

Notations :

- Options shown in **green** color and with  icon are correct.
- Options shown in **red** color and with  icon are incorrect.

Question Paper Name :

Metallurgical Engineering 12th June 2024
Shift 2

Subject Name :

Metallurgical Engineering

Creation Date :

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Duration :

120

Total Marks :

120

Display Marks:

Yes

Share Answer Key With Delivery Engine :

Yes

Actual Answer Key :

Yes

Change Font Color :

No

Change Background Color :

No

Change Theme :

No

Help Button :

No

Show Reports :

No

Show Progress Bar :

No

Metallurgical Engineering

Group Number :

1

Group Id :

38382345

Group Maximum Duration :

0

Group Minimum Duration :

120

Show Attended Group? :

No

Edit Attended Group? :

No

Break time :

0

Group Marks :

120

Mathematics

Section Id :

383823120

Section Number :

1

Section type :

Online

Mandatory or Optional :

Mandatory

Number of Questions : 10
 Number of Questions to be attempted : 10
 Section Marks : 10
 Maximum Instruction Time : 0
 Sub-Section Number : 1
 Sub-Section Id : 383823120
 Question Shuffling Allowed : Yes

Question Number : 1 Question Id : 3838236241 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes
 Correct Marks : 1 Wrong Marks : 0

If $X_1 = \begin{bmatrix} 1 \\ i \end{bmatrix}, X_2 = \begin{bmatrix} i \\ 1 \end{bmatrix}$ are given vectors and $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$.

If $P = [X_1, X_2]$ then $P^{-1}AP$ is

Options :

1. ✓ $\begin{bmatrix} e^{i\theta} & 0 \\ 0 & e^{-i\theta} \end{bmatrix}$

2. ✗ $\begin{bmatrix} e^\theta & 0 \\ 0 & e^\theta \end{bmatrix}$

3. ✗ $\begin{bmatrix} 1 & 1 \\ 0 & 0 \end{bmatrix}$

4. ✗ $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Question Number : 2 Question Id : 3838236242 Question Type : MCQ Option Shuffling : Yes
 Display Question Number : Yes
 Correct Marks : 1 Wrong Marks : 0

The rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 0 \\ 0 & -4 & -8 & 3 \\ 2 & 4 & 3 & 2 \\ 0 & -4 & -11 & 5 \end{bmatrix}$ is

Options :

1. ✗ 4

2. ✖ 2

3. ✖ 1

4. ✔ 3

Question Number : 3 Question Id : 3838236243 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If $x > 0$, the series $x + 2x^2 + 3x^3 + \dots$ is

Options :

1. ✖ convergent if $x > 1$ and divergent $x \geq 1$

2. ✔ convergent if $x < 1$ and divergent $x \geq 1$

3. ✖ divergent if $x > 1$ and convergent $x > 1$

4. ✖ convergent if $x \leq 1$ and convergent $x \geq 1$

Question Number : 4 Question Id : 3838236244 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If $u = \sin^{-1}\left(\frac{x}{y}\right) + \tan^{-1}\left(\frac{y}{x}\right)$ then the value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$ is

Options :

1. ✖ $\frac{1}{\sqrt{y^2 - x^2}}$

2. ✖ $\frac{-1}{y^2 - x^2}$

3. ✔ 0

4. ✖ 1

Question Number : 5 Question Id : 3838236245 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If $\vec{r} = xi + yj + zk$ is position vector of a point, then $\text{curl} \vec{r}$ is

Options :

1. ✓ null vector

2. ✗ 0

3. ✗ $i + j + k$

4. ✗ $i - j$

Question Number : 6 Question Id : 3838236246 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Laplace transform of $\frac{e^{-at} - e^{-bt}}{t}$ is

Options :

1. ✗ $\log\left(\frac{s+a}{s+b}\right)$

2. ✓ $\log\left(\frac{s+b}{s+a}\right)$

3. ✗ $\frac{\pi}{2} - \tan^{-1} s$

4. ✗ $\frac{\pi}{2} - \cot^{-1} s$

Question Number : 7 Question Id : 3838236247 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The particular integral of $(D^2 + 4)y = \cos 3x + \sin 2x$ is

Options :

1. ✗

$$\frac{1}{20}(\cos 3x + 5x \cos 2x)$$

2. ✖ $\frac{1}{20}(4\cos 3x + 5x \cos 2x)$

3. ✔ $-\frac{1}{20}(4\cos 3x + 5x \cos 2x)$

4. ✖ $\frac{1}{20}(4\cos 3x + x \cos 2x)$

Question Number : 8 Question Id : 3838236248 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The table below gives the values of $f(x)$ at five equidistant points of x .

x	0	0.5	1	1.5	2
$f(x)$	0	0.25	1	2.25	4

Then the approximate value of $\int_0^2 f(x)dx$ by Trapezoidal rule is

Options :

1. ✖ 1.75

2. ✖ 2

3. ✖ 2.5

4. ✔ 2.75

Question Number : 9 Question Id : 3838236249 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If $2Y - X - 50 = 0$, $3Y - 2X - 10 = 0$ are the two regression equations, then the mean values of the variables X and Y respectively are

Options :

1. ✖ 80 and 90

2. ✓ 130 and 90

3. ✗ 96 and 130

4. ✗ 90 and 80

Question Number : 10 Question Id : 3838236250 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following cannot be the probability mass function of any discrete random variable X?

Options :

1. ✗ $P(X = x) = \frac{1}{6}$ for $x = 1, 2, 3, 4, 5, 6$

2. ✗ $P(X = x) = \frac{1}{3}$ for $x = 1, 2, 3$

3. ✗ $P(X = x) = \frac{1}{2}$ for $x = 1, 2$

4. ✓ $P(X = x) = \frac{1}{4}$ for $x = 1, 2$

Metallurgical Engineering

Section Id :	383823121
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	110
Number of Questions to be attempted :	110
Section Marks :	110
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	383823121
Question Shuffling Allowed :	Yes

Question Number : 11 Question Id : 3838236251 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

“It is impossible for a heat engine to be 100% efficient”. This statement is related to

Options :

1. ✗ First law of thermodynamics
2. ✓ Second law of thermodynamics
3. ✗ Enthalpy
4. ✗ Diffusion

Question Number : 12 Question Id : 3838236252 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

If a system is completely ordered and the atoms are at rest at zero Kelvin, then the entropy of the system is

Options :

1. ✓ Zero
2. ✗ Positive
3. ✗ Negative
4. ✗ Cannot be defined

Question Number : 13 Question Id : 3838236253 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Electrodes used in anodizing process are

Options :

1. ✗ Iron as cathode and work piece as anode
2. ✓ Lead as cathode and work piece as anode
3. ✗ Work piece as cathode and copper as anode

4. ✖ Work piece as cathode and zinc as anode

Question Number : 14 Question Id : 3838236254 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Units for quantity of electricity are

Options :

1. ✖ Volt
2. ✖ Ampere
3. ✖ Joule
4. ✔ Coulomb

Question Number : 15 Question Id : 3838236255 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Identify the wrong statement

Options :

1. ✖ Alkali halides are highly conductive
2. ✔ Mercury chloride is very good conductor of electricity
3. ✖ Fused salts are good conductor of electricity
4. ✖ Easily polarizable ions in the fused salt mixtures reduces the ionic mobility

Question Number : 16 Question Id : 3838236256 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Identify the noble metal

Options :

1. ✖ Silver
2. ✖ Lead

3. ✖ Zinc

4. ✔ Platinum

Question Number : 17 Question Id : 3838236257 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Hydrogen overvoltage is observed in

Options :

1. ✖ Oxidation processes

2. ✔ Cathodic processes

3. ✖ Anodic processes

4. ✖ Smelting processes

Question Number : 18 Question Id : 3838236258 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Tafel equation defines the relation between

Options :

1. ✖ Oxygen overvoltage and current density

2. ✔ Hydrogen overvoltage and current density

3. ✖ Decomposition voltage and current density

4. ✖ Cell voltage and current density

Question Number : 19 Question Id : 3838236259 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Second law of thermodynamics can be stated as

Options :

1. ✖ Work done by the system is zero

2. ✖ $\Delta H = 0$
3. ✖ $\Delta U_{\text{cycle}} = 0$
4. ✔ $dS = \delta q_{\text{rev}}/T$

Question Number : 20 Question Id : 3838236260 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

An expression for Gibbs free energy is

Options :

1. ✔ $H - TS$
2. ✖ $U - TS$
3. ✖ $dS_{\text{system}} + dS_{\text{surroundings}}$
4. ✖ $dU = T dS - P dV$

Question Number : 21 Question Id : 3838236261 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Identify the incorrect statement

Options :

1. ✔ $dH = VdP - TdS$

$$\frac{d\left(\frac{G}{T}\right)}{d\left(\frac{1}{T}\right)} = H$$

2. ✖

$$\frac{d\left(\frac{\Delta G}{T}\right)}{d\left(\frac{1}{T}\right)} = \Delta H$$

3. ✖

$$TdG - GdT = -HdT$$

4. ✖

Question Number : 22 Question Id : 3838236262 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

“The heat capacity of a solid compound is equal to the sum of the heat capacities of its constituent elements”. This statement is known as

Options :

1. ✖ Trouton’s rule
2. ✖ Dulong and Petit’s law
3. ✖ Kirchoff’s law
4. ✔ Neumann – Kopps rule

Question Number : 23 Question Id : 3838236263 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The difference of C_p and C_v of a substance is

Options :

1. ✖ Positive, finite and variable quantity
2. ✖ Negative, finite and constant quantity
3. ✔ Positive, finite and constant quantity
4. ✖ Negative, finite and variable quantity

Question Number : 24 Question Id : 3838236264 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Ellingham diagram for metal – oxide system doesn’t give idea about

Options :

1. ✖ Kinetics of the oxidation reaction
2. ✖ Oxidation of metals

3. ✓ Value of partial pressure of oxygen for the reactions shown in a diagram

4. ✗ Reduction of metal oxides

Question Number : 25 Question Id : 3838236265 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a reversible cycle, the sum of change in $\frac{q}{T}$ is

(where q is heat absorbed and T is absolute temperature)

Options :

1. ✓ Zero

2. ✗ One

3. ✗ Two

4. ✗ Three

Question Number : 26 Question Id : 3838236266 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

With increase in pressure, the bulk diffusion in catalyst pore

Options :

1. ✓ Decreases

2. ✗ Increases

3. ✗ Increases exponentially

4. ✗ Remains unchanged

Question Number : 27 Question Id : 3838236267 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Equilibrium of a chemical reaction as viewed by kinetics is in a

Options :

1. ✖ Static steady state
2. ✔ Dynamic steady state
3. ✖ Dynamic unsteady state
4. ✖ Static unsteady state

Question Number : 28 Question Id : 3838236268 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The rate of homogeneous reaction is a function of

Options :

1. ✖ Pressure and composition only
2. ✖ Temperature and pressure only
3. ✖ Composition and temperature only
4. ✔ Temperature, pressure and composition

Question Number : 29 Question Id : 3838236269 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The reactions with low activation energy are

Options :

1. ✖ Slow
2. ✔ Fast
3. ✖ Non-spontaneous
4. ✖ Always spontaneous

Question Number : 30 Question Id : 3838236270 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Arrhenious equation represents graphically the variation between the

Options :

1. ✓ Rate constant and temperature
2. ✗ Rate of reaction and temperature
3. ✗ Activation energy and temperature
4. ✗ Frequency factor and temperature

Question Number : 31 Question Id : 3838236271 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Xanthates are used as

Options :

1. ✓ Collectors
2. ✗ pH reagents
3. ✗ Moderators
4. ✗ Frothers

Question Number : 32 Question Id : 3838236272 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Primary step of ore processing is

Options :

1. ✗ Grinding
2. ✓ Crushing
3. ✗ Magnetic separation
4. ✗ Jigging

Question Number : 33 Question Id : 3838236273 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Liberation is done for

Options :

1. ✓ Separation of particles
2. ✗ Sizing of the ore
3. ✗ Concentration of the ore
4. ✗ Oxidising the ores

Question Number : 34 Question Id : 3838236274 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Direct coal is charged as fuel in

Options :

1. ✗ SR process
2. ✓ COREX process
3. ✗ ELRED process
4. ✗ MIDREX process

Question Number : 35 Question Id : 3838236275 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

TISCO located at

Options :

1. ✗ Hazira
2. ✗ Vijayanagaram
3. ✗ Raigarh

4. ✓ Jamshedpur

Question Number : 36 Question Id : 3838236276 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In Indian blast furnaces for iron production, the oxygen enrichment is done up to

Options :

1. ✗ 12% of oxygen
2. ✗ 20% of oxygen
3. ✓ 25% of oxygen
4. ✗ 40% of oxygen

Question Number : 37 Question Id : 3838236277 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Bleeder valves in the blast furnace is provided at

Options :

1. ✗ Below mantle region
2. ✗ Below stack region
3. ✗ Top of stack region
4. ✓ Top of uptakes

Question Number : 38 Question Id : 3838236278 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The important reactions that occur in tuyeres region in blast furnace is

Options :

1. ✗ Slag melting
2. ✓ Combustion of coke

3. ✖ Reduction of iron oxides

4. ✖ Solution loss reaction

Question Number : 39 Question Id : 3838236279 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

JFN number in LD converter process is defined as

Options :

1. ✖ $JFN = \text{Gas pressure} \times (\text{Lance height} / \text{Nozzle diameter})$

2. ✖ $JFN = \text{Nozzle diameter} \times (\text{Lance height} / \text{Gas pressure})$

3. ✔ $JFN = \text{Gas pressure} \times (\text{Nozzle diameter} / \text{Lance height})$

4. ✖ $JFN = (\text{Gas pressure} + \text{Lance height}) \times \text{Nozzle diameter}$

Question Number : 40 Question Id : 3838236280 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

First element to be removed during steel making by BOF method is

Options :

1. ✖ Cadmium

2. ✖ Carbon

3. ✔ Silicon

4. ✖ Manganese

Question Number : 41 Question Id : 3838236281 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Calamine is an ore of

Options :

1. ✖ Lead

2. ✖ Iron

3. ✖ Copper

4. ✔ Zinc

Question Number : 42 Question Id : 3838236282 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

VAD process is a

Options :

1. ✖ Iron extraction process

2. ✖ Reduction process

3. ✔ Secondary refining process

4. ✖ Concentration process

Question Number : 43 Question Id : 3838236283 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Sulphide shape control in steel making is done by adding

Options :

1. ✖ Copper

2. ✔ Argon

3. ✖ Zinc

4. ✖ Nickel

Question Number : 44 Question Id : 3838236284 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Hoope's process used for

Options :

1. ✖ Extraction of copper
2. ✖ Concentration of lead ore
3. ✔ Refining of aluminium
4. ✖ Refining of titanium

Question Number : 45 Question Id : 3838236285 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Metallurgical coke is charged to

Options :

1. ✖ LD convertor
2. ✖ Secondary steel making
3. ✔ Iron blast furnace
4. ✖ Bayer process

Question Number : 46 Question Id : 3838236286 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Ladle metallurgy does not include the following operation

Options :

1. ✖ Deoxidation
2. ✔ Decarburisation
3. ✖ Desulphurisation
4. ✖ Sulphide shape control

Question Number : 47 Question Id : 3838236287 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Titanium is produced by

Options :

1. ✓ Magnesium reduction of TiCl_4
2. ✗ Electrolytic reduction of TiCl_4
3. ✗ Thermal dissociation of TiCl_4
4. ✗ Calcium reduction of TiCl_4

Question Number : 48 Question Id : 3838236288 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following is a suitable method to remove hydrogen from molten aluminium?

Options :

1. ✗ Cover melt surface with a flux
2. ✗ Increase melt temperature
3. ✗ Expose flowing melt to vacuum
4. ✓ Bubble humidified argon gas through the melt

Question Number : 49 Question Id : 3838236289 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Aluminium is not commercially produced by carbo-thermic reduction because

Options :

1. ✗ It melts at a low temperature
2. ✗ It does not vaporise at reasonable temperature

Al – Al_2O_3 line is too low in the Ellingham diagram and need excessively high

3. ✓ temperature

4. ✖ Aluminium metal will have excessive dissolved oxygen

Question Number : 50 Question Id : 3838236290 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The process of cementation involves

Options :

1. ✔ Elimination of a more reactive metal from molten metal by preferential oxidation
2. ✖ Refining by preferential dissolution of the desired metal in a organic solvent
3. ✖ Extraction by selective dissolution of the desired metal in an inorganic solvent
4. ✖ Separation of the desired metal by adding a more reactive metal

Question Number : 51 Question Id : 3838236291 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Ratio of packing factor of an FCC crystal to the packing factor of a simple cubic crystal is

Options :

1. ✖ 1.0
2. ✖ 0.702
3. ✔ 1.423
4. ✖ 2.502

Question Number : 52 Question Id : 3838236292 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Interplanar spacing between parallel planes can be determined by

Options :

1. ✖ Scanning Electron Microscope
2. ✔ Transmission Electron Microscope

3. ✖ Spectrophotometer

4. ✖ Thermogravimetric Analyser

Question Number : 53 Question Id : 3838236293 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Thin sheets of ceramic material is produced by

Options :

1. ✔ Tape casting

2. ✖ Rolling

3. ✖ Forging

4. ✖ Injection molding

Question Number : 54 Question Id : 3838236294 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which one of the following is used as solder in an electronic industry?

Options :

1. ✖ Pb – Cu

2. ✖ Cu – Sn

3. ✖ Sn – Sb

4. ✔ Pb – Sn

Question Number : 55 Question Id : 3838236295 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Reinforcing material which possess highest tensile strength from the following is

Options :

1. ✖ Si_3N_4 fiber
2. ✖ S – glass fiber
3. ✖ SiC fiber
4. ✔ Graphite fiber

Question Number : 56 Question Id : 3838236296 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Composite products such as pressure vessels, liquid storage tanks and rocket motor castings are made by

Options :

1. ✖ Pultrusion
2. ✖ Resin transfer molding
3. ✖ Vacuum bagging
4. ✔ Filament winding

Question Number : 57 Question Id : 3838236297 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following is not the characteristics of a gray cast iron?

Options :

1. ✖ Brittle
2. ✖ Breaks preferentially along the graphite flakes
3. ✔ Produce a white fracture surface
4. ✖ Good damping property

Question Number : 58 Question Id : 3838236298 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Identify the element which increases the Ms temperature of a steel containing 1.0%C

Options :

1. ✖ Chromium
2. ✖ Copper
3. ✖ Manganese
4. ✔ Aluminium

Question Number : 59 Question Id : 3838236299 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Bain distortion model explains

Options :

1. ✔ The atomic movement involved in martensitic transformation
2. ✖ Formation of bainite by isothermal transformation
3. ✖ Formation of pearlite by eutectoid transformation
4. ✖ Formation of ledeburite by eutectic transformation

Question Number : 60 Question Id : 3838236300 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Stepped quenching process is also called as

Options :

1. ✖ Austempering
2. ✖ Self tempering
3. ✔ Martempering
4. ✖ Spray quenching

Question Number : 61 Question Id : 3838236301 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Grossman's critical diameter method is adopted to determine

Options :

1. ✖ Case depth in carburising methods
2. ✖ Percentage of ductility
3. ✖ Percentage of carbon in steel
4. ✔ Hardenability of steel

Question Number : 62 Question Id : 3838236302 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Permanent magnets are made of

Options :

1. ✔ High energy hard magnetic material
2. ✖ Ti-Al-V alloy
3. ✖ Commercial iron
4. ✖ Copper – Zinc alloy

Question Number : 63 Question Id : 3838236303 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Nitriding of the steel is done at low temperatures because

Options :

1. ✔ To favour nitrogen diffusion
2. ✖ To favour carbon diffusion
3. ✖ To minimize thermal cracks

4. ✖ To soften the ferrite phase

Question Number : 64 Question Id : 3838236304 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Minimum percent of nickel needed in stainless steel to stabilize the austenitic FCC phase is

Options :

1. ✖ 2

2. ✖ 4

3. ✔ 9

4. ✖ 16

Question Number : 65 Question Id : 3838236305 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Cu – Be alloys are strengthened by

Options :

1. ✖ Solid solution strengthening

2. ✖ Dispersion strengthening

3. ✖ Grain refinement

4. ✔ Precipitation strengthening

Question Number : 66 Question Id : 3838236306 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Polystyrene belongs to

Options :

1. ✖ Ceramic material

2. ✖ Composite material
3. ✔ Thermoplastic material
4. ✖ Structural material

Question Number : 67 Question Id : 3838236307 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following are the low molecular weight substances added to polymers to increase plasticity and flexibility?

Options :

1. ✖ Fillers
2. ✔ Plasticizers
3. ✖ Inoculants
4. ✖ Stabilisers

Question Number : 68 Question Id : 3838236308 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Hard magnetic material is characterised by

Options :

1. ✖ Only low coercive force
2. ✖ High coercive force and low residual magnetic induction
3. ✔ High coercive force and high residual magnetic induction
4. ✖ Low coercive force and high residual magnetic induction

Question Number : 69 Question Id : 3838236309 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In a single component system, the maximum number of phases that can co-exist in equilibrium is

Options :

- 1. ✖ 0
- 2. ✖ 2
- 3. ✔ 3
- 4. ✖ 4

Question Number : 70 Question Id : 3838236310 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Magnetic permeability of iron is increased by

Options :

- 1. ✖ Purification
- 2. ✖ Decarburising
- 3. ✖ Alternating heating and cooling
- 4. ✔ Alloying with cobalt

Question Number : 71 Question Id : 3838236311 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Plastics as a material of construction suffer from the drawback of low

Options :

- 1. ✔ Strength
- 2. ✖ Density
- 3. ✖ Machinability
- 4. ✖ Plastic deformation

Question Number : 72 Question Id : 3838236312 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Machinability of hard alloys and tool steels is improved by

Options :

1. ✓ Annealing
2. ✗ Normalising
3. ✗ Spheroidising
4. ✗ Tempering

Question Number : 73 Question Id : 3838236313 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Copper is not present as an alloying constituent in

Options :

1. ✓ Nichrome
2. ✗ Delta metal
3. ✗ Silicone bronze
4. ✗ Constantan

Question Number : 74 Question Id : 3838236314 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In precipitation hardenable alloy, like duralumin, intermediate precipitates can form due to

Options :

1. ✓ Coherency strains
2. ✗ Ease of diffusion
3. ✗ Difficulty of the growth of the final precipitate

4. ✖ Difficulty of nucleation of the final precipitate

Question Number : 75 Question Id : 3838236315 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Vanadium in high speed steels

Options :

1. ✖ Provides high hot hardness
2. ✖ Promotes retention of austenite
3. ✖ Increases toughness
4. ✔ Forms very hard carbides and thus increases wear resistance

Question Number : 76 Question Id : 3838236316 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a point defect?

Options :

1. ✔ Dislocation
2. ✖ Interstitials
3. ✖ Vacancies
4. ✖ Frenkel defect

Question Number : 77 Question Id : 3838236317 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

True strain (ϵ) and engineering strain (e) are related by

Options :

1. ✖ $\epsilon = 1 + e$
2. ✔ $\epsilon = \ln(1 + e)$

3. ✖ $e = \ln(1 + \epsilon)$

4. ✖ $\epsilon = \frac{1}{(1 + e)}$

Question Number : 78 Question Id : 3838236318 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Perfect plastic material is

Options :

1. ✔ Rigid

2. ✖ Exhibits elastic property

3. ✖ Very hard

4. ✖ Very brittle

Question Number : 79 Question Id : 3838236319 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The value of Poisson's ratio of most of the metals is

Options :

1. ✖ 0.20

2. ✖ 0.28

3. ✔ 0.33

4. ✖ 1.5

Question Number : 80 Question Id : 3838236320 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Levy – Mises equations are valid for

Options :

1. ✖ Soft material

- 2. ✖ Ideal plastic material with elastic region
- 3. ✖ Hardened material
- 4. ✔ Ideal plastic material

Question Number : 81 Question Id : 3838236321 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Extensive plastic deformation occurs during

Options :

- 1. ✔ Cold work
- 2. ✖ Injection molding
- 3. ✖ Casting
- 4. ✖ Heat treatment

Question Number : 82 Question Id : 3838236322 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Metals with high monotonic strain – hardening exponents ($n > 0.15$) and those with a low strain – hardening exponents ($n < 0.15$) respectively would undergo

Options :

- 1. ✖ Ideal plastic, Ideal elastic
- 2. ✖ Ideal elastic, ideal plastic
- 3. ✔ Cyclic hardening, cyclic softening
- 4. ✖ Cyclic softening, cyclic hardening

Question Number : 83 Question Id : 3838236323 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Deformation by slip occurs in

Options :

1. ✖ Ceramics
2. ✖ Composites
3. ✔ Metals
4. ✖ Nonmetals

Question Number : 84 Question Id : 3838236324 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The Vicker's diamond pyramid method of hardness determination does not give accurate result, when employed for the

Options :

1. ✖ Hard metals
2. ✔ Forged parts with rough surface
3. ✖ Soft metals
4. ✖ Polished and hardened steel surface

Question Number : 85 Question Id : 3838236325 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The yield point in fatigue loading compared to that in static loading is less. The ratio of ultimate tensile strength to endurance limit of a material subjected to fatigue loading is

Options :

1. ✖ 0.5
2. ✖ 1
3. ✖ 1.5

Question Number : 86 Question Id : 3838236326 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following mechanical properties of a material is most structure insensitive?

Options :

1. ✗ Toughness
2. ✗ Tensile strength
3. ✓ Young's modulus
4. ✗ Percentage reduction of area

Question Number : 87 Question Id : 3838236327 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Decrease in stress at constant deformation under creep conditions is termed as the

Options :

1. ✓ Stress relaxation
2. ✗ Residual stress
3. ✗ Stress relief
4. ✗ Proof stress

Question Number : 88 Question Id : 3838236328 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Creep resistance can be improved by allowing the

Options :

1. ✗ Fine grains to grow
2. ✗ Soft particles to precipitate along grain boundaries

3. ✓ Directional solidification of alloys

4. ✗ Uniformly dispersed coarse particles precipitation in the metal matrix

Question Number : 89 Question Id : 3838236329 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The elastic strain energy of a unit length of an edge dislocation as compared to that of a screw dislocation is

Options :

1. ✗ Less

2. ✓ More

3. ✗ Equal

4. ✗ Double

Question Number : 90 Question Id : 3838236330 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The yield point phenomenon observed in annealed low carbon steel is due to the presence of the following element

Options :

1. ✗ Silicon

2. ✗ Chromium

3. ✓ Carbon

4. ✗ Phosphorous

Question Number : 91 Question Id : 3838236331 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Stretcher strains found in a low carbon sheet are associated with

Options :

1. ✖ Thickness of the sheet
2. ✖ Texture
3. ✖ Dislocation density
4. ✔ Yield point phenomenon

Question Number : 92 Question Id : 3838236332 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Movement of jogs can produce

Options :

1. ✖ Interstitials
2. ✔ Vacancies
3. ✖ Grain boundary segregation
4. ✖ Grain boundary sliding

Question Number : 93 Question Id : 3838236333 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Von Mises criterion for plastic yielding of a ductile material predicts that the yield stress in uniaxial tension is related to that in pure torsion as

Options :

1. ✖ Equal to each other
2. ✖ 2 times
3. ✖ One half
4. ✔ $\sqrt{3}$ times

Question Number : 94 Question Id : 3838236334 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Stress intensity factor, K_{IC} , not depends on

Options :

1. ✖ Geometry of the solid containing the crack
2. ✖ The size and location of the crack
3. ✖ Magnitude and distribution of the loads imposed on the solid
4. ✔ Tensile strength of the material

Question Number : 95 Question Id : 3838236335 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The primary strengthening mechanism in 70:30 brass is

Options :

1. ✖ Precipitation hardening
2. ✖ Dispersion strengthening
3. ✖ Fiber strengthening
4. ✔ Solid solution strengthening

Question Number : 96 Question Id : 3838236336 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Frank-Read source

Options :

1. ✔ Generates dislocation
2. ✖ Hinders the movement of dislocation
3. ✖ Is responsible for polygonization in edge dislocation
4. ✖ Is responsible for dislocation climb

Question Number : 97 Question Id : 3838236337 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The tensile load-elongation curve of a metal does not describe

Options :

1. ✘ Yield stress
2. ✘ Necking strain
3. ✔ Anisotropy index
4. ✘ Work hardening

Question Number : 98 Question Id : 3838236338 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Strain ageing is common in

Options :

1. ✘ High carbon steels
2. ✔ Low carbon steels
3. ✘ High manganese steels
4. ✘ High chromium steels

Question Number : 99 Question Id : 3838236339 Question Type : MCQ Option Shuffling : Yes
Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following has the lowest tensile strength?

Options :

1. ✘ Cementite
2. ✘ Bainite

3. ✖ Martensite

4. ✔ Ferrite

Question Number : 100 Question Id : 3838236340 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The most serious manufacturing defect from fracture toughness point of view is

Options :

1. ✔ Crack

2. ✖ Pore

3. ✖ Surface roughness

4. ✖ Spherical inclusion

Question Number : 101 Question Id : 3838236341 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following occupy maximum percentage of powder metallurgy parts distribution in the engineering industry?

Options :

1. ✖ Hardware

2. ✖ House hold appliances

3. ✔ Automotive

4. ✖ Industrial motors

Question Number : 102 Question Id : 3838236342 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following assumptions is not related to continuous casting?

Options :

1. ✖ Solidification begins only when the metal reaches the secondary cooling zone

2. ✖ The radial temperature gradient in the billet is linear
3. ✔ The longitudinal heat flow in the billet is significant
4. ✖ The metal is poured with zero superheat

Question Number : 103 Question Id : 3838236343 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The objection with the use of ----- is a tendency for producing a fountain effect in the casting.

Options :

1. ✖ Ring gate
2. ✔ Horn gate
3. ✖ Pencil gate
4. ✖ Top gate

Question Number : 104 Question Id : 3838236344 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

The microsegregation observed in casting is called

Options :

1. ✖ Impurities
2. ✖ Diffusion
3. ✖ Dissolution
4. ✔ Coring

Question Number : 105 Question Id : 3838236345 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Forging is accomplished in drop forging by dropping the

Options :

1. ✖ Work piece at high velocity
2. ✖ Hammer at high velocity
3. ✔ Die with hammer at high velocity
4. ✖ Weight on hammer to produce the required impact

Question Number : 106 Question Id : 3838236346 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Hot extrusion of aluminium is done in the temperature range of

Options :

1. ✖ 250 °C – 300 °C
2. ✔ 350 °C – 500 °C
3. ✖ 600 °C – 800 °C
4. ✖ 850 °C – 950 °C

Question Number : 107 Question Id : 3838236347 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a non-destructive test?

Options :

1. ✖ Magnaflux method
2. ✖ Radiography
3. ✖ Ultrasonic testing
4. ✔ Fatigue testing

Question Number : 108 Question Id : 3838236348 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following is an exclusively cold working process?

Options :

1. ✖ Spinning
2. ✔ Deep drawing
3. ✖ Rolling
4. ✖ Extrusion

Question Number : 109 Question Id : 3838236349 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In cold working of steel

Options :

1. ✖ Grain structure does not change
2. ✖ Internal stresses disappear
3. ✔ Strength and hardness increases
4. ✖ It is heated above recrystallisation temperature

Question Number : 110 Question Id : 3838236350 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In two high reversing mill, the rolls used are

Options :

1. ✖ Two vertical
2. ✔ Two horizontal
3. ✖ Four vertical

4. ✖ Four horizontal

Question Number : 111 Question Id : 3838236351 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Die casting of aluminium is not done because of the reason that, it is

Options :

1. ✖ Prone to high expansion on solidification
2. ✔ Having high tendency to react chemically with the die surface
3. ✖ Strong and light weight
4. ✖ Having high melting point and cooling time

Question Number : 112 Question Id : 3838236352 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A tooth paste tube can be produced by

Options :

1. ✔ Hollow backward extrusion
2. ✖ Solid backward extrusion
3. ✖ Hollow forward extrusion
4. ✖ Solid forward extrusion

Question Number : 113 Question Id : 3838236353 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

In casting, to promote / provide unidirectional solidification which of the following are used?

Options :

1. ✖ Cores
2. ✖ Patterns

3. ✓ Chills

4. ✗ Chaplets

Question Number : 114 Question Id : 3838236354 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

A casting defect, which occurs near the ingates as rough lumps on the surface of a casting is known as

Options :

1. ✗ Swell

2. ✗ Scab

3. ✗ Blow hole

4. ✓ Sand wash

Question Number : 115 Question Id : 3838236355 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Skim bob is attached to

Options :

1. ✓ Along the runner

2. ✗ Ingates

3. ✗ Risers

4. ✗ Pouring cup

Question Number : 116 Question Id : 3838236356 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following welding uses consumable electrode?

Options :

1. ✖ Thermit
2. ✔ MIG
3. ✖ TIG
4. ✖ Laser

Question Number : 117 Question Id : 3838236357 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Stainless steel is welded using

Options :

1. ✖ Arc welding
2. ✖ Oxy-acetylene flame
3. ✔ Inert gas welding
4. ✖ Oxy-hydrogen flame

Question Number : 118 Question Id : 3838236358 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Melting rates of electrodes in manual metal arc welding process is mainly governed by the

Options :

1. ✖ Length of the electrode
2. ✔ Type of coating
3. ✖ Welding current
4. ✖ Arc voltage

Question Number : 119 Question Id : 3838236359 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Welds made with high heat input will show reduction in

Options :

1. ✘ Yield strength
2. ✔ Toughness
3. ✘ Fatigue strength
4. ✘ Mechanical strength

Question Number : 120 Question Id : 3838236360 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes

Correct Marks : 1 Wrong Marks : 0

Which of the following is not a solid state metal joining technique?

Options :

1. ✘ Friction welding
2. ✘ Diffusion welding
3. ✔ Electroslag welding
4. ✘ Ultrasonic welding