

Question Paper Preview**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 28th May 2018 Shift2
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Magnifying Glass Required?:	No
Ruler Required?:	No
Eraser Required?:	No
Scratch Pad Required?:	No
Rough Sketch/Notepad Required?:	No
Protractor Required?:	No

Display Number Panel:

Yes

Group All Questions:

No

Question Number : 1 Question Id : 5113465401 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 2 \\ 2 & 1 & k \end{bmatrix}$ then the value of k if, $\text{Det } A = 0$

Options :

1. ✗ 0

2. ✗ 1

3. ✗ 2

4. ✓ 3

Question Number : 2 Question Id : 5113465402 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $ax^2 + by^2 = c$, then $\frac{d^2y}{dx^2} =$

Options :

1. ✖ $\frac{ac}{b^2y^3}$
2. ✖ $-\frac{ac}{b^2y^2}$
3. ✖ $\frac{ac}{b^2y^4}$
4. ✔ $-\frac{ac}{b^2y^3}$

Question Number : 3 Question Id : 5113465403 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The alternating series $\sum (-1)^n u_n$ is convergent if

Options :

1. ✔ $u_{n+1} < u_n$ and $\lim_{n \rightarrow \infty} u_n = 0$
2. ✖ if $u_{n+1} < u_n$ and $\lim_{n \rightarrow \infty} u_n \neq 0$
3. ✖ if $u_{n+1} > u_n$ and $\lim_{n \rightarrow \infty} u_n = 0$
4. ✖ if $u_{n+1} = u_n$ and $\lim_{n \rightarrow \infty} u_n = 0$

Question Number : 4 Question Id : 5113465404 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $f = xy^2\mathbf{i} + 2x^2yz\mathbf{j} - 3yz^2\mathbf{k}$ then $\text{div } f$ at $(0, -1, 1)$

Options :

1. ✖ 3
2. ✖ 5

3. ✓ 7

4. ✗ 9

Question Number : 5 Question Id : 5113465405 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $\mathbf{r} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$ and V is the volume then by Gauss divergence theorem $\int \mathbf{r} \cdot \mathbf{n} \, ds$ over the closed surface S is

Options :

1. ✗ 3

2. ✗ V 3. ✗ $2V$ 4. ✓ $3V$

Question Number : 6 Question Id : 5113465406 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The critical points of $f(x) = 3x^4 - 4x^3 - 12x^2 + 3$ in $[-2, 3]$ are

Options :

1. ✓ $-1, 0, 2$ 2. ✗ $1, 0, 3$ 3. ✗ $-2, -1, 2$ 4. ✗ $-1, 1, 3$

Question Number : 7 Question Id : 5113465407 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $u(x, y) = \lambda x^2 - y^2 + x y$ is harmonic, then the value of λ is

Options :

1. ✗ 3

2. ✓ 1

3. ✖ -3

4. ✖ -1

Question Number : 8 Question Id : 5113465408 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If z is a complex number, then the singularities of $f(z) = \frac{z}{z^2+2z+5}$ are

Options :

1. ✖ $-1-2i, 1+2i$

2. ✖ $1+2i, 1-2i$

3. ✖ $1-2i, -1+i$

4. ✔ $-1-2i, -1+2i$

Question Number : 9 Question Id : 5113465409 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Laplace transform of $t^2 e^{-3t}$ is

Options :

1. ✔ $\frac{2}{(s+3)^3}$

2. ✖ $\frac{s}{(s+3)^3}$

3. ✖ $\frac{2}{(s-2)^3}$

4. ✖ $\frac{s}{(s-2)^2}$

Question Number : 10 Question Id : 5113465410 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If the Eigen values of $A = \begin{bmatrix} 2 & 3 \\ x & y \end{bmatrix}$ are 4 and 8, then the values x and y are

Options :

1. ✖ $x = 4, y = 10$
2. ✖ $x = 5, y = 8$
3. ✖ $x = -3, y = 9$
4. ✔ $x = -4, y = 10$

Display Number Panel:

Yes

Group All Questions:

No

Question Number : 11 Question Id : 5113465411 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Floatation is based on the principle of

Options :

1. ✔ Mineral surface hydrophobicity
2. ✖ Gravity difference
3. ✖ Chemical reactivity
4. ✖ Particle size difference

Question Number : 12 Question Id : 5113465412 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The aperture size (in μm) of a 200 mesh sieve having a wire diameter of $53 \mu\text{m}$ is

Options :

1. ✖ 37
2. ✖ 53
3. ✔ 74

4. ✖ 86

Question Number : 13 Question Id : 5113465413 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cyclones are used for

Options :

1. ✖ Comminution
2. ✖ Concentration
3. ✖ Dewatering
4. ✔ classification

Question Number : 14 Question Id : 5113465414 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A simple close grinding circuit may consist of a

Options :

1. ✔ Ball mill and a classifier
2. ✖ rod mill and a hydro cyclone
3. ✖ jaw crusher and a hydro cyclone
4. ✖ ball mill and a froth floatation cell

Question Number : 15 Question Id : 5113465415 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a cyclone of diameter 0.2 m with a tangential velocity of 15m/s at the wall, the separation factor is

Options :

1. ✖ 2250
2. ✖ 1125

3. ✖ 460

4. ✔ 230

Question Number : 16 Question Id : 5113465416 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The permeability of burden in an iron making blast furnace can be improved by using

Options :

1. ✖ Fine charge

2. ✔ Agglomerated charge

3. ✖ Oxygen enriched blast

4. ✖ Pulverized coal injection through the tuyeres

Question Number : 17 Question Id : 5113465417 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The important factors for producing low silicon pig iron in a blast furnace are

Options :

1. ✖ Higher temperature and higher basicity

2. ✖ Lower temperature and lower basicity

3. ✔ Lower temperature and higher basicity

4. ✖ Higher temperature and lower basicity

Question Number : 18 Question Id : 5113465418 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Alkali metal oxide content in the blast furnace raw material

Options :

1. ✖ Increases the strength of coke

2. ✓ Increases the reactivity of coke
3. ✗ Decreases reactivity of coke
4. ✗ Neither affects the strength nor the reactivity of coke

Question Number : 19 Question Id : 5113465419 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Select the correct statement for a blast furnace

Options :

1. ✗ Hearth diameter is greater than bosh diameter
2. ✓ Stack is water cooled
3. ✗ Liquid slag comes out through tuyeres
4. ✗ Tuyeres are located above the bosh

Question Number : 20 Question Id : 5113465420 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Midrex process of iron making

Options :

1. ✗ Uses a fluidized bed reactor
2. ✗ Uses both CO and H₂ for reduction
3. ✗ Uses only H₂ for reduction
4. ✓ Recycles part of exit gas

Question Number : 21 Question Id : 5113465421 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Desulphurization of molten pig iron outside the blast furnace is carried out by the

Options :

1. ✓ Aston process

- 2. ✖ Bayer process
- 3. ✖ Perrin process
- 4. ✖ Strategic- Udy process

Question Number : 22 Question Id : 5113465422 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In LD steel making, the final slag can be best described as

Options :

- 1. ✖ Oxidizing
- 2. ✖ Basic
- 3. ✔ Oxidizing and basic
- 4. ✖ Reducing and basic

Question Number : 23 Question Id : 5113465423 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following factors is not desirable for effective phosphorous removal in BOF steel making process?

Options :

- 1. ✖ Higher FeO level in slag
- 2. ✖ Higher basicity
- 3. ✔ Higher temperature
- 4. ✖ Lower temperature

Question Number : 24 Question Id : 5113465424 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is the process that is performed for inclusion modification in ladle metallurgy of steel making?

Options :

1. ✖ Aluminium wire injection
2. ✔ Calcium wire injection
3. ✖ Oxygen top blowing
4. ✖ Oxygen bottom blowing

Question Number : 25 Question Id : 5113465425 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Identify the condition that is not beneficial for Dephosphorisation of hot metal in an LD converter

Options :

1. ✖ High slag basicity
2. ✖ Low temperature
3. ✔ High silicon in hot metal
4. ✖ Highly oxidizing slag

Question Number : 26 Question Id : 5113465426 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The usual energy consumption in electric arc furnace steel making iskWh/ton of steel

Options :

1. ✖ 60 -100
2. ✔ 400 -700
3. ✖ 1200 -1500
4. ✖ 2000 -2300

Question Number : 27 Question Id : 5113465427 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

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Hydrogen in liquid steels is dissolved

Options :

1. ✓ As tiny gas bubbles
2. ✗ In the atomic form
3. ✗ In the ionic form
4. ✗ In the molecular form

Question Number : 28 Question Id : 5113465428 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Manganese recovery in steel making is aided by

Options :

1. ✗ Low slag basicity
2. ✗ High slag basicity
3. ✓ High slag basicity and high silicon content in the hot metal
4. ✗ Low silicon content in hot metal

Question Number : 29 Question Id : 5113465429 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Speiss is a mixture of

Options :

1. ✓ Arsenides of heavy metals
2. ✗ Antimonides of heavy metals
3. ✗ Arsenides and antimonides of heavy metals
4. ✗ Iron, cobalt and nickel

Question Number : 30 Question Id : 5113465430 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

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Thiobacillus ferrooxidans is used in

Options :

1. ✓ Bacterial leaching in acidic medium
2. ✗ Bacterial leaching in alkaline medium
3. ✗ Bacterial leaching of cuprite ore
4. ✗ Pressure leaching using ammoniacal solution

Question Number : 31 Question Id : 5113465431 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In the Bayer's process, Bauxite is digested under pressure using

Options :

1. ✗ H_2SO_4
2. ✓ NaOH
3. ✗ NH_3
4. ✗ HCl

Question Number : 32 Question Id : 5113465432 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Zinc refining is carried out by

Options :

1. ✗ Liquation
2. ✗ Distillation
3. ✗ Electrolysis
4. ✓ Liquation and Distillation

Question Number : 33 Question Id : 5113465433 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is not measured in ultimate analysis of coal

Options :

1. ✗ Hydrogen
2. ✗ Sulphur
3. ✓ Ash
4. ✗ Total carbon

Question Number : 34 Question Id : 5113465434 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For coal fired furnace system, the flame temperature is dictated by the _____ content of the coal

Options :

1. ✗ fixed carbon
2. ✓ volatile matter
3. ✗ ash
4. ✗ moisture

Question Number : 35 Question Id : 5113465435 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The highest melting pure oxide (MP > 3000°C) is

Options :

1. ✓ Thoria
2. ✗ Alumina
3. ✗ Berylia
4. ✗ Zirconia

Question Number : 36 Question Id : 5113465436 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

One mole of element P is mixed with one mole of element Q. The entropy of mixing at 0 K is

Options :

1. ✗ 0
2. ✓ $-R \ln 0.5$
3. ✗ Infinity
4. ✗ $-R \ln 2$

Question Number : 37 Question Id : 5113465437 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a multi component heterogeneous system at thermodynamic equilibrium, identify the option that need not be true

Options :

1. ✗ Uniform pressure
2. ✗ Uniform temperature
3. ✗ Uniform chemical potential
4. ✓ Uniform composition

Question Number : 38 Question Id : 5113465438 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a homogeneous system (with C as the number of components) in equilibrium, the total number of independent intensive thermodynamic variables are

Options :

1. ✗ $C - 1$
2. ✗ C
3. ✓ $C + 1$

4. ✖ C + 2

Question Number : 39 Question Id : 5113465439 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is an intensive property

Options :

1. ✖ Volume
2. ✖ Gibbs free energy
3. ✔ Chemical potential
4. ✖ Entropy

Question Number : 40 Question Id : 5113465440 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The melting point of paraffin wax (which contracts on solidification) _____ with pressure rise

Options :

1. ✔ increases
2. ✖ decreases
3. ✖ remains unchanged
4. ✖ decreases linearly

Question Number : 41 Question Id : 5113465441 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Identify the wrong statement

Options :

1. ✖ Phase rule properties are intensive properties
2. ✔ Heat and work are both state functions
3. ✖ The work done by expansion of a gas in vacuum is zero

4. ✗ C_p and C_v are state functions

Question Number : 42 Question Id : 5113465442 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A refrigerator may be termed as

Options :

1. ✓ Heat pump
2. ✗ Heat engine
3. ✗ Carnot engine
4. ✗ Heat exchanger

Question Number : 43 Question Id : 5113465443 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A gas performs the maximum work, when it expands

Options :

1. ✗ Non-uniformly
2. ✗ Adiabatically
3. ✓ Isobarically
4. ✗ Isothermally

Question Number : 44 Question Id : 5113465444 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is the unit of rate constant in a chemical reaction in which 10% of the reactant decomposes
in one hour, 20% in two hours, 30% in three hours and so on

Options :

1. ✗ Litre/mole.second
2. ✓ moles/litre.second

3. ✗ litre/mole
4. ✗ litre/second

Question Number : 45 Question Id : 5113465445 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In the case of calcination of lime stone, $\text{CaCO}_3 = \text{CaO} + \text{CO}_2$, the addition of more of CaO will result in _____ the concentration of CO_2

Options :

1. ✓ No change
2. ✗ increase
3. ✗ decrease
4. ✗ unpredictable from the data

Question Number : 46 Question Id : 5113465446 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Limiting reactant in a chemical reaction decides the

Options :

1. ✗ Rate constant
2. ✓ Conversion
3. ✗ Reaction speed
4. ✗ Equilibrium constant

Question Number : 47 Question Id : 5113465447 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The activation energy for a reaction is 100 kJ/mole. The approximate increase in temperature required for doubling the rate of reaction from that at 25°C is

Options :

1. ✗ 5

2. ✓ 10

3. ✗ 15

4. ✗ 20

Question Number : 48 Question Id : 5113465448 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A recrystallisation process is 20% complete after 45 sec, and 85% complete after 75 sec.

Assuming Avrami Kinetics, the value of Avrami exponent 'n' is

Options :

1. ✗ 4.19

2. ✗ 3.12

3. ✓ 2.42

4. ✗ 1.34

Question Number : 49 Question Id : 5113465449 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following statements about the order of a reaction is false?

Options :

1. ✗ Order of a reaction can be a positive integer

2. ✓ Order of a reaction can be a fraction

3. ✗ Order of a reaction can be zero

4. ✗ Order of a reaction cannot change as the reaction proceeds

Question Number : 50 Question Id : 5113465450 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The units of the rate constant for a second order reaction are

Options :

1. ✗ $\text{sec}^{-1} \cdot \text{moles}$
2. ✗ $\text{moles} \cdot \text{sec}^{-1}$
3. ✓ $\text{moles}^{-1} \cdot \text{sec}^{-1}$
4. ✗ $\text{moles}^{+1} \cdot \text{sec}^{-1}$

Question Number : 51 Question Id : 5113465451 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The order of a chemical reaction

Options :

1. ✗ Can be determined only experimentally
2. ✓ can be determined from the stoichiometry of the reaction
3. ✗ cannot be determined
4. ✗ can be fractional

Question Number : 52 Question Id : 5113465452 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Dezincification is a form of corrosion which specifically applies to

Options :

1. ✓ Brasses
2. ✗ Austenitic stainless steel
3. ✗ Plain carbon steel
4. ✗ Babbitt metal

Question Number : 53 Question Id : 5113465453 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following acts as cathodic areas in case of concentration/galvanic cells

Options :

1. ✗ Aerated solution
2. ✓ Dilute electrolyte
3. ✗ Concentrated electrolyte
4. ✗ Metals low in emf series

Question Number : 54 Question Id : 5113465454 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Caustic embrittlement of boiler tubes is an example of

Options :

1. ✗ Crevice corrosion
2. ✓ Stress corrosion
3. ✗ Erosion-corrosion
4. ✗ Dezincification

Question Number : 55 Question Id : 5113465455 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cavitation corrosion is categorized as _____ Corrosion

Options :

1. ✗ uniform
2. ✗ galvanic
3. ✗ stress
4. ✓ ero

Question Number : 56 Question Id : 5113465456 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The most common inorganic corrosion inhibitor used in automobile cooling system is

Options :

1. ✗ Oleic acid
2. ✓ Borax
3. ✗ Calgon
4. ✗ Morpholine

Question Number : 57 Question Id : 5113465457 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Iron at $> 200^{\circ}\text{C}$ follows Law of oxidation

Options :

1. ✗ linear
2. ✗ logarithmic
3. ✓ parabolic
4. ✗ both linear and logarithmic

Question Number : 58 Question Id : 5113465458 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Surface diffusion is generally _____ grain boundary diffusion

Options :

1. ✗ smaller than
2. ✓ equal to
3. ✗ larger than
4. ✗ unpredictable, can be more or less

Question Number : 59 Question Id : 5113465459 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Maximum heat transfer rate is achieved in _____ flow

Options :

1. ✗ counter current
2. ✗ co-current
3. ✗ laminar
4. ✓ turbulent

Question Number : 60 Question Id : 5113465460 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Heat transfer rate described by Fourier's law will decrease, if the _____ increases

Options :

1. ✓ thickness
2. ✗ thermal conductivity
3. ✗ heat transfer area
4. ✗ temperature difference

Question Number : 61 Question Id : 5113465461 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Boundary layer separation is caused by

Options :

1. ✗ Reduction of pressure below vapour pressure
2. ✗ Reduction of pressure gradient to zero
3. ✓ An adverse pressure gradient
4. ✗ Reduction of boundary layer thickness to zero

Question Number : 62 Question Id : 5113465462 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The value of critical Reynolds number for pipe flow is

Options :

1. ✗ 10000
2. ✓ 1300
3. ✗ 100000
4. ✗ 1000

Question Number : 63 Question Id : 5113465463 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Bernoulli's equation describes

Options :

1. ✓ Mechanical energy balance in potential flow
2. ✗ Kinetic energy balance in laminar flow
3. ✗ Mechanical energy balance in turbulent flow
4. ✗ Mechanical energy balance in boundary layer flow

Question Number : 64 Question Id : 5113465464 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Copper atoms occupy _____ percent of the volume of the cube in a unit cell of Copper

Options :

1. ✓ 74
2. ✗ 68
3. ✗ 80
4. ✗ 94

Question Number : 65 Question Id : 5113465465 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Eutectic reaction in binary system in which L is liquid and α , β , γ are solids is given by

Options :

1. ✗ $\alpha = L + \beta$

2. ✓ $L = \alpha + \beta$

3. ✗ $\gamma = \alpha + \beta$

4. ✗ $L + \alpha = \beta$

Question Number : 66 Question Id : 5113465466 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a Triclinic crystal structure

Options :

1. ✓ $a \neq b \neq c$ $\alpha \neq \beta \neq \gamma \neq 90^\circ$

2. ✗ $a \neq b \neq c$ $\alpha = \beta = \gamma = 90^\circ$

3. ✗ $a = b = c$ $\alpha \neq \beta \neq \gamma \neq 90^\circ$

4. ✗ $a = b = c$ $\alpha = \beta = \gamma = 90^\circ$

Question Number : 67 Question Id : 5113465467 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following element promote graphite formation upon addition to steels

Options :

1. ✓ Si

2. ✗ Zr

3. ✗ Ti

4. ✖ Ta

Question Number : 68 Question Id : 5113465468 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Typical value of dislocation density of a heavily deformed material

Options :

- 1. ✖ 10^6 cm^{-2}
- 2. ✖ 10^6 m^{-2}
- 3. ✔ 10^{12} cm^{-2}
- 4. ✖ 10^{12} m^{-2}

Question Number : 69 Question Id : 5113465469 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The first reflection of a FCC crystal by X-ray diffraction corresponds to a family of _____
planes

Options :

- 1. ✖ (110)
- 2. ✖ (100)
- 3. ✔ (111)
- 4. ✖ (112)

Question Number : 70 Question Id : 5113465470 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The reciprocal lattice of a body centered cubic (BCC) lattice is

Options :

- 1. ✔ FCC
- 2. ✖ SC

3. ✖ HCP

4. ✖ BCC

Question Number : 71 Question Id : 5113465471 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Yield strength of a polycrystalline metal with an average grain size, d , is proportional to

Options :

1. ✖ $d^{1/2}$ 2. ✔ $d^{1/2}$ 3. ✖ d 4. ✖ d^{-1}

Question Number : 72 Question Id : 5113465472 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is a low melting point metal?

Options :

1. ✖ Stainless steel

2. ✖ Wrought iron

3. ✔ Tin

4. ✖ Copper

Question Number : 73 Question Id : 5113465473 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The ability of a material to absorb energy in the elastic range is a measure of its

Options :

1. ✖ Toughness

2. ✓ Resilience

3. ✗ Malleability

4. ✗ Brittleness

Question Number : 74 Question Id : 5113465474 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Carbon percentage in hypo-eutectic cast iron is

Options :

1. ✗ > 4.3

2. ✗ $0.08 - 0.8$

3. ✗ $0.8 - 2.5$

4. ✓ $2.0 - 4.3$

Question Number : 75 Question Id : 5113465475 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The property of a material that cannot be significantly changed by heat treatment is

Options :

1. ✗ Yield strength

2. ✗ Ultimate tensile strength

3. ✗ Ductility

4. ✓ Elastic modulus

Question Number : 76 Question Id : 5113465476 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The energetic driving force for grain growth is due to

Options :

1. ✓ Grain boundary energy
2. ✗ Dislocations in the matrix
3. ✗ Residual strain in the different grains
4. ✗ Stacking faulty energy

Question Number : 77 Question Id : 5113465477 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Hardenability of steel does not depend on the

Options :

1. ✗ Alloy content
2. ✓ Grain size
3. ✗ Amount of carbon present
4. ✗ Amount of cold work

Question Number : 78 Question Id : 5113465478 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following is a ferrite stabilizer in steels?

Options :

1. ✗ Ni
2. ✗ Cu
3. ✗ Mn
4. ✓ Cr

Question Number : 79 Question Id : 5113465479 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The self-diffusion in FCC metals occurs by one of the following mechanisms

Options :

1. ✗ Ring
2. ✗ Interstitial
3. ✓ Vacancy
4. ✗ Interstitialcy

Question Number : 80 Question Id : 5113465480 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Martensitic transformation in plain carbon steel occurs by

Options :

1. ✗ Diffusion of carbon
2. ✓ No diffusion of carbon
3. ✗ Shear mechanism
4. ✗ Diffusion of iron

Question Number : 81 Question Id : 5113465481 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The number of grains (N) per square inch at a magnification of 100X in which n = grain size number is given by

Options :

1. ✗ $2^n - 1$
2. ✓ 2^{n-1}
3. ✗ 2^{n+1}
4. ✗ $2^n + 1$

Question Number : 82 Question Id : 5113465482 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

With increasing strain rate, the flow stress of the metal

Options :

1. ✗ Decreases
2. ✓ Increases
3. ✗ Remains constant
4. ✗ Decreases then increases

Question Number : 83 Question Id : 5113465483 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Static recovery _____ the dislocation density

Options :

1. ✗ increases
2. ✓ decreases
3. ✗ remains constant
4. ✗ uncertain

Question Number : 84 Question Id : 5113465484 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Greater the amount of deformation

Options :

1. ✓ Lower is the recrystallization temperature
2. ✗ High is recrystallization temperature
3. ✗ Sometimes higher and sometimes lower depends on material
4. ✗ Recrystallization temperature does not depend on deformation

Question Number : 85 Question Id : 5113465485 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cold working of metals results in

Options :

1. ✓ Increase in strength
2. ✗ Increase in ductility
3. ✗ Decrease in hardness
4. ✗ Decrease in strength

Question Number : 86 Question Id : 5113465486 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The process by which plastic deformation is produced by dislocation motion is known as

Options :

1. ✗ Climb
2. ✗ Pile up
3. ✓ Slip
4. ✗ Diffusion

Question Number : 87 Question Id : 5113465487 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The elastic strain in a metal is due to

Options :

1. ✓ Stretching of atomic bonds
2. ✗ Breakage of atomic bonds
3. ✗ Motion of dislocations

4. ✖ Motion of vacancies

Question Number : 88 Question Id : 5113465488 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The technique which can be used for the direct observation of dislocations is

Options :

- 1. ✖ Scanning electron microscopy
- 2. ✔ Transmission electron microscopy
- 3. ✖ Field-ion microscopy
- 4. ✖ Electron probe microscopy

Question Number : 89 Question Id : 5113465489 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Flash in a close die forgings

Options :

- 1. ✔ Is excess material that has been squirmed out of the die
- 2. ✖ Is to provide excess temperature to the material
- 3. ✖ Reduces the forging load
- 4. ✖ Is always of uniform cross-sectional area

Question Number : 90 Question Id : 5113465490 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The elastic stress strain behavior of rubber is

Options :

- 1. ✖ Linear
- 2. ✔ Non-linear

3. ✖ Plastic
4. ✖ No fixed relationship

Question Number : 91 Question Id : 5113465491 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is a line defect found in metal crystals?

Options :

1. ✖ Grain boundaries
2. ✖ Cracks
3. ✔ Edge dislocation
4. ✖ Vacancies

Question Number : 92 Question Id : 5113465492 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Hot working of zinc is carried out at

Options :

1. ✔ Room temperature
2. ✖ 50°C
3. ✖ 200°C
4. ✖ 300°C

Question Number : 93 Question Id : 5113465493 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In edge dislocation, the direction of movement of dislocation is

Options :

1. ✔ Parallel to the stress direction
2. ✖ Perpendicular to the stress direction

3. ✖ At 120° to the stress direction
4. ✖ At 60° to the stress direction

Question Number : 94 Question Id : 5113465494 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A steel ingot is hot forged to a 25% reduction in cross-section area. The percentage reduction in the volume for the above process is

Options :

1. ✖ 50
2. ✖ 25
3. ✔ 0
4. ✖ 15

Question Number : 95 Question Id : 5113465495 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The slip plane together with the slip direction establishes

Options :

1. ✖ Deformation rate of the crystal
2. ✖ The slip mechanism
3. ✖ Magnitude of shear stress required for plastic deformation
4. ✔ Slip system

Question Number : 96 Question Id : 5113465496 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Loading in Mode 1 fracture refers to

Options :

1. ✔ Opening mode

2. ✖ Sliding mode
3. ✖ Tearing mode
4. ✖ Twisting mode

Question Number : 97 Question Id : 5113465497 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Hooke's law

Options :

1. ✔ Applies to the elastic deformation
2. ✖ Applies beyond limit of proportionality in stress-strain curve
3. ✖ States that stress is inversely proportional to strain upto elastic limit
4. ✖ Applies to plastic deformation

Question Number : 98 Question Id : 5113465498 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following has maximum hardness

Options :

1. ✖ Austenite
2. ✖ Ferrite
3. ✔ Martensite
4. ✖ Pearlite

Question Number : 99 Question Id : 5113465499 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Earing is a defect found in steels after the following metal working operation?

Options :

1. ✔ Deep drawing

- 2. ✖ Rolling
- 3. ✖ Extrusion
- 4. ✖ Wire drawing

Question Number : 100 Question Id : 5113465500 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

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

Options :

- 1. ✖ Surface roughness
- 2. ✖ Pore
- 3. ✖ Spherical inclusion
- 4. ✔ Crack

Question Number : 101 Question Id : 5113465501 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The co-efficient of friction alters by 5 times when a slab is hot rolled instead of cold rolling in a specific rolling mill. The maximum reduction in the thickness of the slab will increase by a factor of

Options :

- 1. ✔ 25
- 2. ✖ 5
- 3. ✖ 0.04
- 4. ✖ 1

Question Number : 102 Question Id : 5113465502 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

At _____ temperature, the grains and the grain boundaries have equal strength.

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Options :

1. ✗ recrystallization
2. ✓ equi-cohesive
3. ✗ Curie
4. ✗ 0°C

Question Number : 103 Question Id : 5113465503 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

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

Options :

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

Question Number : 104 Question Id : 5113465504 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A property that cannot be obtained from tensile test

Options :

1. ✗ Young's modulus
2. ✗ Yield strength
3. ✗ Ultimate tensile strength
4. ✓ Endurance limit

Question Number : 105 Question Id : 5113465505 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

With height of cylinder as two times its diameter, the ratio of solidification time for a sphere to that of cylinder (of the same diameter) will be

Options :

1. ✗ $36/25$
2. ✓ $25/36$
3. ✗ $64/25$
4. ✗ $25/64$

Question Number : 106 Question Id : 5113465506 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is not a casting process

Options :

1. ✓ Extrusion
2. ✗ Shell moulding
3. ✗ Semi-centrifuge process
4. ✗ Slush process

Question Number : 107 Question Id : 5113465507 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The variety of Cast Iron that has maximum ductility is

Options :

1. ✗ Gray Iron
2. ✗ Mottled iron
3. ✗ White iron

4. ✓

Question Number : 108 Question Id : 5113465508 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Riser in a casting compensates for

Options :

1. ✗ Solidification shrinkage
2. ✗ Liquid state shrinkage
3. ✗ Liquid state shrinkage, solidification shrinkage and solid state shrinkage
4. ✓ Liquid state shrinkage and solidification shrinkage

Question Number : 109 Question Id : 5113465509 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is used for making cavities and hollow projections in casting?

Options :

1. ✓ Core
2. ✗ Core print
3. ✗ Muller
4. ✗ Padding

Question Number : 110 Question Id : 5113465510 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Swaging is an operation of

Options :

1. ✗ Extrusion
2. ✗ Drawing
3. ✗ Piercing

4. ☒ Forging

Question Number : 111 Question Id : 5113465511 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For a given extrusion pressure, the extrusion increases with

Options :

1. ☒ Increasing temperature
2. ☐ Decreasing temperature
3. ☐ Remains constant
4. ☐ Uncertain

Question Number : 112 Question Id : 5113465512 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following metal working operations can be categorized as an indirect compression process?

Options :

1. ☐ Forging
2. ☒ Wire drawing
3. ☐ Extrusion
4. ☐ Stretch forming

Question Number : 113 Question Id : 5113465513 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Hot working of metal

Options :

1. ☐ Results in strain hardening
2. ☒ Does not cause its work hardening

- 3. ✗ Can be carried out below recrystallization temperature
- 4. ✗ Causes work hardening

Question Number : 114 Question Id : 5113465514 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For the occurrence of natural bite in rolling, which of the following condition should be satisfied?

Options :

- 1. ✓ The coefficient of friction should exceed the tangent of the contact angle
- 2. ✗ The roll separating force should reach a maximum value
- 3. ✗ The friction coefficient should be zero
- 4. ✗ The contact length should be minimum

Question Number : 115 Question Id : 5113465515 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The most commonly used flame in gas welding is

Options :

- 1. ✗ Oxidizing
- 2. ✗ Carburizing
- 3. ✓ Neutral
- 4. ✗ Reducing

Question Number : 116 Question Id : 5113465516 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the processes can be classified as solid state welding?

Options :

- 1. ✗ Oxyfuel welding

- 2. ✖ Electron beam welding
- 3. ✔ Diffusion welding
- 4. ✖ Resistance welding

Question Number : 117 Question Id : 5113465517 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The commonly used flux in brazing is

Options :

- 1. ✔ Borax
- 2. ✖ Rosin
- 3. ✖ Lead sulphide
- 4. ✖ Zinc chloride

Question Number : 118 Question Id : 5113465518 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Flux in welding process acts as

Options :

- 1. ✖ Catalyst
- 2. ✖ Filler
- 3. ✖ Heat generator
- 4. ✔ Protective agent

Question Number : 119 Question Id : 5113465519 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

As ultrasonic frequency increases

Options :

- 1. ✖ Wavelength increases

2. ☒ Wavelength decreases
3. ☐ Sound velocity increases
4. ☐ Sound velocity decreases

Question Number : 120 Question Id : 5113465520 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Radiography technique of detecting defects is based on the principle of

Options :

1. ☐ Diffraction
2. ☐ Reflection
3. ☐ Interference
4. ☒ Absorption

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