

Question Paper Preview

Question Paper Name: Nano Technology 12th May 2018 Shift2
Subject Name: Nano Technology
Duration: 120

Nano Technology

Display Number Panel: Yes
Group All Questions: No

Question Number : 1 Question Id : 46904841749 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Let $A = \begin{bmatrix} 8 & -4 \\ 2 & 2 \end{bmatrix}$. The sum of the eigen values of A is

Options :

1. 6
2. 10
3. -2
4. 8

Question Number : 2 Question Id : 46904841750 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The system of matrix equations $AX = B$ will have a unique solution if

Options :

1. A is singular
2. $\text{Rank}(A) > \text{Rank}(A|B)$
3. $\text{Rank } A < \text{Rank}(A|B)$
4. A is non-singular

Question Number : 3 Question Id : 46904841751 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

$$\sum_{n=1}^{\infty} \sin\left(\frac{1}{n}\right)$$

Options :

1. converges
2. diverges to ∞
3. oscillates
4. diverges to $(-\infty)$

Question Number : 4 Question Id : 46904841752 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If $z = f(x + ay) + \phi(x - ay)$ ($a \neq 0$), then $\frac{\partial^2 z}{\partial y^2} =$

Options :

1. $\frac{\partial z}{\partial x}$
2. $\frac{\partial^2 z}{\partial x^2}$
3. $a^2 \frac{\partial^2 z}{\partial x^2}$
4. $\frac{1}{a^2} \frac{\partial^2 z}{\partial x^2}$

Question Number : 5 Question Id : 46904841753 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The order and degree of the differential equation $\frac{d^2 y}{dx^2} = \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{3/2}$ is

Options :

1. 1 and 2
2. 2 and 1

3. 2 and 2

4. 1 and 1

Question Number : 6 Question Id : 46904841754 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

$$\iint_S (ax\bar{i} + by\bar{j} + cz\bar{k}) \cdot \bar{n} \, ds =$$

Options :

1. $(a + b + c)$

2. $\frac{(a+b+c)}{3}$

3. $\frac{4}{3} \pi (a + b + c)$

4. $\frac{3}{4} \pi (a + b + c)$

Question Number : 7 Question Id : 46904841755 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A bag contains 3 red, 6 white and 7 blue balls. Two balls are drawn at random. The probability that the balls drawn are one white and one blue is

Options :

1. $\frac{7}{10}$

2. $\frac{7}{13}$

3. $\frac{7}{20}$

4. $\frac{13}{16}$

Question Number : 8 Question Id : 46904841756 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

There are $n(> 2)$ boys sitting in a row, two of them are selected at random. Then the probability that those two are not sitting side by side is

Options :

1. $\frac{n(n-1)}{(n-2)}$

2. $\frac{2}{n}$

3. $\frac{n-2}{n}$

4. $\frac{(n-1)(n-2)}{n}$

Question Number : 9 Question Id : 46904841757 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Using Picard's method, the first approximate of $y' = 1 + xy$, $y(0) = 1$ with $h = 0.1$ is

Options :

1. 1.01

2. 1.1

3. 1.21

4. 1.11

Question Number : 10 Question Id : 46904841758 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The value of y_1 , by Euler's method of $y' = y - x$, $y(0) = 2$ and $h = 0.2$ is

Options :

1. 2.4

2. 2.2

3. 2.6

4. 2.8

Question Number : 11 Question Id : 46904841759 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Percentage of free space in FCC and in BCC packing is, respectively

Options :

1. 30% and 26%
2. 48% and 26%
3. 32% and 48%
4. 26% and 32%

Question Number : 12 Question Id : 46904841760 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Graphene is a

Options :

1. wide bandgap semiconductor
2. gapless-band semiconductor
3. not a semiconductor but behaves like graphite
4. a narrow bandgap semiconductor

Question Number : 13 Question Id : 46904841761 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The most important property of nano material is

Options :

1. Force
2. Friction
3. Pressure
4. Temperature

As the size of a gold particle decreases into the nanoscale regime, the melting point

Options :

1. Increases linearly
2. Decreases linearly
3. No change
4. Decreases at a non-linear rate

The size of a quantum dot is around _____ nm.

Options :

1. 5
2. 10
3. 50
4. 100

Moment of inertia of a triangular section of base (b) and height (h) about an axis passing through its C.G. and parallel to the base, is

Options :

1. $bh^2/4$
2. $bh^3/8$
3. $bh/12$
4. $bh^3/36$

Moment of inertia of a rectangular section having width (b) and depth (d) about an axis passing through its C.G. and parallel to the width (b), is

Options :

1. $\frac{db^3}{12}$

2. $\frac{bd^3}{12}$

3. $\frac{db^3}{36}$

4. $\frac{bd^3}{36}$

Question Number : 18 Question Id : 46904841766 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If the side of a cube is 4 cm and its total surface area is 96 cm^2 . When the same cube is divided into eight cubes, what will be the total surface area?

Options :

1. 96 cm^2

2. 192 cm^2

3. 156 cm^2

4. 32 cm^2

Question Number : 19 Question Id : 46904841767 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

How many oxygen atoms lined up in a row would fit in a one nanometer space?

Options :

1. One

2. Three

3. Seven

4. Five

Question Number : 20 Question Id : 46904841768 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What are the three major alloying elements of austenitic stainless steels?

Options :

1. Chromium, Carbon and Nickel

2. Chromium, Zinc and Nickel

3. Chromium, Carbon and Zinc

4. Chromium, Carbon and Copper

Question Number : 21 Question Id : 46904841769 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following elements has the highest Hall-Patch constant (σ , MPa)

Options :

1. Copper

2. Titanium

3. Mild steel

4. Ni_3Al

Question Number : 22 Question Id : 46904841770 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

When a body is subjected to a direct tensile stress (σ) in one plane, then tangential or shear stress on an oblique section of the body inclined at an angle θ to the normal of the section is

Options :

1. $\sigma \sin 2\theta$

2. $\sigma \cos 2\theta$

3. $\sigma/2 \sin 2\theta$

4. $\sigma/2 \cos 2\theta$

Question Number : 23 Question Id : 46904841771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Rankine's formula holds good for

Options :

1. short columns

2. long columns

3. both short and long columns

4. weak columns

Question Number : 24 Question Id : 46904841772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Examples of superconducting materials with $T_c > 35$ K include all but one of the following. Which is the odd one out?

Options :

1. NbTi

2. MgB₂

3. Cs₃C₆₀

4. YBa₂Cu₃O₇

Question Number : 25 Question Id : 46904841773 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Thin films of TiC are

Options :

1. Used for wear-resistant coatings

2. Semiconducting
3. Used in solar cells
4. Phosphorescent

Question Number : 26 Question Id : 46904841774 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The efficiency of today's best solar cell is around

Options :

1. 15-20%
2. 40%
3. 50%
4. 75%

Question Number : 27 Question Id : 46904841775 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The maximum frictional force, which comes into play, when a body just begins to slide over the surface of the other body, is known as

Options :

1. static friction
2. limiting friction
3. dynamic friction
4. coefficient of friction

Question Number : 28 Question Id : 46904841776 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The net positive suction head (NPSH) of a centrifugal pump is defined as the sum of the velocity head and the pressure head at the

Options :

1. discharge
2. suction
3. suction minus vapor pressure of the liquid at suction temperature
4. discharge minus vapor pressure of the liquid at the discharge temperature

Question Number : 29 Question Id : 46904841777 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The general relationship between speed N , head H , power P and discharge Q for a centrifugal pump is

Options :

1. $Q \propto N$: $H \propto N^2$: $P \propto N^3$
2. $Q \propto N^2$: $H \propto N^3$: $P \propto N$
3. $Q \propto N$: $H \propto N^3$: $P \propto N^2$
4. $Q \propto N^3$: $H \propto N$: $P \propto N^2$

Question Number : 30 Question Id : 46904841778 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following is expected when a drop of water is dispersed on a hydrophobic surface such as teflon?

Options :

1. Increase the contact angle
2. Decrease the contact angle
3. Hydrolyze the water so that it spreads out or "wets" the surface
4. decomposition of water takes place

Question Number : 31 Question Id : 46904841779 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which ratio decides the efficiency of nano substances?

Options :

1. Weight/volume
2. Surface area/volume
3. Volume/weight
4. Pressure/volume

Question Number : 32 Question Id : 46904841780 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Permalloy, an alloy consisting of about 20% Fe and 80% Ni, is an example of a

Options :

1. Soft magnet
2. Hard magnet
3. Non-magnet
4. Dia magnet

Question Number : 33 Question Id : 46904841781 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Two like parallel forces are acting at a distance of 24 mm apart and their resultant is 20 N. If the line of action of the resultant is 6 mm from any given force, the two forces are

Options :

1. 15 N and 5 N
2. 20 N and 5 N
3. 15 N and 15 N
4. 25 N and 10 N

The pressure exerted by an ideal gas is _____ of the kinetic energy of all the molecules contained in a unit volume of gas.

Options :

1. one-half
2. one-third
3. two-third
4. three-fourth

Which of the following forced convection heat transfer equation accounts for the liquid viscosity effect for viscous liquids?

Options :

1. Dittus-Boeltier equation
2. Sieder-Tate equation
3. Nusselt equation
4. Dittus-Lucii equation

A globe valve is the most suitable for applications, in which

Options :

1. fluid flow control is required
2. fluid contains dispersed solid particles
3. valve is required to be either fully open or fully closed

4. one way flow is required

Question Number : 37 Question Id : 46904841785 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A simply supported beam of span L carries a uniformly distributed load W . The maximum bending moment M is

Options :

1. $\frac{WL}{2}$

2. $\frac{WL}{4}$

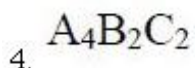
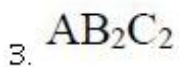
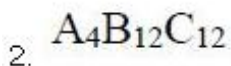
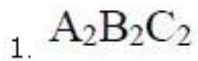
3. $\frac{WL}{8}$

4. $\frac{WL}{12}$

Question Number : 38 Question Id : 46904841786 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A cubic crystal consist of three atoms A, B, C. If A is placed in alternative corners, B placed in alternative face centres and C is placed in alternative edge centers, what is the formula of solid?

Options :



Question Number : 39 Question Id : 46904841787 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is an example of top-down approach for the preparation of nanomaterials?

Options :

1. Hydrothermal
2. Molecular self-assembly
3. Mechanical grinding
4. Molecular beam epitaxy

Question Number : 40 Question Id : 46904841788 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is not an example of nanoscience in nature?

Options :

1. Hydrophobic surface of a lotus plant
2. Hydrophilic surface of a pitcher plant
3. Sticky pads on the bottom of an ant's foot
4. Gold that can stretch to form flexible electronics

Question Number : 41 Question Id : 46904841789 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cast iron has high _____ strength.

Options :

1. Tensile
2. compressive
3. shear
4. fatigue

Question Number : 42 Question Id : 46904841790 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following has highest theoretical surface area?

Options :

1. CNT
2. Graphene
3. CNF
4. Graphite

Question Number : 43 Question Id : 46904841791 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is the simplest formula of the solid whose cubic unit cell are the atoms A at each corner and atoms B at each face centre and C atoms at body centre?

Options :

1. AB_3C
2. A_3BC
3. ABC
4. ABC_3

Question Number : 44 Question Id : 46904841792 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

At a triple point

Options :

1. both the temperature and pressure are fixed
2. only the temperature is fixed
3. only the pressure is fixed
4. sometimes pressure and sometimes temperature is fixed

Question Number : 45 Question Id : 46904841793 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which ratio decides the efficiency of nanosubstances?

Options :

1. Weight/volume
2. Surface area/volume
3. Volume/weight
4. Pressure/volume

Question Number : 46 Question Id : 46904841794 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A flow in which each liquid particle has a definite path and their paths do not cross each other, is called

Options :

1. Steady flow
2. Uniform flow
3. Streamline flow
4. Turbulent flow

Question Number : 47 Question Id : 46904841795 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Grashoff number is defined as the ratio of the

Options :

1. buoyancy to inertial forces
2. buoyancy to viscous forces
3. inertial to viscous forces
4. buoyancy to surface tension forces

Question Number : 48 Question Id : 46904841796 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which type of crystals are generally good optical reflectors?

Options :

1. Metals
2. Ionic crystals
3. Covalent crystals
4. Liquid crystals

Question Number : 49 Question Id : 46904841797 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Prevention of corrosion of iron by Zn coating is called _____.

Options :

1. Galvanization
2. Cathode protection
3. Electrolysis
4. Photo electrolysis

Question Number : 50 Question Id : 46904841798 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Zirconium alloys are used in nuclear reactors as

Options :

1. Catalyst
2. Fuel
3. Moderator
4. Cladding material

Question Number : 51 Question Id : 46904841799 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following material has overlapping energy bands

Options :

1. Diamond
2. Al
3. Ge
4. Si

Question Number : 52 Question Id : 46904841800 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Match the following group 1 items (crystal structures) with group 2 items (average number of atoms per unit cell) and select the correct option

- | | |
|--------------------------------------|------|
| i) Simple cubic crystal structure | a) 2 |
| ii) Body centered crystal structure | b) 6 |
| iii) Face centered crystal structure | c) 1 |
| iv) Hexagonal close packed structure | d) 4 |

Options :

1. (i) – (a), (ii) – (c), (iii) – (d), (iv) – (b)
2. (i) – (c), (ii) – (a), (iii) – (d), (iv) – (b)
3. (i) – (b), (ii) – (a), (iii) – (c), (iv) – (d)
4. (i) – (d), (ii) – (a), (iii) – (b), (iv) – (c)

Question Number : 53 Question Id : 46904841801 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Match the terminologies given in Column I with their relations listed in Column II

Column I

p) domain wall

q) Fick's law

r) Matthiessen's rule

s) Hall-Petch relation

t) Meissner effect

Column II

i) superconductors

ii) mechanical properties

iii) ferromagnetic materials

iv) resistivity of impure metals

v) diffusion

Options :

1. (p)-(i), (q)-(iii), (r)-(v), (s)-(ii), (t)-(iv)

2. (p)-(iii), (q)-(v), (r)-(ii), (s)-(iv), (t)-(i)

3. (p)-(iii), (q)-(v), (r)-(iv), (s)-(ii), (t)-(i)

4. (p)-(iii), (q)-(iv), (r)-(i), (s)-(ii), (t)-(v)

Question Number : 54 Question Id : 46904841802 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Internal energy of a perfect gas depends on

Options :

1. temperature, specific heats and pressure

2. temperature, specific heats and enthalpy

3. temperature, specific heats and entropy

4. temperature only

Question Number : 55 Question Id : 46904841803 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Slow plastic deformation of metals under a constant stress is known as

Options :

1. creep

2. fatigue
3. Plastic deformation
4. non-plastic deformation

Question Number : 56 Question Id : 46904841804 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a bar of large length when held vertically and subjected to a load at its lower end, its own-weight produces additional stress. The maximum stress will be

Options :

1. at the lower cross-section
2. at the built-in upper cross-section
3. at the central cross-section
4. at every point of the bar

Question Number : 57 Question Id : 46904841805 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Annealing twins are not observed in

Options :

1. Cu-Au alloys
2. Austenitic stainless steels
3. Duralumin
4. Brass

Question Number : 58 Question Id : 46904841806 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Proteins are made up of

Options :

1. sugars

2. fatty acids
3. amino acids
4. nucleic acid

Question Number : 59 Question Id : 46904841807 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Rivets are generally specified by

Options :

1. thickness of plates to be joined
2. overall length
3. shank diameter
4. diameter of head

Question Number : 60 Question Id : 46904841808 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is the effect of temperature on stiffness of a metal?

Options :

1. Temperature has no effect on stiffness of a metal
2. As temperature increases stiffness of metal decreases
3. As temperature increases stiffness of metal increases
4. As temperature decreases stiffness of metal decreases

Question Number : 61 Question Id : 46904841809 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

When are the slip lines observed?

Options :

1. after plastic deformation

2. before plastic deformation
3. after mechanical working
4. after annealing

Question Number : 62 Question Id : 46904841810 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Example for a thermosetting polymer is

Options :

1. Polyethylene
2. Polyester
3. Cellulose nitrate
4. Poly Vinyl Chloride

Question Number : 63 Question Id : 46904841811 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which dislocation is not confined to a slip plane?

Options :

1. Edge
2. Screw
3. Mixed
4. Partial

Question Number : 64 Question Id : 46904841812 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The correct order of the co-ordination number in simple cubic, body centered cubic and face centered cubic of unit cell is

Options :

1. 6, 8, 12

2. 8, 12, 12

3. 12, 8, 12

4. 6, 8, 8

Question Number : 65 Question Id : 46904841813 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A gas which obeys kinetic theory perfectly is known as

Options :

1. monoatomic gas

2. diatomic gas

3. real gas

4. perfect gas

Question Number : 66 Question Id : 46904841814 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The general energy equation is applicable to

Options :

1. Steady flow

2. Unsteady flow

3. Non-uniform flow

4. Turbulent flow

Question Number : 67 Question Id : 46904841815 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Oxygen which is liberated during the photosynthesis comes from _____.

Options :

1. CO_2

2. Water
3. phospho glyceric acid
4. chlorophyll

Question Number : 68 Question Id : 46904841816 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Entropy of the universe is

Options :

1. continuously increasing
2. continuously decreasing
3. zero
4. constant

Question Number : 69 Question Id : 46904841817 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following processes must violate the first law of thermodynamics?

(There may be more than one answer!)

Options :

1. $W > 0$, $Q < 0$ and $\Delta E_{\text{int}} = 0$
2. $W > 0$, $Q < 0$ and $\Delta E_{\text{int}} > 0$
3. $W > 0$, $Q < 0$ and $\Delta E_{\text{int}} < 0$
4. $W > 0$, $Q > 0$ and $\Delta E_{\text{int}} < 0$

Question Number : 70 Question Id : 46904841818 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The number of translational degree of freedom for a diatomic gas is

Options :

1. 2

2. 3

3. 5

4. 6

Question Number : 71 Question Id : 46904841819 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is the common reinforcement for polymer composites?

Options :

1. Boron

2. Ceramic

3. Graphite

4. Glass fiber

Question Number : 72 Question Id : 46904841820 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Fermi energy level for n-type extrinsic semiconductors lies

Options :

1. At middle of the band gap

2. Close to conduction band

3. Close to valence band

4. In the vacuum

Question Number : 73 Question Id : 46904841821 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Example for strengthening mechanism in single-phase material

Options :

1. Strain hardening

2. Precipitation hardening
3. Fiber strengthening
4. Dispersion strengthening

Question Number : 74 Question Id : 46904841822 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

$a \neq b \neq c$ and $\alpha = \beta = \gamma = 90^\circ$ is characterized by which of the following crystal system?

Options :

1. Cubic
2. Orthorhombic
3. hexagonal
4. triclinic

Question Number : 75 Question Id : 46904841823 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In equilibrium condition, fluids are not able to sustain

Options :

1. Shear force
2. Resistance to viscosity
3. Surface tension
4. Geometric similitude

Question Number : 76 Question Id : 46904841824 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Second law of thermodynamics is concerned with

Options :

1. Irreversible processes only
2. direction of energy transfer

3. Amount of energy transferred

4. non-cyclic process only

Question Number : 77 Question Id : 46904841825 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A cycle consisting of one constant pressure, one constant volume and two isentropic processes is known as

Options :

1. Carnot cycle

2. Stirling cycle

3. Otto cycle

4. Diesel cycle

Question Number : 78 Question Id : 46904841826 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The heat supplied to the gas at constant volume is (where m = Mass of gas, c_v = Specific heat at constant volume, c_p = Specific heat at constant pressure, $T_2 - T_1$ = Rise in temperature, and R = Gas constant)

Options :

1. $mR(T_2 - T_1)$

2. $mc_v(T_2 - T_1)$

3. $mc_p(T_2 - T_1)$

4. $mc_p(T_2 + T_1)$

Question Number : 79 Question Id : 46904841827 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following energy transfer processes cannot occur in solid?

i) Conduction

ii) Convection

iii) Radiation

Options :

1. (ii) only
2. (i) and (iii) only
3. (ii) and (iii) only
4. (i), (ii) and (iii)

Question Number : 80 Question Id : 46904841828 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following statements are true about the Eutectic point on a two component (compounds A and B) phase diagram?

Options :

1. Both compounds are solid
2. The melting point of the mixture is lower than the melting points of either of the individual compounds
3. One compound is in the liquid phase whilst the other is in the solid phase
4. It always occurs when the ratio of compound A to compound B is 50:50

Question Number : 81 Question Id : 46904841829 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

One mole of which of the following has the highest entropy?

Options :

1. liquid nitrogen
2. mercury
3. hydrogen gas
4. diamond

The metal that is often mixed for corrosion resistance in stainless steels is

Options :

1. Silicon
2. Manganese
3. Carbon
4. Chromium

The permanent magnets are made from which of the following materials?

Options :

1. Soft iron
2. Ferromagnetic
3. Paramagnetic
4. Diamagnetic

Which instrument is used to measure velocity?

Options :

1. Orifice-meter
2. Venturimeter
3. Mouthpiece
4. Pitot tube

An isolated system can exchange _____ with its surroundings

Options :

1. matter
2. energy
3. neither matter nor energy
4. both matter and energy

Question Number : 86 Question Id : 46904841834 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In an irreversible process, there is a

Options :

1. loss of heat
2. no loss of heat
3. gain of heat
4. no gain of heat

Question Number : 87 Question Id : 46904841835 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For the constant pressure and heat input, the air standard efficiency of gas power cycle is in the order

Options :

1. Dual cycle, Diesel cycle, Otto cycle
2. Otto cycle, Diesel cycle, Dual cycle
3. Dual cycle, Otto cycle, Diesel cycle
4. Diesel cycle, Otto cycle, Dual cycle

Question Number : 88 Question Id : 46904841836 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Chemical vapor deposition involves depositing nano particulate material from the _____ phase.

Options :

1. Solid
2. Liquid
3. Gas
4. gel

Question Number : 89 Question Id : 46904841837 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Different conditions favoring electro deposition are

Options :

1. low current density
2. high temperature
3. high viscosity
4. high mobility

Question Number : 90 Question Id : 46904841838 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Fourier's law of conduction is valid only for

Options :

1. One dimensional cases only
2. Two dimensional cases only
3. Three dimensional cases only
4. Regular surfaces with non-uniform temperature gradient

The physical property of a material that refers to the temperature at which a ferromagnetic material becomes paramagnetic on

Options :

1. Melting point
2. Thermal conductivity
3. Thermal expansion
4. Curie point

What is the purpose of molybdenum in steel alloying?

Options :

1. To increase brittleness
2. To reduce brittleness, combine with sulfur
3. To increase dynamic and high-temperature strength and hardness
4. To increase corrosion and resistance

Which of the following is not a Hume-Ruthery condition?

Options :

1. Crystal structure of each element of solid solution must be the same
2. Size of atoms of each two elements must not differ by more than 15%
3. Elements should form compounds with each other
4. Elements should have the same valence

Which of the following gives materials in order of decreasing values of permeability?

Options :

1. Permalloy, nickel, air, water
2. Cobalt, nickel, aluminium, iron
3. Pure iron, silicon iron, aluminium, bismuth
4. Silver, copper, aluminium, iron

If the density in a fluid flow changes with respect to length of direction of flow, it is called

Options :

1. steady flow
2. compressible flow
3. incompressible flow
4. unsteady flow

Heat energy can be obtained from other type of energy is the statement of

Options :

1. Zeroth law of thermodynamics
2. First law of thermodynamics
3. Second law of thermodynamics
4. Fourier's law

In typical nanomaterials the majority of the atoms are located on the _____ of the particles.

Options :

1. surface
2. above the surface
3. below the surface
4. only on Materials

Match the following group 1 items (crystal structures) with group 2 items (average number of atoms per unit cell) and select the correct option

- | | |
|--------------------------------------|------|
| i) Simple cubic crystal structure | a) 2 |
| ii) Body centered crystal structure | b) 6 |
| iii) Face centered crystal structure | c) 1 |
| iv) Hexagonal close packed structure | d) 4 |

Options :

1. (i)-(a), (ii)-(c), (iii)-(d), (iv)-(b)
2. (i)-(c), (ii)-(a), (iii)-(d), (iv)-(b)
3. (i)-(b), (ii)-(a), (iii)-(c), (iv)-(d)
4. (i)-(d), (ii)-(a), (iii)-(b), (iv)-(c)

The size of a nanoparticle is

Options :

1. Less than an electron
2. less than an atom
3. less than a polymer molecule
4. less than nucleus

Question Number : 100 Question Id : 46904841848 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Mobility of electron is

Options :

1. Flow of electron per unit electric field
2. Reciprocal of conductivity
3. average electron drift velocity per unit electric field
4. average electron drift velocity per magnetic field

Question Number : 101 Question Id : 46904841849 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which is the hardest metal of the following?

Options :

1. Chromium
2. Graphene
3. Diamond
4. Aluminum

Question Number : 102 Question Id : 46904841850 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Examples of superconducting materials has $T_c < 35 \text{ K}$

Options :

1. NbTi
2. MgB₂
3. Cs₃C₆₀
4. YBa₂Cu₃O₇

Question Number : 103 Question Id : 46904841851 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What type of steel has 0.8% carbon and 100% pearlite?

Options :

1. Austenite
2. Eutectoid
3. Hyper-eutectoid
4. Stainless steel

Question Number : 104 Question Id : 46904841852 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The surface area of Graphene is around

Options :

1. 1000 m²/g
2. 1200 m²/g
3. 2600 m²/g
4. 825 m²/g

Question Number : 105 Question Id : 46904841853 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Room temperature slip system in F.C.C. is

Options :

1. $(111)[111]$

2. $(110)[111]$

3. $(100)[110]$

4. $(111)[110]$

Question Number : 106 Question Id : 46904841854 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The correct relation between equilibrium constant and free energy change is

Options :

1. $\Delta G = -RT \ln K$

2. $\Delta H = -RT \ln K$

3. $\Delta G_0 = -RT \ln K$

4. $\Delta G = (2.303 \log K)/2$

Question Number : 107 Question Id : 46904841855 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is the relation between brake efficiency, internal efficiency and mechanical efficiency?

Options :

1. $\eta_{\text{Internal}} = \eta_{\text{Mech}} * \eta_{\text{Brake}}$

2. $\eta_{\text{Mech}} = \eta_{\text{Internal}} * \eta_{\text{Brake}}$

3. $\eta_{\text{Brake}} = \eta_{\text{Internal}} * \eta_{\text{Mech}}$

4. $\eta_{\text{Mech}} = \eta_{\text{Internal}} - \eta_{\text{Brake}}$

Question Number : 108 Question Id : 46904841856 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

As pressure approaches zero, the ratio of fugacity to pressure (f/P) for a gas approaches

Options :

1. zero
2. unity
3. infinity
4. an indeterminate value

Question Number : 109 Question Id : 46904841857 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Stage III in single crystal deformation is due to

Options :

1. easy glide
2. cross-slip
3. work hardening
4. dynamic recovery

Question Number : 110 Question Id : 46904841858 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Gun metal is an alloy of

Options :

1. Ni, Sn & Cu
2. Mn, Ni & P
3. Cu, P & Ni
4. Cu, Sn & Zn

Question Number : 111 Question Id : 46904841859 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following has the minimum atomic mass?

Options :

1. Oxygen
2. Sulphur
3. Nitrogen
4. Carbon

Question Number : 112 Question Id : 46904841860 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The nanomaterials, often used in water purifiers is

Options :

1. Silver
2. Gold
3. Copper
4. Iron

Question Number : 113 Question Id : 46904841861 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The thermal conductivity of an SWNT along length is _____ watt/(m.K)

Options :

1. 35
2. 350
3. 3500
4. 385

Question Number : 114 Question Id : 46904841862 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

One mole of which of the following has the highest entropy?

Options :

1. Liquid nitrogen
2. mercury
3. hydrogen gas
4. diamond

Question Number : 115 Question Id : 46904841863 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The physical property of a material that refers to the temperature at which a ferromagnetic material becomes paramagnetic on

Options :

1. Melting point
2. Thermal conductivity
3. Thermal expansion
4. Curie point

Question Number : 116 Question Id : 46904841864 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

An edge dislocation can move into a different slip plane by

Options :

1. glide
2. cross-slip
3. cross-slip and climb
4. climb

Question Number : 117 Question Id : 46904841865 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In face-centered cubic lattice, the most closely packed planes are

Options :

1. (1 0 0)

2. (1 1 2)

3. (1 1 1)

4. (1 1 0)

Question Number : 118 Question Id : 46904841866 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In a bucky ball, each carbon atom is bound to _____ adjacent carbon atoms.

Options :

1. 1

2. 2

3. 3

4. 4

Question Number : 119 Question Id : 46904841867 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The ideal gas-refrigeration cycle is similar to

Options :

1. Brayton cycle

2. Reversed Brayton cycle

3. Rankine cycle

4. Reversed Rankine cycle

Question Number : 120 Question Id : 46904841868 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

1 m = _____ nm.

Options :

1. 10^{-9}

2. 10^{-8}

3. 10^9

4. 10^8