

Question Paper Preview

Question Paper Name: Nano Technology 12th May 2017 Shift 2
Subject Name: Nano Technology
Duration: 120

Nano Technology

Display Number Panel: Yes
Group All Questions: No

Question Number : 1 Question Id : 8711121201 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A is a real symmetric matrix and λ_1 and λ_2 are two distinct eigen values of A. Then the eigen vectors corresponding to λ_1 and λ_2 are

Options :

1. equal and null
2. equal and non-null
3. distinct and orthogonal
4. non orthogonal

Question Number : 2 Question Id : 8711121202 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The vector $\begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$ is an eigenvector of the matrix $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$. One of the eigen values of A is

Options :

1. 1
2. 4
3. -1
4. 5

Question Number : 3 Question Id : 8711121203 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

$\sum_{n=1}^{\infty} \frac{1}{n^p}$ converges if and only if

Options :

1. $p > 1$
2. $p < 1$
3. $p = 1$
4. $p \leq 1$

Question Number : 4 Question Id : 8711121204 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

if $\vec{r}$ is the position vector, then $\text{div } \vec{r}$ is

Options :

1. 0
2. 1
3. 2
4. 3

Question Number : 5 Question Id : 8711121205 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $\frac{d^2y}{dx^2} + 9y = \sin 2x$, then its complementary function is

Options :

1. $c_1 e^{-x} + c_2 e^x$
2. $c_1 e^{-2x} + c_2 e^{2x}$
3. $c_1 e^{-3x} + c_2 e^{3x}$
4. $c_1 \cos 3x + c_2 \sin 3x$

Question Number : 6 Question Id : 8711121206 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Laplace transform of $f(t) = t \sin at$

Options :

1. $\frac{s^2 - a^2}{s^2 + a^2}$
2. $\frac{s^2 - a^2}{(s^2 + a^2)^2}$

3. $\frac{2as}{(s^2+a^2)^2}$

4. $\frac{2a}{(s^2+a^2)^2}$

Question Number : 7 Question Id : 8711121207 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If a variable X satisfies the Poisson's distribution with a mean value of 2, then probability that $X > 2$ is

Options :

1. e^{-2}

2. $2e^{-2}$

3. $1 - 3e^{-2}$

4. $1 - 2e^{-2}$

Question Number : 8 Question Id : 8711121208 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The probability that two friends share the same birth month is

Options :

1. $\frac{1}{12}$

2. $\frac{1}{6}$

3. $\frac{1}{144}$

4. $\frac{1}{65}$

Question Number : 9 Question Id : 8711121209 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If $\frac{dy}{dx} = y + x^2, y(1) = 1$ then the value of $y(1.1)$ by Euler's method is

Options :

1. 0.212

2. 1.121

3. 2.212

4. 1.2

An example of a transcendental equation is

Options :

1. $2xe^x - 1 = 0$
2. $x^3 + 3x^2 + 6x + 1 = 0$
3. $x^4 - x^3 + x^2 + 1 = 0$
4. $6x^2 - 3x = 0$

Question Number : 11 Question Id : 8711121211 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

At constant pressure, if the temperature increases by two times, then the average kinetic energy of gas molecules

Options :

1. increases by 6 times
2. increases by 4 times
3. increases by 2 times
4. remains the same

Question Number : 12 Question Id : 8711121212 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Bandgap (eV) of Diamond on insulator at 302 K is

Options :

1. 5.5
2. 1.21
3. 1.11
4. 3.21

Question Number : 13 Question Id : 8711121213 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The ratio of average fluid velocity to the maximum velocity in case of steady laminar flow of a Newtonian fluid in a circular pipe is

Options :

1. 1
2. 2

3. 0.6

4. 0.5

Question Number : 14 Question Id : 8711121214 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The length to diameter ratio is known as the _____ ratio.

Options :

1. Aspect

2. Poisson

3. Polymeric

4. Displacement

Question Number : 15 Question Id : 8711121215 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which among the following is the preferred to Zn coating inside a steel fruit juice can?

Options :

1. Ca

2. Na

3. Li

4. Sn

Question Number : 16 Question Id : 8711121216 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

At 298 K the entropy of pure substance is _____.

Options :

1. 0

2. 1

3. negative

4. infinite

Question Number : 17 Question Id : 8711121217 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following relation is correct?

Options :

1. Crystal structure > grain structure > microstructure

2. Microstructure > grain structure > crystal structure

3. Grain structure > microstructure > crystal structure
4. Crystal structure > microstructure > grain structure

Question Number : 18 Question Id : 8711121218 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is the main component of sunscreen lotions/products?

Options :

1. Zinc oxide
2. Iron oxide
3. Titanium oxide
4. Zinc oxide and Titanium oxide

Question Number : 19 Question Id : 8711121219 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Tightening action of nut on a bolt involves

Options :

1. negative torque
2. positive torque
3. linear moment
4. twisting moment

Question Number : 20 Question Id : 8711121220 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The units of specific surface area are

Options :

1. mg
2. m²g
3. m/g
4. m²/g

Question Number : 21 Question Id : 8711121221 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. super hard magnet
4. non magnet

Question Number : 22 Question Id : 8711121222 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A cycle consisting of two isothermal and two isentropic processes, is known as

Options :

1. Carnot cycle
2. Stirling cycle
3. Ericsson cycle
4. Joule cycle

Question Number : 23 Question Id : 8711121223 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The role of fibers in fiber reinforced composite is to

Options :

1. render high modulus to the composite
2. enhance the overall density of the composite
3. enhance the hardness of the composite
4. reduce the strength of the composite

Question Number : 24 Question Id : 8711121224 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 : 25 Question Id : 8711121225 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The displacement distance of the atoms around a dislocation is called as _____.

Options :

1. Frankel's vector
2. Burgers vector
3. Fresnel's vector
4. Gardener's vector

Question Number : 26 Question Id : 8711121226 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Graphene is a

Options :

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

Question Number : 27 Question Id : 8711121227 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Gibb's free energy change of mixing ideal solutions or ideal gases is

Options :

1. negative
2. positive
3. zero
4. undefined

Question Number : 28 Question Id : 8711121228 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Degrees of freedom at triple point will be

Options :

1. 0
2. 1
3. 2
4. 3

Compressibility factor of gas is

Options :

1. not a function of its pressure
2. not a function of its nature
3. not a function of its temperature
4. unity, if it follows ideal gas law

Question Number : 30 Question Id : 8711121230 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is the least desired property in magnetic materials for electrical engineering applications?

Options :

1. High magnetic permeability
2. High electrical resistivity
3. Large hysteresis loop
4. Small hysteresis loop

Question Number : 31 Question Id : 8711121231 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

First law of thermodynamics

Options :

1. holds for only reversible processes
2. holds for only irreversible processes
3. holds for reversible as well as irreversible processes
4. does not hold for reversible as well as irreversible processes

Question Number : 32 Question Id : 8711121232 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. ABC₃

Question Number : 33 Question Id : 8711121233 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

To remove the brittleness from hardened steels, _____ is used

Options :

1. Tempering
2. Carburising
3. Quenching
4. Nitriding

Question Number : 34 Question Id : 8711121234 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In which of the following crystals, alternate tetrahedral voids are occupied?

Options :

1. NaCl
2. ZnS
3. CaF₂
4. Na₂O

Question Number : 35 Question Id : 8711121235 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a material with uniform distribution of grain sizes, ASTM grain size number (at a magnification of 100X) is derived from

Options :

1. number of grains/nm²
2. number of grains/inch²
3. number of grains/mm²
4. number of grains/cm²

Question Number : 36 Question Id : 8711121236 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Dislocation cross-slip is difficult in those materials which have

Options :

1. large number of slip systems
2. high work-hardening rate
3. coarse grain size
4. low stacking fault energy

Question Number : 37 Question Id : 8711121237 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The atomic mass of Copper is X g/mol. The mass in grams of one atom of copper is _____ (N = Avogadro's Number).

Options :

1. $(X + N)_g$
2. $(X - N)_g$
3. $(X \times N)_g$
4. $(X/N)_g$

Question Number : 38 Question Id : 8711121238 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When standard enthalpy change for a chemical reaction is known, Van 't Hoff equation relates the change in the equilibrium constant of the chemical reaction to the change in

Options :

1. pressure
2. partial pressure
3. concentration of the reactants
4. temperature

Question Number : 39 Question Id : 8711121239 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Work done in a free expansion process is

Options :

1. zero
2. minimum
3. maximum
4. positive

Question Number : 40 Question Id : 8711121240 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

What is the relation between conductivity (σ) electric field (E) and current density (J) according Ohm's law?

Options :

1. $J = E/\sigma$
2. $J = \sigma/E^2$
3. $J = \sigma/E$
4. $J = \sigma E$

Question Number : 41 Question Id : 8711121241 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A gas does 4.5 J of external work during adiabatic expansion. If the temperature falls by 2 K, its internal energy will

Options :

1. increase by 4.5 J
2. decrease by 4.5 J
3. decrease by 9 J
4. increase by 9 J

Question Number : 42 Question Id : 8711121242 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A thermodynamic system is said to be stable when its

Options :

1. free energy is maximum
2. free energy is minimum
3. enthalpy is minimum
4. entropy is minimum

Question Number : 43 Question Id : 8711121243 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The automobile radiator is a heat exchanger of

Options :

1. Counter flow type
2. Parallel flow type
3. Cross flow type

4. Regenerator type

Question Number : 44 Question Id : 8711121244 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Instantaneous centre of a body rolling without sliding on a stationary curved surface lies

Options :

1. at the point of contact
2. on the common normal at the point of contact
3. on the common tangent at the point of contact
4. at the centre of curvature of the stationary surface

Question Number : 45 Question Id : 8711121245 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Materials which lack permanent magnetic dipoles are called

Options :

1. ferromagnetic
2. diamagnetic
3. ferrimagnetic
4. paramagnetic

Question Number : 46 Question Id : 8711121246 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Hot working of a metallic material is carried out _____ temperature.

Options :

1. at its melting
2. at its recrystallization
3. below its recrystallization
4. above its recrystallization

Question Number : 47 Question Id : 8711121247 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 dislocation
- 4. motion of vacancies

Question Number : 48 Question Id : 8711121248 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In shell and tube heat exchanger, baffles are mainly used to

Options :

- 1. increase the mixing of fluids
- 2. increase the heat transfer area
- 3. deflect the flow in desired direction
- 4. reduce fouling of the tube surface

Question Number : 49 Question Id : 8711121249 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When mild steel is subjected to a tensile load, its fracture will conform to _____ shape.

Options :

- 1. Star
- 2. Granular
- 3. Cup and cone
- 4. Fibrous

Question Number : 50 Question Id : 8711121250 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a given heat flow and for the same thickness, the temperature drop across the material will be maximum for

Options :

- 1. copper
- 2. steel
- 3. glass wool
- 4. refractory brick

Question Number : 51 Question Id : 8711121251 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which one of the following products cannot be produced by rolling?

Options :

1. Seamless pipe
2. I-beams
3. Crankshaft
4. Rails

Question Number : 52 Question Id : 8711121252 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The number of slip systems of the HCP-structure is _____.

Options :

1. 1
2. 2
3. 3
4. 4

Question Number : 53 Question Id : 8711121253 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The point of contraflexure in a loaded beam is one where

Options :

1. the bending moment is maximum
2. the shear force is maximum
3. the bending moment changes sign
4. the shear force changes sign

Question Number : 54 Question Id : 8711121254 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Vacancies are _____ defects.

Options :

1. Volume
2. Planar
3. Line
4. Point

Question Number : 55 Question Id : 8711121255 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The crystal structure of gamma iron is

Options :

1. orthorhombic
2. simple cubic
3. body centered cubic
4. face centered cubic

Question Number : 56 Question Id : 8711121256 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Slip phenomenon occurs when the shearing stress on the slip plane in the slip direction reaches a threshold value called

Options :

1. 2% offset yield strength
2. Pierls-Nabarro stress
3. critical resolved shear stress
4. endurance limit

Question Number : 57 Question Id : 8711121257 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The equation of state in terms of pressure (P), temperature (T), volume (V) and ideal gas constant R corresponding to 8 g of O₂ is

Options :

1. $PV = 8RT$
2. $PV = RT/4$
3. $PV = RT$
4. $PV = RT/2$

Question Number : 58 Question Id : 8711121258 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The total vapour pressure of an alloy is _____ the partial pressure of each constituents present in it.

Options :

1. smaller than
2. greater than
3. not related to
4. equal to

Question Number : 59 Question Id : 8711121259 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The polymer synthesized by ring opening polymerization is

Options :

1. poly acrylic acid
2. nylon 6
3. poly ethylene terephthalate
4. nylon 66

Question Number : 60 Question Id : 8711121260 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Gibbs free energy of a gas, expressed as a function of Pressure P and temperature T , is given by $G(T, P) = RT \log\left(\frac{P}{P_0}\right) - AP$, Where A and P_0 are constants. Entropy of the gas is given by

Options :

1. $R \log\left(\frac{P}{P_0}\right)$
2. $R \log\left(\frac{P}{P_0}\right) - \frac{AP}{T}$
3. $RT^2 \log\left(\frac{P}{P_0}\right) - APT$
4. $-R \log\left(\frac{P}{P_0}\right)$

Question Number : 61 Question Id : 8711121261 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The rate of energy emission from unit surface area through unit solid angle, along a normal to the surface, is known as

Options :

1. Emissivity
2. Transmissivity
3. Reflectivity

4. Intensity of radiation

Question Number : 62 Question Id : 8711121262 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The unit of modulus of elasticity is same as those of

Options :

1. stress, strain and pressure
2. stress, force and modulus of rigidity
3. strain, force and pressure
4. stress, pressure and modulus of rigidity

Question Number : 63 Question Id : 8711121263 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A ring, disk and cylinder have same mass. Which of the following is correct with respect to their moment of inertia (I)?

Options :

1. $I_{\text{ring}} < I_{\text{cylinder}} < I_{\text{disc}}$
2. $I_{\text{ring}} > I_{\text{cylinder}} > I_{\text{disc}}$
3. $I_{\text{ring}} < I_{\text{disc}} < I_{\text{cylinder}}$
4. $I_{\text{ring}} > I_{\text{disc}} > I_{\text{cylinder}}$

Question Number : 64 Question Id : 8711121264 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Human bodies can be scanned with Magnetic Resonance Imaging (MRI) because they contain

Options :

1. carbon
2. nickel
3. hydrogen
4. iron

Question Number : 65 Question Id : 8711121265 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The best way to compare the mechanical properties of different materials at various temperatures is in terms of

Options :

1. Flow stress

2. Creep
3. Fracture
4. Homologous temperature

Question Number : 66 Question Id : 8711121266 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

How many independent elastic constants are required to characterize materials without symmetry elements?

Options :

1. 5
2. 4
3. 3
4. 2

Question Number : 67 Question Id : 8711121267 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If P is pressure and T is temperature, then $\frac{dP}{dT}$ denotes

Options :

1. specific enthalpy
2. the curvature of the coexistence curve
3. the slope of any intersecting line that intersects the coexistence curve at any point
4. the slope of the tangent to the coexistence curve at any point

Question Number : 68 Question Id : 8711121268 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The magnetic moments present in some solids and when the magnetic moments of two sub-lattices are not equal but results in a net magnetic moment is called _____.

Options :

1. Ferromagnetism
2. Antiferromagnetism
3. Ferrimagnetism
4. Diamagnetism

Question Number : 69 Question Id : 8711121269 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Blasius equation related to boundary layer theory is a

Options :

1. Third-order linear partial differential equation
2. Third-order nonlinear partial differential equation
3. Second-order nonlinear ordinary differential equation
4. Third-order linear ordinary differential equation

Question Number : 70 Question Id : 8711121270 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following statements is not true?

Options :

1. All ferroelectric materials exhibit piezoelectric.
2. All ferroelectric materials possess center of symmetry.
3. All ferroelectric materials exhibit pyroelectric.
4. All ferroelectric materials possess spontaneous polarization.

Question Number : 71 Question Id : 8711121271 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

10^{-21} m is termed as

Options :

1. nanometer
2. attometer
3. zeptometer
4. picometer

Question Number : 72 Question Id : 8711121272 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The relationship between Young's modulus (E), Modulus of rigidity (η) and Poisson's ratio (ν) is

Options :

1. $E = 2\eta (1 + \nu)$
2. $\eta = 2E (1 + \nu)$
3. $\nu = 2E/(1 + \eta)$

$$E = \eta (1 + v)$$

4.

Question Number : 73 Question Id : 8711121273 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Cooling curves are not dependent on _____

Options :

1. temperature fluctuations in the furnace
2. the rate of cooling
3. uniform stirring
4. accurate composition

Question Number : 74 Question Id : 8711121274 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The SI units for electric field strength

Options :

1. A/cm^2
2. mho/meter
3. N/C
4. V/km

Question Number : 75 Question Id : 8711121275 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is/are affected by the temperature?

- i. Activity co-efficient
- ii. Free energy
- iii. Fugacity

Options :

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

Question Number : 76 Question Id : 8711121276 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Cavitation is caused by

Options :

1. high pressure

2. high velocity
3. low viscosity
4. low pressure

Question Number : 77 Question Id : 8711121277 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

FRP stands for _____.

Options :

1. Fiber Reinforced Polymer
2. Film Reinforced Polymer
3. Fiber Reinforced Plastic
4. Film Reinforced Plastic

Question Number : 78 Question Id : 8711121278 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

5.6 liters of a gas at STP weights 8.0 g. The vapor density of the gas is _____.

Options :

1. 32
2. 40
3. 8
4. 16

Question Number : 79 Question Id : 8711121279 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The degrees of freedom at triple point in unary diagram for water is _____.

Options :

1. 0
2. 1
3. 2
4. 3

Question Number : 80 Question Id : 8711121280 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Diamond pyramid indenter is used for _____ test.

Options :

1. Rockwell B Hardness

2. Brinell Hardness
3. Rockwell C Hardness
4. Vickers Hardness

Question Number : 81 Question Id : 8711121281 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the case of uniaxial tensile deformation, at strain equal to 0.5, true stress is

Options :

1. equal to engineering stress
2. independent of engineering stress
3. greater than engineering stress
4. lesser than engineering stress

Question Number : 82 Question Id : 8711121282 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The kinetic energy per kg molecule of any gas at absolute temperature T is equal to (where R is gas constant)

Options :

1. $R \times T$
2. $1.5 RT$
3. $2 RT$
4. $3 RT$

Question Number : 83 Question Id : 8711121283 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Transfer of an iron from molten slag to molten metal in a refining process, is _____ reaction

Options :

1. a homogeneous
2. a heterogeneous
3. an isomeric
4. a homogeneous and Heterogeneous

Question Number : 84 Question Id : 8711121284 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following techniques is bottom-up process for synthesis of Nano materials?

Options :

1. Ball Milling
2. Friction stir processing
3. Equal channel angular pressing
4. Self-assembly

Question Number : 85 Question Id : 8711121285 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For small deformations, what is the tensor of stress required?

Options :

1. Biot stress tensor
2. Kirchhoff stress tensor
3. Piola–Kirchhoff stress tensor
4. Cauchy stress tensor

Question Number : 86 Question Id : 8711121286 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Phase rule at constant pressure is _____.
(when F is degrees of freedom, C is number of components and P is number of phases)

Options :

1. $F = C + P + 1$
2. $F = P - C + 1$
3. $F = C - P + 1$
4. $F = C - P + 2$

Question Number : 87 Question Id : 8711121287 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The action that is not confined to a unique line in space is called as _____

Options :

1. Free vector
2. Sliding vector
3. Fixed vector
4. Unit vector

Question Number : 88 Question Id : 8711121288 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The full form of STM is _____.

Options :

1. Scanning Tunneling Microscope
2. Scientific Technical Microscope
3. Systematic Technical Microscope
4. Super Tensile Microscope

Question Number : 89 Question Id : 8711121289 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Rule-of-mixture provides _____ bounds for mechanical properties of particulate composites.

Options :

1. lower
2. upper
3. no
4. lower and upper

Question Number : 90 Question Id : 8711121290 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The type of atomic bonding most common in diamond is _____.

Options :

1. metallic
2. covalent
3. ionic
4. hydrogen

Question Number : 91 Question Id : 8711121291 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

_____ atmosphere is maintained inside an iron blast furnace.

Options :

1. Oxidising
2. Inert
3. Decarburising

4. Reducing

Question Number : 92 Question Id : 8711121292 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Joule Thomson coefficient is zero at

Options :

1. Inversion temperature only
2. Critical Temperature only
3. Absolute temperature only
4. Absolute and Critical Temperature

Question Number : 93 Question Id : 8711121293 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is true in the thermodynamic equilibrium?

Options :

1. Only temperature is uniform throughout the system
2. Only pressure is uniform throughout the system
3. Chemical potential is uniform throughout the system
4. Both temperature and Pressure are uniform throughout the system

Question Number : 94 Question Id : 8711121294 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is correct with respect to the activation energy (Q) for diffusion generally follows the qualitative variation?

Options :

1. $Q_{\text{surface}} < Q_{\text{grain boundary}} < Q_{\text{lattice}}$
2. $Q_{\text{surface}} > Q_{\text{grain boundary}} > Q_{\text{lattice}}$
3. $Q_{\text{surface}} > Q_{\text{grain boundary}} = Q_{\text{lattice}}$
4. $Q_{\text{surface}} < Q_{\text{grain boundary}} = Q_{\text{lattice}}$

Question Number : 95 Question Id : 8711121295 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following has the highest entropy for one mole?

Options :

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

Question Number : 96 Question Id : 8711121296 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A structural member which is acted upon by a system of external loads at right angles to its axis is known as _____.

Options :

1. Truss
2. Beam
3. Bar
4. Frame

Question Number : 97 Question Id : 8711121297 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Fluid flow is said to be irrotational, if

Options :

1. Vorticity is zero
2. Vorticity is Unity
3. Vorticity is Infinity
4. Vorticity is negative

Question Number : 98 Question Id : 8711121298 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In isomorphous system, which of the following holds true?

Options :

1. Complete liquid solubility and partial solid solubility
2. Partial liquid solubility and partial solid solubility
3. Partial liquid solubility and complete solid solubility
4. Complete liquid solubility and complete solid solubility

Question Number : 99 Question Id : 8711121299 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Fatigue fracture surface depicts

Options :

1. dimples
2. voids
3. striations
4. pits

Question Number : 100 Question Id : 8711121300 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The imaginary components of the refraction index of a light absorbing material corresponds to

Options :

1. Attenuation of Light
2. Refraction of Light
3. Attenuation and Refraction of Light
4. Polarization of Light

Question Number : 101 Question Id : 8711121301 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Property of the fluid by which its molecules are attracted is called

Options :

1. Adhesion
2. Cohesion
3. Surface tension
4. Viscosity

Question Number : 102 Question Id : 8711121302 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following would lead to a reduction in thermal resistance?

Options :

1. In conduction, reduction in the thickness of the material and an increase in thermal conductivity
2. In convection, stirring of the fluid and cleaning the heating surface
3. In radiation, increasing the temperature and reducing the emissivity
4. In conduction (reduction in the thickness of the material and an increase in thermal conductivity) and convection (stirring of the fluid and cleaning the heating surface).

Question Number : 103 Question Id : 8711121303 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is a correct statement?

Options :

1. All polymers are electrically insulating in nature.
2. All polymers are electrically conducting in nature.
3. Few polymers are electrically insulating in nature.
4. Polymiline is the only polymer that is electrically conducting in nature.

Question Number : 104 Question Id : 8711121304 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

X-ray diffraction is used for

Options :

1. both crystal structure determination and chemical state identification of any material
2. both crystal structure and oxidation state determination of any material
3. both crystal structure and crystallite size determination of a crystalline material
4. specific gravity determination of any material

Question Number : 105 Question Id : 8711121305 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Compressive strength is greater than tensile strength in _____.

Options :

1. Ceramics only
2. Concrete only
3. Ductile Metals
4. Ceramics and Concrete

Question Number : 106 Question Id : 8711121306 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Burgers vector gives

Options :

1. Only magnitude of the lattice distortion even though the word vector is associated with it
2. Only direction of the lattice distortion even though the word vector is associated with it

3. Both direction and magnitude of the lattice distortion due to the presence of a dislocation

4. Both direction and magnitude of the lattice distortion due to the presence of a point defect

Question Number : 107 Question Id : 8711121307 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

1 nm =

Options :

1. 1000 Å

2. 100 Å

3. 10 Å

4. 0.1 Å

Question Number : 108 Question Id : 8711121308 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

“Meisner effect” is an effect related to

Options :

1. superconductivity

2. superelasticity

3. superpermittivity

4. superplasticity

Question Number : 109 Question Id : 8711121309 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Solids typically contain

Options :

1. 10^3 - 10^5 atoms per cm^3

2. 10^6 - 10^{10} atoms per cm^3

3. 10^{12} - 10^{15} atoms per cm^3

4. 10^{22} - 10^{23} atoms per cm^3

Question Number : 110 Question Id : 8711121310 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In case of liquids and gases, the heat transfer takes place according to

Options :

1. Conduction only
2. Convection only
3. Radiation only
4. Conduction and Convection

Question Number : 111 Question Id : 8711121311 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The surface area to volume ratio of a sphere with radius 1 cm is R_1 and that of a sphere with radius 5 cm is R_2 . Then $R_1 = \underline{\hspace{1cm}} R_2$.

Options :

1. 3
2. $1/3$
3. 5
4. $1/5$

Question Number : 112 Question Id : 8711121312 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which is the most thermally efficient furnace?

Options :

1. Rotary kilns
2. Reheating furnace
3. Boiler furnace
4. Reverberatory furnace

Question Number : 113 Question Id : 8711121313 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Electronic specific heat in nonmetals is

Options :

1. a considerably high quantity
2. a negligible quantity
3. infinite
4. $3R$, R being universal gas constant

Question Number : 114 Question Id : 8711121314 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a particular reversible reaction at temperature T , enthalpy change (ΔH) and entropy change (ΔS) were found to be both +ve. If T_e is the temperature at equilibrium, the reaction would be spontaneous when

Options :

1. $T = T_e$
2. $T_e > T$
3. $T > T_e$
4. $T_e = 5 T$

Question Number : 115 Question Id : 8711121315 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which one of the following is the extensive property of a thermodynamic system?

Options :

1. Volume
2. Pressure
3. Temperature
4. Density

Question Number : 116 Question Id : 8711121316 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which one of the following is most ductile?

Options :

1. Face centered cubic lattice
2. Body centered cubic lattice
3. Hexagonal close packed lattice
4. Edge centered cubic lattice

Question Number : 117 Question Id : 8711121317 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

1 Gauss = _____

Options :

1. $10^{-3} T$
2. $10^{-4} T$
3. $10^{-5} T$

10^{-6} T

4.

Question Number : 118 Question Id : 8711121318 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The slope of enthalpy versus temperature plot at constant pressure is _____.

Options :

1. Enthalpy
2. Entropy
3. Volume
4. Heat Capacity

Question Number : 119 Question Id : 8711121319 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

‘The total change in heat in a chemical reaction is same irrespective whether it occurs in a single step or in multiple steps provided the reaction must be isothermal or isobaric’.

This law is known as _____.

Options :

1. Dalton’s Law
2. Second Law Thermodynamics
3. Boyle’s Law
4. Hess’s Law

Question Number : 120 Question Id : 8711121320 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Tensile strength of a material is obtained by dividing the maximum load during the test by the

Options :

1. area at the time of fracture
2. original cross-sectional area
3. average of fracture and original cross sectional area
4. minimum area after fracture