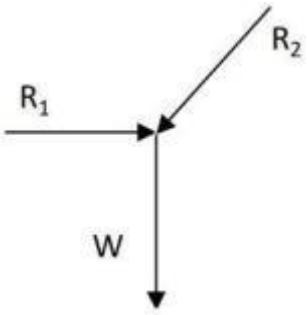

2. ✖




3. ✔



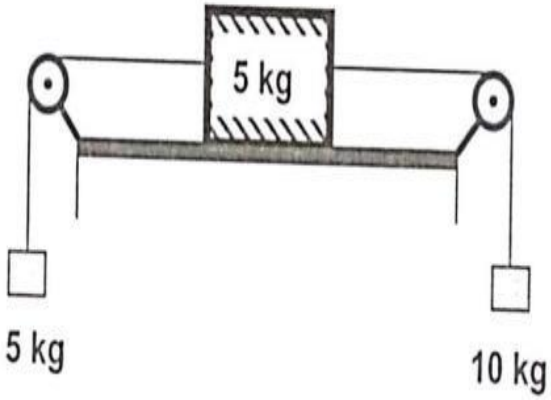

4. ✖




**Question Number : 28 Question Id : 2839369788 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Two blocks of mass 5 kg and 10 kg are connected with cords and frictionless pulleys as shown in figure. The coefficient of friction between the 5 kg block and table is 0.2, then the acceleration of the system when the blocks are released from rest ('g' is acceleration due to gravity) is




**Options :**

1. ✗ $5g$

2. ✗ $12g$

3. ✓ $\frac{g}{5}$

4. ✗ $\frac{g}{10}$

**Question Number : 29 Question Id : 2839369789 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A series of tri-axial compression tests conducted on sandstone samples reveal the relationship between major and minor principal stresses is $\sigma_1 = 50 + 3\sigma_3$ [stresses are in MPa], Then the cohesion in MPa and angle of internal friction in degrees of sandstone respectively are

**Options :**

1. ✔ 14.43, 30.0

2. ✖ 14.43, 60.0

3. ✖ 0.21, 73.9

4. ✖ 0.21, 16.1

**Question Number : 30 Question Id : 2839369790 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A cylindrical rock specimen is uniaxially loaded under compression and fails at 50 MPa. The fracture plane is inclined at an angle of 45° with the axial direction, then the normal and shear stresses respectively on the failure plane (in MPa) are

**Options :**

1. ✖ 50, 50

2. ✖ 0, 50

3. ✖ 50, 0

4. ✔ 25, 25

**Question Number : 31 Question Id : 2839369791 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If Poisson's ratio of a rock sample is 0.25, then the relationship among the modulus of elasticity (E), modulus of rigidity (G) and bulk modulus (K) is

**Options :**

1. ✖ $E = K = G$

2. ✖ $E > G > K$

3. ✖ $E = G > K$

4. ✔ $E > K > G$

**Question Number : 32 Question Id : 2839369792 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Stress concentration at a point on the wall of a vertical shaft results in a compressive test is 59.66 MPa. The wall rock mass has an unconfined compressive strength of 89.49 MPa, then the factor of safety of the shaft wall at the point is

**Options :**

1. ✖ 0.67

2. ✖ 0.86

3. ✖ 1.23

4. ✔ 1.50

**Question Number : 33 Question Id : 2839369793 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A core sample of 54 mm diameter having Young's modulus of 68.97 GPa fails under uniaxial compression at 0.1% axial strain, then the axial load at failure point in kN is

**Options :**

1. ✔ 158.00

2. ✖ 68.97

3. ✖ 58.00

4. ✖ 15.80

**Question Number : 34 Question Id : 2839369794 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Bieniawski's Rock Mass Rating considers the parameters RQD, spacing of joints, number of joints, ground water condition and

**Options :**

1. ✗ tensile strength

2. ✓ uniaxial compressive strength

3. ✗ shear strength

4. ✗ buckling strength

**Question Number : 35 Question Id : 2839369795 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

During Brazilian test, a rock specimen of diameter 50 mm and height 5 cm, failed at a compression load of 19.6 kN, then the indirect tensile strength of the specimen is

**Options :**

1. ✗ 0.5 MPa

2. ✗ 2.5 MPa

3. ✔ 5 MPa

4. ✖ 25 MPa

**Question Number : 36 Question Id : 2839369796 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The ratio of volume of an intact rock to fragmented rock is

**Options :**

1. ✖ fill factor

2. ✔ bulking factor

3. ✖ compaction factor

4. ✖ swell factor

**Question Number : 37 Question Id : 2839369797 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a compression strength test, the increase in confining pressure leads to an increase in the rock is

**Options :**

1. ✖ ductility

2. ✖ angle of internal friction

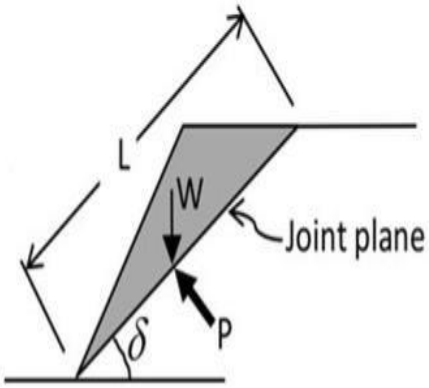
3. ✖ brittleness

4. ✔ ultimate bearing load

**Question Number : 38 Question Id : 2839369798 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A joint plane of length L and dip δ intersects the toe of a slope is as shown in the figure. The weight of the shaded block is W. Uniform water pressure P acts normal to the joint plane. If the cohesion and angle of internal friction of the joint surface are c and φ respectively, then the expression for 'safety factor' of the shaded block is




**Options :**

1. ✖ $\frac{Lc+(W\sin\delta-LP)\tan\varphi}{W\cos\delta}$

2. ✖ $\frac{Lc+(W\cos\delta+LP)\tan\varphi}{W\sin\delta}$

3. ✔ $\frac{Lc+(W\cos\delta-LP)\tan\varphi}{W\sin\delta}$

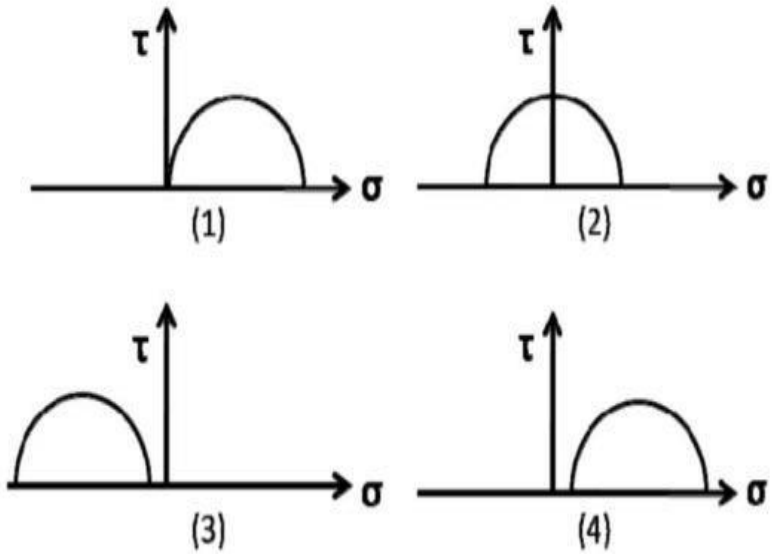
4. ✖ $\frac{Lc+(W\sin\delta+LP)\tan\varphi}{W\cos\delta}$

**Question Number : 39 Question Id : 2839369799 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Identify the uniaxial compressive loading condition from the following four Mohr circles




**Options :**

1. ✔ 1

2. 2

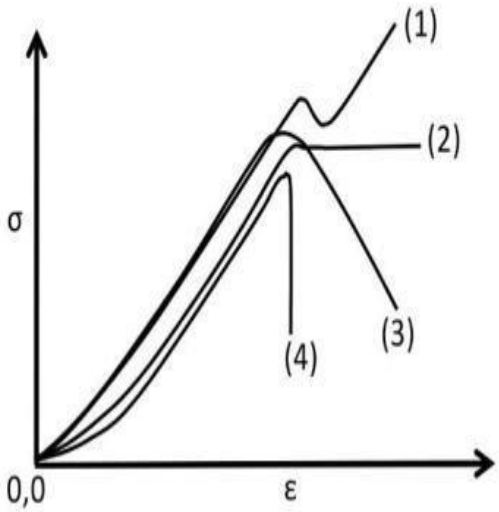
3. 3

4. 4

**Question Number : 40 Question Id : 2839369800 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Out of the given stress-strain curves, identify the rock type that is most prone to rock burst




**Options :**

1. 1

2. 2

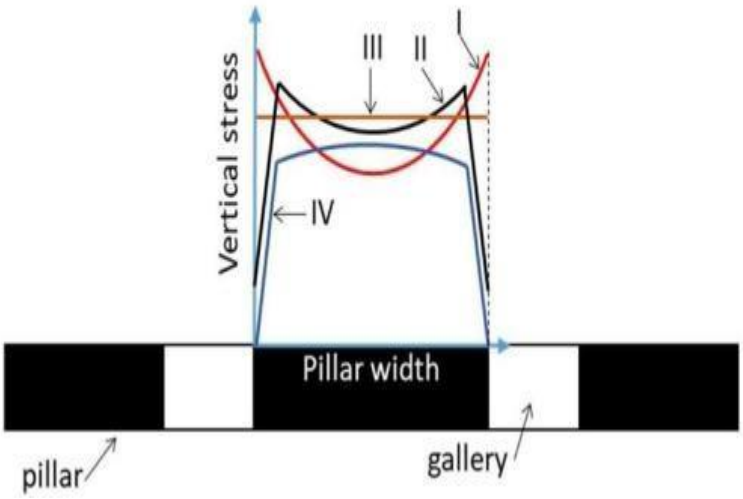
3. 3

4. ✔ 4

**Question Number : 41 Question Id : 2839369801 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The correct vertical stress profile in the case of tributary area method for pillar design is




**Options :**

1. ✖ I

2. ✖ II

3. ✔ III

4. ✖ IV

**Question Number : 42 Question Id : 2839369802 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A rock specimen was tested in compression. The lateral and longitudinal strains were found 0.6% and 3% respectively, then the Poisson's ratio of the specimen is

**Options :**

1. ✔ 0.2

2. ✖ 0.3

3. ✖ 0.4

4. ✖ 0.5

**Question Number : 43 Question Id : 2839369803 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The hydraulic sand stowing pipeline layout should be such that

**Options :**

1. ✖ the geometric profile must coincide with the hydraulic gradient line

2. ✔ the hydraulic profile should always be below the hydraulic gradient line

3. ✖ the hydraulic profile should always be above the hydraulic gradient line

4. ✖ the geometric profile should always be above the hydraulic gradient line

**Question Number : 44 Question Id : 2839369804 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The ratio of horizontal to vertical in-situ stresses, K, at a mine field varies with depth, D (in m) as $K = \frac{267}{D} + 1.25$. If the unit weight of overburden rock is 25 kN/m$^3$, the horizontal stress (in MPa) at a depth of 400 m is

**Options :**

1. ✖ 17.10 to 17.25

2. ✖ 18.10 to 18.25

3. ✔ 19.10 to 19.25

4. ✖ 20.10 to 20.25

**Question Number : 45 Question Id : 2839369805 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A multipoint borehole extensometer is used to monitor

**Options :**

1. ✗ convergence between the roof and the floor

2. ✗ strain between fixed points along a borehole

3. ✗ strain between the anchor point and the reference point on the surface

4. ✓ behavior of the rock

**Question Number : 46 Question Id : 2839369806 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A measure of dispersion of a sample dataset is

**Options :**

1. ✗ mean

2. ✗ median

3. ✓ standard deviation

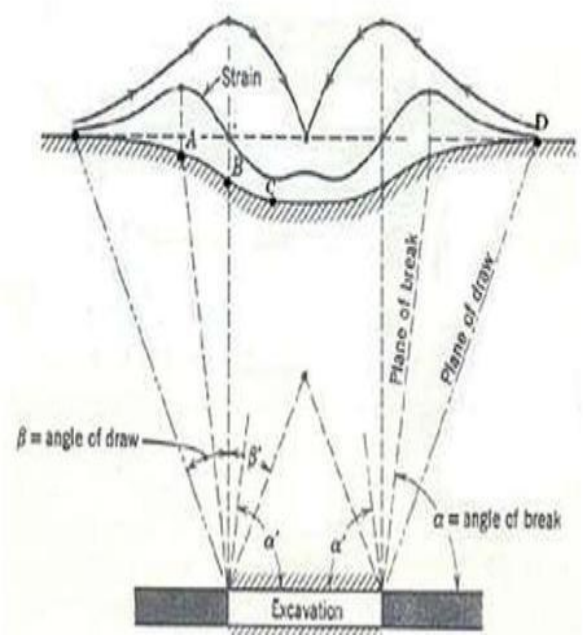
4. ✗ mode

**Question Number : 47 Question Id : 2839369807 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A sub-critical subsidence profile is shown in the figure below, then the points A, B, C and D represent respectively the points of




**Options :**

1. ✗ zero vertical displacement, maximum tension, inflexion, maximum compression

2. ✗ inflexion, maximum tension, maximum compression, zero vertical displacement

3. ✓ maximum tension, inflexion, maximum compression, zero vertical displacement

4. ✗ maximum compression, maximum tension, inflexion, zero vertical displacement

**Question Number : 48 Question Id : 2839369808 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A piece of coal sample weighs 10 kg in air and 2 kg when immersed in water, then the specific gravity of the coal sample is

**Options :**

1. ✖ 1.50

2. ✔ 1.25

3. ✖ 2.50

4. ✖ 2.25

**Question Number : 49 Question Id : 2839369809 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a borehole log of 1.2 m in length, recovery of rock cores in cm is given as: 20, 8, 15, 8, 8, 4, 3, 9, 10, 1, 5, 10, then the RQD in percentage is

**Options :**

1. ✖ 29.2

2. ✖ 31.8

3. ✔ 45.8

4. ✖ 50.0

**Question Number : 50 Question Id : 2839369810 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The support system followed along the goaf edge in a depillaring panel using continuous miner technology is

**Options :**

1. ✖ rope stitching and cable bolting

2. ✔ closely spaced longer resin grouted bolts

3. ✖ skin-to-skin wooden/steel chock and hydraulic props

4. ✖ W straps roof bolting

**Question Number : 51 Question Id : 2839369811 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If the $CO/O_2$ deficiency ratio in a mine is 2%, than it indicates?

**Options :**

1. ✖ Existence of spontaneous heating

2. ✖ active fire

3. ✔ heating in advanced stage

4. ✖ explosion stage

**Question Number : 52 Question Id : 2839369812 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The stoping method, where a large part of blasted ore is allowed to accumulate in the stope to serve the purpose of providing working platform for stoping as well as to support the wall-rock, is known as

**Options :**

1. ✔ shrinkage stoping

2. ✖ long hole blasting

3. ✖ square-set stoping

4. ✖ sublevel stoping

**Question Number : 53 Question Id : 2839369813 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a fully mechanised Bord & Pillar mining system, wining of coal and its transportation from the face is commonly carried out with the combination of

**Options :**

1. ✔ continuous miner, shuttle car, feeder breaker and belt conveyor

2. ✖ continuous miner, LHD, feeder breaker and chain conveyor

3. ✖ continuous miner, SDL, feeder breaker and belt conveyor

4. ✖ continuous miner, shuttle car, feeder breaker and chain conveyor

**Question Number : 54 Question Id : 2839369814 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Continuous miner used as coal cutting machine in Room and Pillar mining method has a limiting gradient of

**Options :**

1. ✔ 1 in 6

2. ✖ 1 in 3

3. ✖ 1 in 10

4. ✖ 1 in 7

**Question Number : 55 Question Id : 2839369815 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

When a double ended ranging drum shearer cuts coal in a longwall face

**Options :**

1. ✖ both the drums rotate in the same direction keeping the front drum up and the rear drum down

2. ✔ both the drums rotate in the opposite direction keeping the front drum up and the rear drum down

3. ✖ both the drums rotate in the opposite direction keeping the front drum down and the rear drum up

4. ✖ both the drums rotate in the same direction keeping the front drum down and the rear drum up

**Question Number : 56 Question Id : 2839369816 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Most popular hydraulic fluid used in power supports is

**Options :**

1. ✖ emulsion of 20% oil and 80% water

2. ✖ emulsion of 95% oil and 5% water

3. ✔ emulsion of 5% oil and 95% water

4. ✖ emulsion of 80% oil and 20% water

**Question Number : 57 Question Id : 2839369817 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The purpose of setting load in mining operations is

**Options :**

1. ✖ to ensure that the support is firmly in place and can resist vertical pressure

2. ✔ to ensure that the support is firmly in place and can resist lateral pressure

3. ✖ to ensure that the support is firmly in place only

4. ✖ to ensure that the support can resist only lateral pressure

**Question Number : 58 Question Id : 2839369818 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

What material is used in the grouting to reduce curing time and enhance safety?

**Options :**

1. ✖ cement

2. ✖ gypsum

3. ✖ plaster of paris

4. ✔ resin

**Question Number : 59 Question Id : 2839369819 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The correct sequence of attachments between the winding rope and the cage in a drum winding system, is

**Options :**

1. ✖ Triangular plate → Rope capel → Bull chain → Detaching hook → Cage chain

2. ✖ Rope capel → Bull chain → Triangular plate → Detaching hook → Cage chain

3. ✖ Detaching hook → Rope capel → Bull chain → Cage chain → Triangular plate

4. ✔ Rope capel → Detaching hook → Bull chain → Triangular plate → Cage chain

**Question Number : 60 Question Id : 2839369820 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

What should be the maximum value of fleet angle in a drum winder?

**Options :**

1. ✖ $3.5^{o}$

2. ✖ $4.5^{o}$

3. ✔ $1.5^{o}$

4. ✖ $2.5^{o}$

**Question Number : 61 Question Id : 2839369821 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a 60 m wide long wall panel at a depth of 60 m results in a subsidence trough of width 110 m, then the angle of draw is

**Options :**

1. ✖ $19.9°$

2. ✖ $18.4°$

3. ✔ $22.6°$

4. ✖ 39.8°

**Question Number : 62 Question Id : 2839369822 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a Bord & Pillar mining, the width of the pillar and galleries are 19.5 m and 3 m respectively, then the percentage of extraction during development is

**Options :**

1. ✔ 24.8

2. ✖ 29.3

3. ✖ 25.2

4. ✖ 30.5

**Question Number : 63 Question Id : 2839369823 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The most safe and efficient method of mining a thick coal seam of 10 m is

**Options :**

1. ✖ A combination of Bord & Pillar and Longwall methods

2. ✔ Longwall top coal caving method

3. ✖ Longwall sublevel caving

4. ✖ Bord & Pillar method in lifts

**Question Number : 64 Question Id : 2839369824 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Best-suited method of work upto 20 m thick ore body, steeply dipping and having weak wall and strong host rock is

**Options :**

1. ✖ Cut and Fill

2. ✖ Stope and pillar

3. ✔ Block Caving

4. ✖ Sub level open stoping

**Question Number : 65 Question Id : 2839369825 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Crown Pillar is

**Options :**

1. ✔ On the side of the stope

2. ✖ At the top of the stope

3. ✖ At the base

4. ✖ Just above the ore drawing crosscuts

**Question Number : 66 Question Id : 2839369826 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Match the following

| | |
|---|---|
| (P) Room and Pillar | (1) Artificially supported |
| (Q) Shrinkage stoping | (2) Heavily supported |
| (R) Sublevel stoping | (3) Naturally supported |
| (S) Square set stoping | (4) Unsupported |

**Options :**

1. ✖ P-2, Q-1, R- 4, S-3

2. ✖ P-2, Q-3, R-4, S-1

3. ✔ P-3, Q-1, R-4, S-2

4. ✖ P-4, Q-2, R- 3, S-1

**Question Number : 67 Question Id : 2839369827 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A flat coal seam of thickness 3 m is excavated and broken roof rock has completely filled the space created due to extraction. If the bulking factor of roof rock is 1.2, then the caving height (in m) is

**Options :**

1. ✔ 15

2. ✖ 20

3. ✖ 25

4. ✖ 30

**Question Number : 68 Question Id : 2839369828 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Long-hole drilling with crater blasting is used for the construction of

**Options :**

1. ✖ winze

2. ✖ shaft

3. ✔ raise

4. ✖ decline

**Question Number : 69 Question Id : 2839369829 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Match the following,

| | Excavating/loading machine | | Transportation scheme |
|---|---|---|---|
| P. | Bucket Wheel Excavator | 1. | Mine tub |
| Q. | Continuous Miner | 2. | Armoured flexible chain conveyor |
| R. | Shearer | 3. | Shiftable Conveyor |
| S. | Load Haul Dumper | 4. | Shuttle car |

**Options :**

1. ✔ P-3, Q-4, R-2, S-1

2. ✖ P-3, Q-2, R-4, S-1

3. ✖ P-3, Q-2, R-1, S-4

4. ✖ P-1, Q-4, R-3, S-2

**Question Number : 70 Question Id : 2839369830 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Match the following:

| | Equipment | | Component |
|---|---|---|---|
| P. | Scraper | 1. | Dribble belt |
| Q. | Dragline | 2. | Dipper stick |
| R. | Bucket wheel excavator | 3. | Fair lead |
| S. | Rope shovel | 4. | Bowl |

**Options :**

1. ✖ P-2, Q-4, R-3, S-1

2. ✖ P-4, Q-2, R-1, S-3

3. ✔ P-4, Q-3, R-1, S-2

4. ✖ P-2, Q-4, R-1, S-3

**Question Number : 71 Question Id : 2839369831 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The most important chemical in a self-rescuer is

**Options :**

1. ✔ hopcalite

2. ✖ protosorb

3. ✖ calcium bromide

4. ✖ lithium chloride

**Question Number : 72 Question Id : 2839369832 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Proximate analysis of coal determines

**Options :**

1. ✖ moisture, Sulphur, Nitrogen and fixed Carbon

2. ✖ moisture, ash, Sulphur and volatile matter

3. ✔ moisture, ash, fixed Carbon and volatile matter

4. ✖ sulphur, nitrogen and fixed carbon

**Question Number : 73 Question Id : 2839369833 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Dust suppression by water has one of the following disadvantages

**Options :**

1. ✗ causes the belt to slip

2. ✗ workers take rest during this period

3. ✓ increases humidity in the mine

4. ✗ blasting efficiency becomes poor

**Question Number : 74 Question Id : 2839369834 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

When an identical fan is installed in parallel combination to an existing mine fan then

**Options :**

1. ✓ air quantity is doubled and pressure remains same

2. ✗ pressure is doubled and air quantity remains same

3. ✗ air quantity as well as pressure is doubled

4. ✗ air quantity is quadrupled and pressure is doubled

**Question Number : 75 Question Id : 2839369835 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In ventilation network analysis if Kirchhoff's first law is used, then with respect to this law which of the following is correct statement

**Options :**

1. ✔ mass flow entering a junction equals the mass flow leaving the junction

2. ✖ all pressure drops around a closed path in the network must be zero

3. ✖ all positive pressure drops around a closed path in the network must be more than all negative pressure drops

4. ✖ all positive pressure drops around a closed path in the network must be less than all negative pressure drops

**Question Number : 76 Question Id : 2839369836 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Intake air to a longwall panel has CO at 10 ppm and $O_2$ at 20.5%, whereas the return air has CO at 30 ppm and $O_2$ at 20.1.%, then the Graham's ratio (%) for the oxidation process in the panel is

**Options :**

1. ✖ 0.1

2. ✖ 0.4

3. ✖ 0.8

4. ✔ 0.5

**Question Number : 77 Question Id : 2839369837 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Spontaneous combustion of coal on storage, results due to

**Options :**

1. ✖ inadequate ventilation

2. ✖ storage in large heaps with small surface to volume

3. ✖ low temperature oxidation

4. ✔ excessive oxygen

**Question Number : 78 Question Id : 2839369838 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following component is more dangerous to ozone layer?

**Options :**

1. ✔ Halons

2. ✖ Sulphur

3. ✖ CFCs

4. ✖ Nitrogen

**Question Number : 79 Question Id : 2839369839 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The pressure required to circulate 2400 $m^3$/min of air through a 3 km long tunnel of 3 m × 2.5 m cross section with k = 0.001 $Ns^2m^{-4}$ is

**Options :**

1. ✔ 125 Pa

2. ✖ 225 Pa

3. ✖ 375 Pa

4. ✖ 300 Pa

**Question Number : 80 Question Id : 2839369840 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The factor of safety required for drum winders to be used for men winding is

**Options :**

1. ✖ 6

2. ✖ 8

3. ✔ 10

4. ✖ 4

**Question Number : 81 Question Id : 2839369841 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

As per the Indian law the methane concentration should not exceed "X%" in the return of a ventilation district, then X is given by

**Options :**

1. ✔ 0.75%

2. ✖ 0.25%

3. ✖ 1.25%

4. ✖ 0.45%

**Question Number : 82 Question Id : 2839369842 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A district of an underground mine is ventilated by 40 $m^3/s$. Water gauge across the district is 30 mm. If the quantity has to be reduced to 25$m^3/s$ by installing a regulator in the return of the district, then the size of the regulator is

**Options :**

1. ✖ 4.44 $m^2$

2. ✖ 5.1 $m^2$

3. ✖ 3.33 $m^2$

4. ✔ 2.22 $m^2$

**Question Number : 83 Question Id : 2839369843 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Which of the Fire Extinguisher can be used for Electrical fires?

**Options :**

1. ✖ Water type

2. ✔ $CO_2$ type

3. ✖ Foam type

4. ✖ Automatic

**Question Number : 84 Question Id : 2839369844 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

50 dB + 50 dB =

**Options :**

1. ✔ 53 dB

2. ✖ 100 dB

3. ✖ 0 dB

4. ✖ 50 dB

**Question Number : 85 Question Id : 2839369845 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Identify the wrong statement:

The application of controlled air recirculation in an underground work place can

**Options :**

1. ✖ increase the air velocity at the work place

2. ✔ lead to increased concentration of contaminants in the work place

3. ✖ require the installation of an additional fan in the system

4. ✖ lead to overall ventilation cost savings

**Question Number : 86 Question Id : 2839369846 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

For geometrically similar fans the impeller diameter is 'D', speed of rotation is 'n' and air density is 'ρ', then the fan pressure is proportional to

**Options :**

1. ✗ $nD^2\rho$

2. ✓ $n^2D^2\rho$

3. ✗ $n^2D^5\rho^2$

4. ✗ $n^3D^5\rho$

**Question Number : 87 Question Id : 2839369847 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In the context of gas testing using flame safety lamp, the correct statement is

**Options :**

1. ✗ each accumulation test has to be necessarily followed by percentage test

2. ✗ accumulation test is always done after percentage test

3. either accumulation test or percentage test can be done first

4. ✔ percentage test is done only in the event of accumulation test giving negative result

**Question Number : 88 Question Id : 2839369848 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Stone dust barriers in underground coal mines are used to arrest

**Options :**

1. ✖ black damp explosions

2. ✖ air blast

3. ✖ fire damp explosions

4. ✔ coal dust explosions

**Question Number : 89 Question Id : 2839369849 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

From a coal seam of a mine 1000 tonnes of coal is produced per day. The seam has inflammable gas emission rate of 14000 $m^3$ per day. If percentage of inflammable gas in general body of air is 0.14, then the gassiness of the seam is

1. ✖

**Options :**

1. ✗ Degree IV

2. ✓ Degree III

3. ✗ Degree II

4. ✗ Degree I

**Question Number : 90 Question Id : 2839369850 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The 'Yellow Boy' formed due to acid mine drainage mainly consist of

**Options :**

1. ✗ ferrous hydroxide

2. ✗ ferrous sulphate

3. ✓ ferric hydroxide

4. ✗ ferric sulphate

**Question Number : 91 Question Id : 2839369851 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Underground coal mines are in principle ventilated by exhausting system, so that

**Options :**

1. spontaneous heating risk is reduced

2. fumes can be quickly removed in case of an underground fire

3. build-up of methane concentration is decreased

4. to dilute carbon monoxide in working areas.

**Question Number : 92 Question Id : 2839369852 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Identify the WRONG statement.

The 'temperature inversion' of the atmosphere in surface mines aggravates the problem of

**Options :**

1. airborne dust

2. noise

3. ground vibrations

4. visibility

**Question Number : 93 Question Id : 2839369853 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

With reference to Coward diagram, match the following in the context of explosibility of a mixture of 'normal air' and 'methane'.

| ($O_2$ %, $CH_4$ %) | Mixture status |
|---|---|
| P. 20.5, 2.4 | 1. Impossible mixture |
| Q. 19.0, 9.5 | 2. Non-explosive |
| R. 17.0, 19.0 | 3. Potentially explosive |
| S. 20.0, 19.5 | 4. Explosive |

**Options :**

1. ✔ P-2, Q-4, R-3, S-1

2. ✖ P-2, Q-3, R-1, S-4

3. ✖ P-2, Q-4, R-1, S-3

4. ✖ P-3, Q-2, R-1, S-4

**Question Number : 94 Question Id : 2839369854 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

✖

An underground coal mine panel produces 520 tonnes per day deploying 220, 200 and 192 persons in three shifts. As per CMR 1957, the minimum quantity of air in $m^3$ /min to be delivered at the last ventilation connection of the panel is

**Options :**

1. 1020

2. 1120

3. 1220

4. 1320

**Question Number : 95 Question Id : 2839369855 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Match the following in the context of underground mine environment

| Instrument | Measuring parameter |
|---|---|
| P. Haldane apparatus | 1. Humidity |
| Q. Godbert-Greenwald apparatus | 2. Air velocity |
| R. Hygrometer | 3. Mine air composition |
| S. Anemometer | 4. Ignition point temperature |

**Options :**

1. P-2, Q-1, R-3, S-4

2. ✔ P-3, Q-4, R-1, S-2

3. ✖ P-4, Q-2, R-3, S-1

4. ✖ P-1, Q-3, R-4, S-2

**Question Number : 96 Question Id : 2839369856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Which of the following is correct match

| Equation/formula/law | Application |
|---|---|
| P. Bernoulli equation | 1. Pressure loss in laminar flow of fluid |
| Q. Poiseuille equation | 2. Drag loss due to regular obstructions in fluid flow |
| R. Bromilow's formula | 3. Energy conservation in ideal fluid flow |
| S. Stokes law | 4. Terminal settling velocity of fine particles in fluid |

the correct match is

**Options :**

1. ✔ P-3, Q-1, R-2, S-4

2. ✖ P-1, Q-3, R-2, S-4

3. ✖ P-2, Q-3, R-4, S-1

✖

4. P-3, Q-1, R-4, S-2

**Question Number : 97 Question Id : 2839369857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Pressure characteristic of a mine fan is given by $P = -0.06Q^2 + 400$, where P is the pressure in Pa and Q is quantity in $m^3/s$. The resistance of the mine is 0.19 $Ns^2/m^8$, then the mine quantity in $m^3/s$ is

**Options :**

1. 160.0

2. 53.5

3. 45.9

4. 40.0

**Question Number : 98 Question Id : 2839369858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Nystagmus is a miner's disease associated with

**Options :**

1. liver

2. lung

3. eye

4. stomach

**Question Number : 99 Question Id : 2839369859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Match the following

| Mine gas | Principal constituent |
|---|---|
| P. Stink damp | 1. CO |
| Q. White damp | 2. $H_2S$ |
| R. Black damp | 3. $CH_4$ |
| S. Fire damp | 4. $CO_2$ |

**Options :**

1. ✖ P-1, Q-2, R-3, S-4

2. ✖ P-3, Q-4, R-1, S-2

3. ✔ P-2, Q-1, R-4, S-3

4. ✖ P-2, Q-1, R-3, S-4

**Question Number : 100 Question Id : 2839369860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A Drager Gas Mask does not filter

**Options :**

1. ✖ water vapour

2. ✔ nitrous fumes

3. ✖ carbon monoxide

4. ✖ carbon dioxide

**Question Number : 101 Question Id : 2839369861 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

IRR of a project is the discount rate at which

**Options :**

1. ✖ profit after tax is zero

2. ✖ written down value of the project is zero

3. ✖ revenue from the project is zero

4. ✔ NPV is zero

**Question Number : 102 Question Id : 2839369862 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The difference between depreciation and amortization allowances in tax calculation is that

**Options :**

1. ✔ depreciation is for a tangible asset applicable on its declared life, whereas amortization is for an intangible asset applicable on a specified period

2. ✖ depreciation is for an intangible asset applicable on its declared life, whereas amortization is for a tangible asset applicable on a specified period

3. ✖ depreciation is for a tangible asset applicable on a specified period, whereas amortization is for an intangible asset applicable on its declared life

4. ✖ depreciation is for an intangible asset applicable on a specified period, whereas amortization is for tangible asset applicable on its declared life

**Question Number : 103 Question Id : 2839369863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Which one of the following does not belong to the direct operating cost of a mine?

**Options :**

1. ✔ administrative cost

2. ✖ royalty

3. ✖ fuel cost

4. ✖ explosive cost

**Question Number : 104 Question Id : 2839369864 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Father of the Industrial Engineering is

**Options :**

1. ✖ Jeck Gilberth

2. ✔ Gnatt

3. ✖ Tylor

4. ✖ Newton

**Question Number : 105 Question Id : 2839369865 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

An equipment costs Rs. 8,00,000 today and has a service life of 15 years. The salvage value at the end of 15 years is Rs. 2,00,000, then the value at the end of 10 years is

**Options :**

1. ✔ 12.25

2. ✖ 16.6

3. ✖ 10.50

4. ✖ 8.75

**Question Number : 106 Question Id : 2839369866 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If the value of ore is Rs 600 per tonne, production cost Rs. 400 per tonne and stripping cost is Rs. 50 per tonne, the breakeven stripping ratio of the mine is

**Options :**

1. ✖ 2:1

2. ✖ 3:1

3. ✖ 1:2

4. ✔ 4:1

**Question Number : 107 Question Id : 2839369867 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

An investment at 10% yearly interest rate, compounded quarterly, accumulates to a sum of Rs. 120,000 in 5 years, then the present value of the sum in rupees is

**Options :**

1. ✔ 72,233

2. ✖ 74,511

3. ✖ 88,232

4. ✖ 106,063

**Question Number : 108 Question Id : 2839369868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A system consists of four elements A, B, C and D which are connected functionally in a parallel configuration. The individual reliability of the elements is 0.80, 0.82, 0.85 and 0.90 respectively, then the reliability of the system is

**Options :**

1. ✖ 0.498

2. ✖ 0.602

3. ✖ 0.750

4. ✔ 0.999

**Question Number : 109 Question Id : 2839369869 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A safety device consists of two independent critical components $X_1$ and $X_2$. The failure of any one or both of these components can cause an accident. The failure probabilities of components $X_1$ and $X_2$ are 0.2 and 0.1 respectively, then the probability of occurrence of an accident is

**Options :**

1. ✔ 0.28

2. ✖ 0.50

3. ✖ 0.20

4. ✖ 0.40

**Question Number : 110 Question Id : 2839369870 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The failure and the repair rates of a shovel are 0.06 $hr^{-1}$ and 0.04 $hr^{-1}$ respectively, then the availability of the shovel in percentage is

**Options :**

1. ✖ 20

2. ✔ 40

3. ✖ 60

4. ✖ 80

**Question Number : 111 Question Id : 2839369871 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

A mining company produces iron ore and sells to another company, then the Royalty to be paid is on the basis of

**Options :**

1. ✖ quantity of ore produced

2. ✔ quantity of ore sold

3. ✖ difference between the quantities of ore produced and sold

4. ✖ net profit

**Question Number : 112 Question Id : 2839369872 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Simplex method of solving linear programming problem uses

**Options :**

1. ✖ all the points in the feasible region

2. ✔ only the corner points of the feasible region

3. ✖ intermediate points within the feasible region

4. ✖ only the interior points in the feasible region

**Question Number : 113 Question Id : 2839369873 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a transportation problem with 4 supply points and 5 demand points, the number of constraints required in its formulation are

**Options :**

1. ✖ 20

2. ✖ 1

3. ✖ 0

4. ✔ 9

**Question Number : 114 Question Id : 2839369874 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

The total number of allocations in a basic feasible solution of transportation problem of $m \times n$ size is

**Options :**

1. ✗ $m \times n$

2. ✗ $(m/n) - 1$

3. ✗ $m + n + 1$

4. ✓ $m + n - 1$

**Question Number : 115 Question Id : 2839369875 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

If m is the number of constraints in a linear programming with two variables x and y and non-negativity constraints $x \geq 0, y \geq 0$, then the feasible region in the graphical solution is surrounded by the number of lines are

**Options :**

1. ✗ $m$

2. ✖ m+1

3. ✔ m + 2

4. ✖ m+4

**Question Number : 116 Question Id : 2839369876 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Three jobs A, B and C are to be assigned to three machines X, Y and Z, the processing costs are given below

| | | Machine | | |
|---|---|---|---|---|
| | | X | Y | Z |
| Job | A | 19 | 28 | 31 |
| | B | 11 | 17 | 16 |
| | C | 12 | 15 | 13 |

The minimum total cost of assigning the jobs to the machines is

**Options :**

1. ✖ 60

2. ✖ 54

3. ✖ 51

4. ✔ 49

**Question Number : 117 Question Id : 2839369877 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Unit cost of a transportation problem is given below in certain monetary units

| | | Destination | | | Supply |
|---|---|---|---|---|---|
| | | City 1 | City 2 | City 3 | |
| Source | 1 | 2 | 2 | 8 | 15 |
| | 2 | 1 | 5 | 7 | 40 |
| | 3 | 6 | 4 | 3 | 20 |
| | Demand | 10 | 25 | 40 | |

The total cost of transportation based on the initial basic feasible solution obtained by the North-West Corner rule is

**Options :**

1. ✖ 250

2. ✖ 290

3. ✔ 330

4. ✖ 360

**Question Number : 118 Question Id : 2839369878 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

In a PERT network, the activities on the critical path are a, b and c. The standard deviations of the durations of these activities are 2, 2 and 1 respectively, then the variance of the project duration is

**Options :**

1. ✖ 3

2. ✖ 5

3. ✔ 9

4. ✖ 12

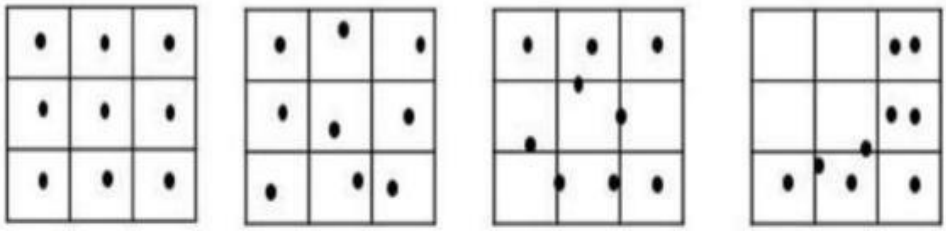
**Question Number : 119 Question Id : 2839369879 Question Type : MCQ Option Shuffling : Yes**

**Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time**

**: N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Match the following sampling patterns with the corresponding sampling types



P Q R S

| Sampling pattern | Sampling Type | |
|---|---|---|
| P | 1 | Regular |
| Q | 2 | Biased |
| R | 3 | Stratified random |
| S | 4 | Random |

**Options :**

1. ✖ P-1, Q-3, R-2, S-4

2. ✔ P-1, Q-3, R-4, S-2

3. ✖ P-1, Q-2, R-3, S-4

4. ✖ P-4, Q-2, R-1, S-3

**Question Number : 120 Question Id : 2839369880 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1 Wrong Marks : 0**

Semi-variogram modelling is used for reserve estimation of mineral deposit by

**Options :**

1. ✖ polygonal method

2. ✖ distance weighing method

3. ✔ geostatistical method

4. ✖ nearest neighbor method