

Question Paper Preview

Notations :

1. Options shown in green color and with ✓ icon are correct.
2. Options shown in red color and with ✗ icon are incorrect.

| | |
|----------------------------------------|------------------------------------------------|
| Question Paper Name: | Metallurgical Engineering 28th May 2018 Shift2 |
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| Duration: | 120 |
| Total Marks: | 120 |
| Display Marks: | No |
| Calculator: | None |
| 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 $f = xy^2i + 2x^2yzj - 3yz^2k$ 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 $r = xi+yj+zk$ and V is the volume then by Gauss divergence theorem $\int r \cdot n \, ds$ 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

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

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. ✗ Liquefaction
2. ✗ Distillation
3. ✗ Electrolysis
4. ✓ Liquefaction 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. ✘ Babbit 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.

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

Malleable 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