

Question Paper Preview**Notations :**

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

Question Paper Name: Nano Technology 31st May 2018 Shift2
Subject Name: Nano Technology
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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 : 5113469361 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If a number of forces act simultaneously on a particle then it is possible to replace them by

Options :

- ✓ a single force
- ✗ a single force passing through C.G
- ✗ a couple
- ✗ a single force and a couple

Question Number : 2 Question Id : 5113469362 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

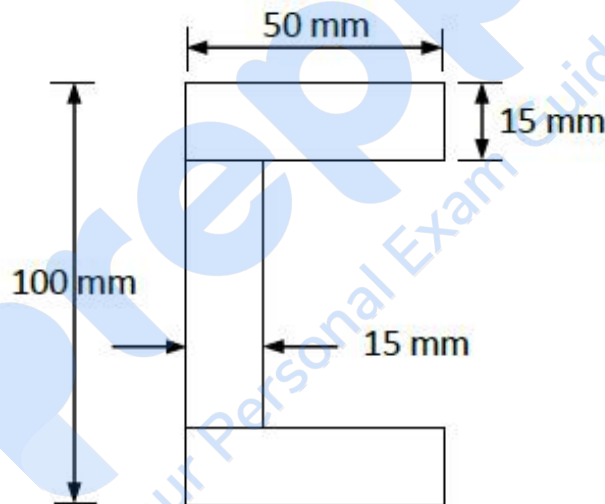
If the sum of all the forces acting on a body is zero, then the body said to be in equilibrium provided the forces are

Options :

1. ✓ concurrent
2. ✗ collinear
3. ✗ coplanar
4. ✗ coplanar and concurrent

Question Number : 3 Question Id : 5113469363 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The center of gravity of a channel section $100 \text{ mm} \times 50 \text{ mm} \times 15 \text{ mm}$ shown in figure is



Options :

1. ✗ (25, 50)
2. ✗ (7.5, 50)
3. ✓ (17.8, 50)
4. ✗ (17.5, 50)

Question Number : 4 Question Id : 5113469364 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A circular hole of radius (r) is cut out from a circular disc of radius ($2r$) in such a way that the diagonal of the hole is the radius of the disc. The center of gravity of the section lies at

Options :

1. ✗ center of a disc
2. ✗ center of the hole
3. ✓ somewhere in the disc
4. ✗ somewhere in the hole

Question Number : 5 Question Id : 5113469365 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The moment of inertia of a triangular section of base (b) and height (h) about its axis passing through its vertex and parallel to the base is _____ as that passing through its C.G and parallel to the base.

Options :

1. ✗ four times
2. ✗ six times
3. ✓ nine times
4. ✗ twelve times

Question Number : 6 Question Id : 5113469366 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The concept of mass moment of Inertia (I) is useful in calculating

Options :

1. ✓ angular momentum
2. ✗ linear momentum
3. ✗ kinetics of linear motion

4. ✖ force equation

Question Number : 7 Question Id : 5113469367 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The polar moment of inertia refers to

Options :

1. ✖ resistance of object to angular acceleration
2. ✔ resistance of object against torsion
3. ✖ shape of the object
4. ✖ distribution of mass of the object

Question Number : 8 Question Id : 5113469368 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The relation $s = ut + \frac{1}{2}at^2$ is applicable to bodies

Options :

1. ✖ moving with any type of motion
2. ✖ moving with uniform velocity
3. ✔ moving with uniform acceleration
4. ✖ moving in curvilinear motion only

Question Number : 9 Question Id : 5113469369 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The term 'virtual work' refers to

Options :

1. ✖ Actual work done by virtual forces
2. ✔ Virtual work done by actual forces

3. ✖ Actual work done by actual forces

4. ✖ Virtual work done by virtual forces

Question Number : 10 Question Id : 5113469370 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The velocity of a particle moving with simple harmonic motion is maximum when its acceleration is

Options :

1. ✔ zero

2. ✖ maximum

3. ✖ average

4. ✖ minimum

Question Number : 11 Question Id : 5113469371 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The value of acceleration due to gravity at poles as compared to at equator is

Options :

1. ✔ greater

2. ✖ lesser

3. ✖ same

4. ✖ unpredictable

Question Number : 12 Question Id : 5113469372 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The masses of two balls are in the ratio of 2:1 and their respective velocities are in then ratio of 1:2 but in the opposite direction before impact. If the coefficient of restitution is 0.5, the velocity of separation of the balls is equal to

Options :

1. ✖ original velocity in the same direction
2. ✖ half the original velocity in the same direction
3. ✖ half the original velocity in the opposite direction
4. ✔ original velocity in the opposite direction

Question Number : 13 Question Id : 5113469373 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Three perfectly elastic and similar balls are lying on floor. When one is struck with velocity ' v ', it strikes second and onwards third. What will be the resultant velocity of the third ball.

Options :

1. ✖ v
2. ✖ $v/2$
3. ✔ $v/3$
4. ✖ $v/4$

Question Number : 14 Question Id : 5113469374 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The angular velocity of a particle changes from 69 to 71 rpm in 30 secs. Its angular acceleration in rev/min is equal to

Options :

1. ✖ 1
2. ✖ 2
3. ✔ 4
4. ✖ 8

Question Number : 15 Question Id : 5113469375 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A 4 kg mass hung at one end of a helical spring and is set to vibrate vertically. The mass makes 2 vibrations per second. The stiffness of the spring is

Options :

1. ✗ 321.5 N/m
2. ✗ 452.6 N/m
3. ✗ 530.6 N/m
4. ✓ 613.6 N/m

Question Number : 16 Question Id : 5113469376 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The impact strength of a material is an index of its

Options :

1. ✓ toughness
2. ✗ tensile strength
3. ✗ hardness
4. ✗ fatigue strength

Question Number : 17 Question Id : 5113469377 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In compression test, the fracture in cast iron specimen would occur along

Options :

1. ✗ the axis of load
2. ✗ perpendicular to the axis of load
3. ✓ on oblique plane
4. ✗ any direction

Question Number : 18 Question Id : 5113469378 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

A non-yielding support implies that the

Options :

1. ✗ support is frictionless
2. ✗ support can take any amount of reaction
3. ✗ support holds members firmly
4. ✓ slope of the beam at the support is zero

Question Number : 19 Question Id : 5113469379 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If a material is subjected to a tensile load, then to avoid the shear failure of a material along a plane inclined at 45° to the direction of the tensile stress, the material should have its shear strength at least equal to

Options :

1. ✗ its tensile strength
2. ✓ half the tensile strength
3. ✗ its compressive strength
4. ✗ principal stress

Question Number : 20 Question Id : 5113469380 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Zero bending moment in a fixed beam of length ' l ' carrying uniformly distributed load will occur at

Options :

1. ✓ $l/2$
2. ✗ $l/3$

3. ✖ $l/4$ 4. ✖ $l/6$

Question Number : 21 Question Id : 5113469381 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Two beams have same width but one beam has double depth of the other. The elastic strength of double depth beam compared to other beam will be

Options :

1. ✖ double

2. ✔ four time

3. ✖ six times

4. ✖ eight times

Question Number : 22 Question Id : 5113469382 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If a shaft of radius r and polar moment of inertia J be subjected to bending moment M and torque T , then maximum combined shear and bending stress is equal to

Options :

1. ✔ $\frac{r}{J} \sqrt{M^2 + T^2}$ 2. ✖ $\frac{J}{r} \sqrt{M^2 + T^2}$ 3. ✖ $\frac{2r}{J} \sqrt{M^2 + T^2}$ 4. ✖ $\frac{r}{J} \sqrt{\frac{M^2 + T^2}{2}}$

Question Number : 23 Question Id : 5113469383 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Stress in a beam and the second modulus

Options :

1. ✖ are directly proportional
2. ✔ are inversely proportional
3. ✖ are curvilinearly related
4. ✖ have unpredictable relationship

Question Number : 24 Question Id : 5113469384 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The extremities of any diameter on Mohr's circle represents

Options :

1. ✖ principal stresses
2. ✔ normal stresses on planes at 45°
3. ✖ shear stresses on planes at 45°
4. ✖ normal and shear stresses on a plane

Question Number : 25 Question Id : 5113469385 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In case of pure shear at a point, the sum of normal stresses on two orthogonal planes is equal to

Options :

1. ✖ maximum shear stress
2. ✖ twice the maximum shear stress
3. ✖ half the maximum shear stress
4. ✔ zero

Question Number : 26 Question Id : 5113469386 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The increase in temperature results in

Options :

1. ✗ increase in viscosity of gas
2. ✗ increase in viscosity of liquid
3. ✗ decrease in viscosity of gas
4. ✓ decrease in viscosity of liquid

Question Number : 27 Question Id : 5113469387 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Choose the correct relationship

Options :

1. ✗ $\text{specific gravity} = \text{gravity} \times \text{density}$
2. ✓ $\text{dynamic viscosity} = \text{kinematic viscosity} \times \text{density}$
3. ✗ $\text{gravity} = \text{specific gravity} \times \text{density}$
4. ✗ $\text{kinematic viscosity} = \text{dynamic viscosity} \times \text{density}$

Question Number : 28 Question Id : 5113469388 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If mercury in a barometer is replaced by water, the height of 3.75 cm of mercury will be equal to water of

Options :

1. ✓ 51 cm
2. ✗ 50 cm
3. ✗ 52 cm
4. ✗ 51.7 cm

Question Number : 29 Question Id : 5113469389 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For measuring flow by a venturimeter, it should be installed in

Options :

1. ✗ vertical line
2. ✗ horizontal line
3. ✗ inclined
4. ✓ in any direction and in any location

Question Number : 30 Question Id : 5113469390 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Non uniform flow occurs when

Options :

1. ✗ the direction and magnitude of the velocity at all points are identical
2. ✗ the velocity of successive fluid particles, at any point, is the same at successive periods of time
3. ✗ the magnitude and direction of the velocity do not change from point to point in the fluid
4. ✓ velocity, depth, pressure, etc change from point to point in the fluid flow.

Question Number : 31 Question Id : 5113469391 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

During the opening of a valve in a pipe line, the flow is

Options :

1. ✗ steady
2. ✓ unsteady
3. ✗ uniform
4. ✗ laminar

Question Number : 32 Question Id : 5113469392 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The flow in which the velocity of fluid particles vary from point to point in magnitude and direction as well as from instant to instant, is known as

Options :

1. ✖ one dimensional flow
2. ✖ uniform flow
3. ✖ steady flow
4. ✔ turbulent flow

Question Number : 33 Question Id : 5113469393 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The total energy of each particle at various places in the case of perfect incompressible fluid flowing in continuous stream

Options :

1. ✖ keeps on increasing
2. ✖ keeps on decreasing
3. ✔ remains constant
4. ✖ may increase/decrease

Question Number : 34 Question Id : 5113469394 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

According to Bernoulli's equation for steady ideal fluid flow

Options :

1. ✖ principle of conservation of mass holds
2. ✖ velocity and pressure are inversely proportional

3. ✖ total energy is constant throughout
4. ✔ energy is constant along a stream line but may vary across stream lines

Question Number : 35 Question Id : 5113469395 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Froude number is significant in

Options :

1. ✖ supersonic, as with projectile and jet propulsion
2. ✖ full immersion or completely enclosed flow, as with pipes, aircrafts wings, nozzles etc.
3. ✔ simultaneous motion through two fluids where there is a surface of discontinuity, gravity forces, and wave making effect, as with ship's hull.
4. ✖ subsonic flows, as in flow over streamlined body

Question Number : 36 Question Id : 5113469396 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The non-dimensional factor governing viscous or frictional resistance is

Options :

1. ✖ Reynolds number
2. ✖ Weber number
3. ✖ Froude number
4. ✔ Mach number

Question Number : 37 Question Id : 5113469397 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cavitation will occur when

Options :

1. ✓

the pressure at any location reaches an absolute pressure equal to the saturation vapour pressure of the liquid

2. ✗

pressure becomes more than critical pressure

3. ✗

flow is increased

4. ✗

pressure is increased

Question Number : 38 Question Id : 5113469398 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The region downstream from the streamline where separation takes place from the boundary is known as

Options :

1. ✓

wake

2. ✗

lift

3. ✗

drag

4. ✗

cavitation

Question Number : 39 Question Id : 5113469399 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Choose the wrong statement about flow nets

Options :

1. ✓

flow nets are drawn to indicate flow patterns in case of one dimensional flow

2. ✗

flow net consists of a system of streamlines so spaced that the rate of flow is the same between each successive pair of lines

3. ✗

flow net consists of another system of lines normal to the streamlines and so spaced that the distance between the normal lines equals the distance between adjacent streamlines

4. ✖

an infinite number of streamlines are required to describe completely the flow under given boundary conditions

Question Number : 40 Question Id : 5113469400 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The function of a surge tank is to

Options :

1. ✔ relieve the pipe line of excessive pressure produced by water hammer
2. ✖ smoothen flow
3. ✖ act as reservoir for emergency conditions
4. ✖ avoid reverse flow

Question Number : 41 Question Id : 5113469401 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For an irrotational flow, $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0$ is the equation given by

Options :

1. ✖ Cauchy-Riemaan
2. ✔ Laplace
3. ✖ Reynold
4. ✖ Bernoulli

Question Number : 42 Question Id : 5113469402 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In laminar flow

Options :

1. ✖ the velocity is of no consideration

2. ✓ Newton's law of viscosity applies
3. ✗ losses are proportional to square of velocity
4. ✗ generally occurs in practice

Question Number : 43 Question Id : 5113469403 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The thermal conductivity of non-metallic amorphous solids with decrease in temperature

Options :

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

Question Number : 44 Question Id : 5113469404 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Thermal diffusivity is

Options :

1. ✗ a dimensionless parameter
2. ✗ function of temperature
3. ✓ a physical property of the material
4. ✗ useful in case of heat transfer by radiation

Question Number : 45 Question Id : 5113469405 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In the heat flow equation $Q = \frac{kA(t_1 - t_2)}{x}$ the term $\frac{x}{kA}$ is known as

Options :

1. ✓ thermal resistance
2. ✗ thermal coefficient
3. ✗ thermal gradient
4. ✗ thermal conductivity

Question Number : 46 Question Id : 5113469406 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Absorptivity of a body will be equal to its emissivity

Options :

1. ✗ at all temperatures
2. ✗ at one particular temperature
3. ✓ when system is under thermal equilibrium
4. ✗ at critical temperature

Question Number : 47 Question Id : 5113469407 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In heat exchangers, degree of approach is defined as the difference between temperatures of

Options :

1. ✗ Cold water inlet and outlet
2. ✗ Hot medium inlet and outlet
3. ✗ Hot medium outlet and cold water inlet
4. ✓ Hot medium outlet and cold water outlet

Question Number : 48 Question Id : 5113469408 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Units of Thermal diffusivity is

Options :

1. ✓ m^2/hr
2. ✗ $\text{m}^2/\text{hr } ^\circ\text{C}$
3. ✗ $\text{kcal}/\text{m}^2\text{hr}$
4. ✗ $\text{kcal}/\text{m}^2\text{hr } ^\circ\text{C}$

Question Number : 49 Question Id : 5113469409 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is expected to have highest thermal conductivity

Options :

1. ✗ steam
2. ✓ solid ice
3. ✗ melting ice
4. ✗ water

Question Number : 50 Question Id : 5113469410 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cermets belong to which of the following category of material

Options :

1. ✗ metals
2. ✗ polymers
3. ✗ ceramics
4. ✓ composites

Question Number : 51 Question Id : 5113469411 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Ionic compounds possess which of the following property

Options :

1. ✗ low melting point
2. ✓ poor conductors
3. ✗ have open structure
4. ✗ low hardness

Question Number : 52 Question Id : 5113469412 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The number of bravais lattices in two dimensions is

Options :

1. ✗ four
2. ✓ five
3. ✗ seven
4. ✗ fourteen

Question Number : 53 Question Id : 5113469413 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Miller indices in a crystal are

Options :

1. ✗ Coordinates of lattice points
2. ✗ directions of lines connecting lattice points
3. ✓ planes in a crystal
4. ✗ translation vectors

Question Number : 54 Question Id : 5113469414 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following structure has highest packing factor

Options :

1. ✗ Diamond
2. ✗ simple cube
3. ✗ BCC
4. ✓ FCC

Question Number : 55 Question Id : 5113469415 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The number of equivalent directions in the group $\langle 1\ 1\ 0 \rangle$ is

Options :

1. ✗ six
2. ✗ eight
3. ✗ ten
4. ✓ twelve

Question Number : 56 Question Id : 5113469416 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following crystal structure has four atoms per unit cell

Options :

1. ✗ Simple cube
2. ✗ BCC
3. ✓ FCC
4. ✗ Diamond

Question Number : 57 Question Id : 5113469417 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Griffith's theory deals with the analysis of

Options :

1. ✗ ductile materials
2. ✓ brittle materials
3. ✗ rubber materials
4. ✗ elastomers

Question Number : 58 Question Id : 5113469418 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following combination ensures best creep properties

Options :

1. ✓ low temperature fine grains
2. ✗ low temperature course grains
3. ✗ high temperature fine grains
4. ✗ fine grain at any temperature

Question Number : 59 Question Id : 5113469419 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following disturbance of the atomic arrangement in a crystal leads to dislocation

Options :

1. ✓ linear
2. ✗ angular
3. ✗ cylindrical

4. ✖ spherical

Question Number : 60 Question Id : 5113469420 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Impurities such as slag causes

Options :

- 1. ✖ volume defects
- 2. ✖ area defects
- 3. ✖ line defects
- 4. ✔ point defects

Question Number : 61 Question Id : 5113469421 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Crystal dislocation is caused due to

Options :

- 1. ✖ edge dislocation only
- 2. ✖ screw dislocation only
- 3. ✖ either edge or screw dislocation
- 4. ✔ both edge and screw dislocation together

Question Number : 62 Question Id : 5113469422 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The interaction between to unlike dislocations on the same plane leads to

Options :

- 1. ✖ vacancy defect
- 2. ✖ interstitial defect
- 3. ✔ perfect lattice

4. ✖ substitutional defect

Question Number : 63 Question Id : 5113469423 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Quenching from high temperature can lead to

Options :

1. ✔ point defects
2. ✖ line defects
3. ✖ surface defects
4. ✖ volume defects

Question Number : 64 Question Id : 5113469424 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The movement of dislocation is termed as dislocation climb when dislocation moves in a direction

Options :

1. ✔ perpendicular to slip plane
2. ✖ parallel to slip plane
3. ✖ 45° to the slip plane
4. ✖ 30° to the slip plane

Question Number : 65 Question Id : 5113469425 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The portion of the grain which is the mirror image of the original lattice is called

Options :

1. ✖ Slip
2. ✔ Twinning

3. ✖ Tilt

4. ✖ Jog

Question Number : 66 Question Id : 5113469426 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The thermal and electrical conductivity of metals and alloys are affected by the presence of

Options :

1. ✔ interstitial defects

2. ✖ substitutional defects

3. ✖ edge dislocations

4. ✖ stacking faults

Question Number : 67 Question Id : 5113469427 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following methods increases the strength of the material

Options :

1. ✖ annealing

2. ✔ decreasing the grain size

3. ✖ increasing the grain size

4. ✖ single crystal

Question Number : 68 Question Id : 5113469428 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What happens during the recovery phase of heat treatment

Options :

1. ✔ stresses are relieved

2. ✖ new grains are formed
3. ✖ small grains join to form large grains
4. ✖ larger grains are split into small grains

Question Number : 69 Question Id : 5113469429 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Burge vector defines

Options :

1. ✖ magnitude of slip
2. ✖ direction of slip
3. ✔ both magnitude and direction of slip
4. ✖ point of slip

Question Number : 70 Question Id : 5113469430 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The increase in tensile strength and hardness due to cold working of metal is called

Options :

1. ✖ precipitation hardening
2. ✖ solute hardening
3. ✔ strain hardening
4. ✖ diffusion hardening

Question Number : 71 Question Id : 5113469431 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The area under the stress-strain diagram upto the elastic limit defines

Options :

1. ✖ toughness

- 2. ✗ hardness
- 3. ✗ resilience
- 4. ✓ strain energy

Question Number : 72 Question Id : 5113469432 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The peak point in the stress-strain diagram of mild steel represents

Options :

- 1. ✗ upper yield point
- 2. ✗ lower yield point
- 3. ✓ ultimate stress
- 4. ✗ fracture

Question Number : 73 Question Id : 5113469433 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following property is relevant to cast iron

Options :

- 1. ✗ low carbon content
- 2. ✓ high compressive strength
- 3. ✗ high tensile strength
- 4. ✗ easily welded

Question Number : 74 Question Id : 5113469434 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Cold worked material possess

Options :

- 1. ✗ refined coarse grains

- 2. ✖ improved ductility
- 3. ✖ better resistance to impact loading
- 4. ✔ good surface finish

Question Number : 75 Question Id : 5113469435 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The Hall Petch equation relates

Options :

- 1. ✔ yield strength to grain size
- 2. ✖ Temperature to the surface finish
- 3. ✖ strain hardening to hardness
- 4. ✖ temperature to grain size

Question Number : 76 Question Id : 5113469436 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The value of Proof stress is usually taken as

Options :

- 1. ✖ 0.8 to 1% of plastic strain
- 2. ✖ 0.6 to 0.8 % of plastic strain
- 3. ✖ 0.3 to 0.5 % of plastic strain
- 4. ✔ 0.1 to 0.2 % of plastic strain

Question Number : 77 Question Id : 5113469437 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

According to Charles law for a perfect gas

Options :

1. ✗ $\frac{T_2}{T_1} = \frac{P_2}{P_1}$, if V is kept constant

2. ✓ $\frac{T_2}{T_1} = \frac{V_2}{V_1}$, if P is kept constant

3. ✗ $\frac{PV}{T} = \text{constant}$

4. ✗ $\frac{V_1}{V_2} = \frac{P_2}{P_1}$, If T is kept constant

Question Number : 78 Question Id : 5113469438 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following is the limitation of classical thermodynamics

Options :

1. ✓ it is applicable to state of equilibrium in closed system

2. ✗ it is applicable to state of non-equilibrium in closed system

3. ✗ it is applicable to state of equilibrium in open system

4. ✗ it is applicable to state of non-equilibrium in open system

Question Number : 79 Question Id : 5113469439 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Work done in a free expansion process is

Options :

1. ✗ +ve

2. ✗ -ve

3. ✓ zero

4. ✗ maximum

Question Number : 80 Question Id : 5113469440 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following quantities is not a property of the system

Options :

1. ✗ pressure
2. ✗ temperature
3. ✗ specific volume
4. ✓ heat

Question Number : 81 Question Id : 5113469441 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Heat and work are

Options :

1. ✗ point functions
2. ✓ path functions
3. ✗ intensive properties
4. ✗ extensive properties

Question Number : 82 Question Id : 5113469442 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

What is true for reversible polytropic process

Options :

1. ✗ temperature remains constant
2. ✗ entropy remains constant
3. ✗ internal energy remains constant
4. ✓ some heat transfer takes place

Question Number : 83 Question Id : 5113469443 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The polytropic index of expansion n in the equation $p v^n = c$ for isobaric process is

Options :

1. ✗ 1
2. ✗ 1.4
3. ✗ ∞
4. ✓ 0

Question Number : 84 Question Id : 5113469444 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

For reversible adiabatic process, change in entropy is

Options :

1. ✗ maximum
2. ✗ minimum
3. ✓ zero
4. ✗ unpredictable

Question Number : 85 Question Id : 5113469445 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Under ideal conditions, isothermal, isobaric, isochoric and adiabatic process are

Options :

1. ✗ static process
2. ✗ dynamic process
3. ✓ quasi-static process
4. ✗ stable process

Question Number : 86 Question Id : 5113469446 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

First law of thermodynamics furnishes the relationship between

Options :

1. ✗ heat and work
2. ✓ heat, work and entropy
3. ✗ enthalpy and entropy
4. ✗ various thermodynamic processes

Question Number : 87 Question Id : 5113469447 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Measurement of temperature is based on

Options :

1. ✗ Joules law
2. ✓ zeroth law of thermodynamics
3. ✗ first law of thermodynamics
4. ✗ second law of thermodynamics

Question Number : 88 Question Id : 5113469448 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In carnot cycle, heat is transferred at

Options :

1. ✗ constant pressure
2. ✗ constant volume
3. ✓ constant temperature
4. ✗ constant enthalpy

Question Number : 89 Question Id : 5113469449 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The value of $\sum \frac{dQ}{T}$ for reversible process is equal to

Options :

1. ✗ + ve value
2. ✗ - ve value
3. ✓ zero
4. ✗ unity

Question Number : 90 Question Id : 5113469450 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Efficiency of a Carnot cycle is 0.75. The cycle direction is reversed, COP of reversed carnot cycle will be

Options :

1. ✗ 0.25
2. ✗ 0.5
3. ✗ 1.25
4. ✓ 1.33

Question Number : 91 Question Id : 5113469451 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Kelvin Plank's law deals with

Options :

1. ✗ conservation of heat
2. ✗ conservation of work
3. ✓ conversion of heat into work
4. ✗ conversion of work into heat

Question Number : 92 Question Id : 5113469452 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The charge of a n-type semiconductor is

Options :

1. ✗ positive
2. ✗ negative
3. ✓ neutral
4. ✗ none of the above

Question Number : 93 Question Id : 5113469453 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

In superconductive materials

Options :

1. ✓ electrical resistivity suddenly drops to zero as temperature approaches absolute zero
2. ✗ electrical conductivity increases above critical transition temperature
3. ✗ electrical resistivity increases below critical transition temperature
4. ✗ electrical resistivity decreases with increase of temperature

Question Number : 94 Question Id : 5113469454 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The ratio of magnetization to the magnetic field is known as

Options :

1. ✗ magnetic field strength
2. ✗ magnetic flux density
3. ✗ magnetic permeability
4. ✓ magnetic susceptibility

Question Number : 95 Question Id : 5113469455 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The efficiency of the solar cell does not depend on

Options :

1. ✗ the energy gap of the emitter/absorber material
2. ✗ the absorption coefficient of the absorber
3. ✗ the diffusion length of the minority carrier
4. ✓ size of the solar panel

Question Number : 96 Question Id : 5113469456 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Light Emitting Diode emits light when

Options :

1. ✓ a $p-n$ junction is forward biased
2. ✗ a $p-n$ junction is reversed biased
3. ✗ a $p-n$ junction is neutral
4. ✗ a $n-p$ junction is forward biased

Question Number : 97 Question Id : 5113469457 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following material is anisotropic in nature

Options :

1. ✗ Iron
2. ✗ copper
3. ✓ Plastic
4. ✗ Composites

Question Number : 98 Question Id : 5113469458 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Temperature at which spontaneous polarization disappears is called ferroelectric

Options :

1. ✖ absolute temperature
2. ✖ rankine temperature
3. ✔ curie temperature
4. ✖ polarization temperature

Question Number : 99 Question Id : 5113469459 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Nylon threads are made of

Options :

1. ✖ polyethylene polymer
2. ✖ polyvinyl polymer
3. ✖ polyester polymer
4. ✔ polyamide polymer

Question Number : 100 Question Id : 5113469460 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following statement is true with respect to nanomaterials?

Options :

1. ✖ Large density
2. ✔ Volume to surface area is large
3. ✖ Chemically inactive

4. ✖ Grain size is of the order of 10^{-12} m

Question Number : 101 Question Id : 5113469461 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Bakelite is obtained from phenol by reacting with

Options :

1. ✔ HCHO
2. ✖ $(\text{CH}_2\text{OH})_2$
3. ✖ CH_3CHO
4. ✖ CH_3COCH_3

Question Number : 102 Question Id : 5113469462 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following is not a condensation polymer?

Options :

1. ✖ Dacron
2. ✔ Neoprene
3. ✖ Melamine
4. ✖ Glyptal

Question Number : 103 Question Id : 5113469463 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Composite materials are defined as

Options :

1. ✖ two or more materials combined on microscopic scale
2. ✔ two or more materials combined on macroscopic scale

3. ✖ chemical combination of two or more materials on microscopic scale
4. ✖ chemical compound of two or more materials on macroscopic scale

Question Number : 104 Question Id : 5113469464 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 amorphous solids

Options :

1. ✖ precious stones
2. ✖ pottery
3. ✖ porcelain
4. ✔ glass

Question Number : 105 Question Id : 5113469465 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following process is used for making nanoceramics?

Options :

1. ✖ two-photon lithography
2. ✖ sintering
3. ✔ Sol-gel
4. ✖ attrition

Question Number : 106 Question Id : 5113469466 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following statement is true

Options :

1. ✖ bulk of the materials are free from defects

2. ✓ fiber form of material has superior strength over its bulk form
3. ✗ Glass fibers are expensive than carbon fibers
4. ✗ Glass-epoxy composites are used for high temperature applications

Question Number : 107 Question Id : 5113469467 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The hygroscopic property is observed in

Options :

1. ✗ ceramics
2. ✓ polymers
3. ✗ metals
4. ✗ carbon

Question Number : 108 Question Id : 5113469468 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following fiber has high specific modulus

Options :

1. ✗ glass
2. ✗ kevlar
3. ✓ carbon
4. ✗ aramide

Question Number : 109 Question Id : 5113469469 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The electric conductivity of a nanotube is _____ times that of copper

Options :

1. ✗ 1/100
2. ✗ 100
3. ✓ 1000
4. ✗ 1/1000

Question Number : 110 Question Id : 5113469470 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The tensile strength of Multiwalled carbon Nano Tube is

Options :

1. ✓ 630×10^8 MPa
2. ✗ 630×10^7 MPa
3. ✗ 630×10^6 MPa
4. ✗ 630×10^5 MPa

Question Number : 111 Question Id : 5113469471 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Nano science can be studied with the help of

Options :

1. ✗ micromechanics
2. ✗ statistical mathematics
3. ✓ Newtonian mechanics
4. ✗ quantum mechanics

Question Number : 112 Question Id : 5113469472 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 top-down approach in making nano particles?

Options :

1. ✗ Colloidal dispersion
2. ✗ Attrition
3. ✓ Chemical vapour deposition
4. ✗ Sol-gel process

Question Number : 113 Question Id : 5113469473 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which one of the following nanoparticle can be used for antibacterial activity?

Options :

1. ✗ Gold
2. ✓ Silver
3. ✗ Platinum
4. ✗ Cerium oxide

Question Number : 114 Question Id : 5113469474 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The width of carbon nanotube in nanometers is

Options :

1. ✗ 1
2. ✓ 1.3
3. ✗ 1.55
4. ✗ 10

Question Number : 115 Question Id : 5113469475 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Heat capacity is measured in

Options :

1. ✓ $\frac{J}{Kg^{\circ}C}$

2. ✗ $\frac{JKg}{^{\circ}C}$

3. ✗ $\frac{J}{^{\circ}C}$

4. ✗ $\frac{Kg}{J^{\circ}C}$

Question Number : 116 Question Id : 5113469476 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If the thermal conductivity of a material through which heat is transferred is increased by a factor of 5, then the rate of heat transfer is

Options :

1. ✗ Decreased by a factor 5

2. ✓ Increased by a factor 5

3. ✗ Decreased by a factor 2.5

4. ✗ Increased by a factor 2.5

Question Number : 117 Question Id : 5113469477 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

If there are no externally induced flow velocities, then the Nusselt Number (N_n) does not depend upon

Options :

1. ✓ Reynolds Number (R_e)

2. ✗ Grashof Number (G_r)

3. ✖ Prandtl Number (P_r)

4. ✖ Weber Number (W_e)

Question Number : 118 Question Id : 5113469478 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

Which of the following condition is correct for natural convection

Options :

1. ✖ $\frac{Gr}{\sqrt{Re}} = 1$

2. ✔ $\frac{Gr}{Re^2} \gg 1$

3. ✖ $\frac{Gr}{\sqrt{Re}} \gg 1$

4. ✖ $\frac{Gr}{Re^2} = 1$

Question Number : 119 Question Id : 5113469479 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The general heat conduction equation in an isotropic solid reduces to Laplace equation

Options :

1. ✔ If the body is in steady-state with no heat generation

2. ✖ If the body is in unsteady-state with heat generation

3. ✖ If the body is in unsteady-state with no heat generation

4. ✖ If the body is in steady-state with heat generation

Question Number : 120 Question Id : 5113469480 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes
Single Line Question Option : No Option Orientation : Vertical

The reciprocal of the scale heat transfer coefficient is called as

Options :

1. ✖ Resistant factor
2. ✖ Forming factor
3. ✔ Fouling factor
4. ✖ Scaling factor

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