

National Testing Agency

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Material Science -1

Section Id :	94091893
Section Number :	1
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Sub-Section Number :	1
Sub-Section Id :	940918136
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 9409183731 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 2 Wrong Marks : 0

Non- alignment of the test specimen in simple tension test will result in

1. the machine exerting an axial load on the specimen
2. the machine exerting a torsional load on the specimen
3. the machine exerting a bending load on the specimen
4. the machine exerting no load on the specimen

Options :

- 94091813685. 1
- 94091813686. 2
- 94091813687. 3
- 94091813688. 4

Question Number : 2 Question Id : 9409183732 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No Correct Marks : 2 Wrong Marks : 0

In which grip of simple test specimen, the alignment is dependent on the skill of technician

1. Pinned
2. Serrated
3. Threaded
4. None of the above

Options :

94091813689. 1

94091813690. 2

94091813691. 3

94091813692. 4

Question Number : 3 Question Id : 9409183733 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The yield point indicates the point where

1. 100% proportionality ceases to exist
2. 100% elasticity ceases to exist
3. plasticity ends
4. material becomes brittle

Options :

94091813693. 1

94091813694. 2

94091813695. 3

94091813696. 4

Question Number : 4 Question Id : 9409183734 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

By Hooke's law

1. Stress is directly proportional to Strain
2. Stress is inversely proportional to Strain
3. Stress is directly proportional to square of Strain
4. Stress is directly proportional to the square root of Strain

Options :

94091813697. 1

94091813698. 2

94091813699. 3

94091813700. 4

Question Number : 5 Question Id : 9409183735 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Ductility is indicated by

1. Percentage contraction
2. Percentage elongation
3. Percentage compression
4. Percentage bending

Options :

94091813701. 1

94091813702. 2

94091813703. 3

94091813704. 4

Question Number : 6 Question Id : 9409183736 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Modulus of resilience is

1. the maximum energy that material can absorb without attaining plastic state is called resilience.
2. the maximum elastic energy per unit volume that material can absorb without attaining plastic state
3. maximum energy that material can absorb without undergoing fracture
4. All of the above

Options :

94091813705. 1

94091813706. 2

94091813707. 3

94091813708. 4

Question Number : 7 Question Id : 9409183737 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Modulus of toughness depends upon

1. Yield point
2. Strain at fracture
3. Ultimate tensile strength
4. Strain at fracture and Ultimate tensile strength

Options :

94091813709. 1

94091813710. 2

94091813711. 3

94091813712. 4

Question Number : 8 Question Id : 9409183738 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The cup and cone type of fracture is observed in

1. Ductile materials under tension
2. Ductile materials under compression
3. Brittle materials under compression
4. Brittle materials under tension

Options :

94091813713. 1

94091813714. 2

94091813715. 3

94091813716. 4

Question Number : 9 Question Id : 9409183739 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

True stress at any point in the tension test specimen is

1. ratio of load to original area of cross-section of specimen
2. ratio of load to instantaneous area of cross-section of specimen
3. ratio of original area of cross-section of specimen to cross-section of load
4. ratio of square of load to original area of cross-section of specimen

Options :

94091813717. 1

94091813718. 2

94091813719. 3

94091813720. 4

Question Number : 10 Question Id : 9409183740 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

There is no ultimate compressive strength in ductile materials because

1. Ductile materials keep on compressing in lateral direction as compressive load increases.
2. Ductile materials are more plastic
3. Ductile materials keep on expanding in lateral direction as compressive load increases.
4. Ductile materials break before reaching ultimate tensile strength

Options :

94091813721. 1

94091813722. 2

94091813723. 3

94091813724. 4

Question Number : 11 Question Id : 9409183741 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For a ductile material in compression, failure occurs mainly due to

1. Tensile stress
2. Compressive stress
3. Bending stress
4. Shear stress

Options :

94091813725. 1

94091813726. 2

94091813727. 3

94091813728. 4

Question Number : 12 Question Id : 9409183742 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Why is the length to diameter ratio of compression specimen need to be chosen carefully?

1. For minimizing the influence of friction
2. For minimizing the influence of buckling
3. For minimizing wear and tear
4. Both 1 and 2

Options :

94091813729. 1

94091813730. 2

94091813731. 3

94091813732. 4

Question Number : 13 Question Id : 9409183743 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Strain rate in static tensile tests are in the range of

1. 0.0001/s
2. 0.000001/s
3. 0.001/s
4. 0.1/s

Options :

94091813733. 1

94091813734. 2

94091813735. 3

94091813736. 4

Question Number : 14 Question Id : 9409183744 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

With increase in strain rate, yield strength

1. Increases
2. Decreases
3. First increases then decreases
4. Remains constant

Options :

94091813737. 1

94091813738. 2

94091813739. 3

94091813740. 4

Question Number : 15 Question Id : 9409183745 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

With increase in strain rate, percentage elongation

1. Increase and decrease in a periodic manner
2. Decreases
3. First increases then decreases
4. Increases

Options :

94091813741. 1

94091813742. 2

94091813743. 3

94091813744. 4

Question Number : 16 Question Id : 9409183746 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Load is classified as impact load when

1. Strain rate is higher than 100/s and ductility has a tendency to reduce.
2. Strain rate is higher than 10/s and ductility has a tendency to reduce.
3. Strain rate is higher than 1000/s and ductility has a tendency to increase.
4. Strain rate is higher than 10/s and ductility has a tendency to increase

Options :

94091813745. 1

94091813746. 2

94091813747. 3

94091813748. 4

Question Number : 17 Question Id : 9409183747 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

What happens during brittle fracture of a material?

1. Crack propagates suddenly without any plastic deformation and produces loud retort due to sudden release of energy
2. Crack propagates slowly with plastic deformation and produces loud retort due to sudden release of energy
3. Crack propagates suddenly without any plastic deformation and produces no noise due to gradual release of energy
4. Crack propagates slowly with plastic deformation and produces no noise due to gradual release of energy

Options :

94091813749. 1

94091813750. 2

94091813751. 3

94091813752. 4

Question Number : 18 Question Id : 9409183748 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In impact testing, the measurement criteria is

1. Strain
2. Stress
3. Energy absorbed
4. Force applied

Options :

94091813753. 1

94091813754. 2

94091813755. 3

94091813756. 4

Question Number : 19 Question Id : 9409183749 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The Charpy impact test specimen is of

1. Triangular cross-section
2. Circular cross-section
3. Square cross-section
4. Rectangular cross-section

Options :

94091813757. 1

94091813758. 2

94091813759. 3

94091813760. 4

Question Number : 20 Question Id : 9409183750 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The notch in the Charpy test specimen is

1. X shaped
2. V shaped
3. C shaped
4. U shaped

Options :

94091813761. 1

94091813762. 2

94091813763. 3

94091813764. 4

Question Number : 21 Question Id : 9409183751 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The mass of the striker or the hammer in Charpy test is concentrated in

1. Horizontal plane
2. Oblique plane at 45 degree to the horizontal
3. Oblique plane at 60 degree to the horizontal
4. Vertical plane

Options :

94091813765. 1

94091813766. 2

94091813767. 3

94091813768. 4

Question Number : 22 Question Id : 9409183752 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

With high temperature

1. Fracture strength reduction rate is more than the yield strength
2. Yield strength reduction rate is more than the fracture strength
3. Fracture strength remains constant
4. Yield strength remains constant

Options :

94091813769. 1

94091813770. 2

94091813771. 3

94091813772. 4

Question Number : 23 Question Id : 9409183753 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The softest and the hardest material in mho's scale are

1. Gypsum and Calcite
2. Talc and Diamond
3. Feldspar and Quartz
4. Fluorite and Apatite

Options :

94091813773. 1

94091813774. 2

94091813775. 3

94091813776. 4

Question Number : 24 Question Id : 9409183754 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The Brinell hardness number (BHN) is given by

$$1. BHN = \frac{P}{\frac{\pi D}{2} (D - \sqrt{D^2 - d^2})}$$

$$2. BHN = \frac{P}{\frac{\pi D}{2} (D + \sqrt{D^2 - d^2})}$$

$$3. BHN = \frac{P}{\frac{\pi D}{2} (D - \sqrt{D^2 + d^2})}$$

$$4. BHN = \frac{P}{\frac{\pi D}{2} (D - \sqrt{D - d})}$$

Options :

94091813777. 1

94091813778. 2

94091813779. 3

94091813780. 4

Question Number : 25 Question Id : 9409183755 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In Brinell hardness test, the metal has a tendency to pile up along the edge of impression. This behaviour is known as

1. buckling
2. rigging
3. grazing
4. ridging

Options :

94091813781. 1

94091813782. 2

94091813783. 3

94091813784. 4

Question Number : 26 Question Id : 9409183756 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The angle between opposite faces of a Vicker's indenter is

1. 136 degree
2. 68 degree
3. 34 degree
4. 108 degree

Options :

94091813785. 1

94091813786. 2

94091813787. 3

94091813788. 4

Question Number : 27 Question Id : 9409183757 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The barrel shaped indenter impression in Vickers Hardness Number shows

1. Apparent Increase in hardness
2. Hardness remains constant
3. Decrease in hardness
4. Initial increase and then decrease in hardness

Options :

94091813789. 1

94091813790. 2

94091813791. 3

94091813792. 4

Question Number : 28 Question Id : 9409183758 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Best suited hardness measurement technique for a very small part is

1. Rockwell Hardness
2. Brinell Hardness
3. Vicker's Hardness
4. Knoop Hardness

Options :

94091813793. 1

94091813794. 2

94091813795. 3

94091813796. 4

Question Number : 29 Question Id : 9409183759 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Instrument for measuring dynamic hardness of a material is known as

1. Oscilloscope
2. Shore Scleroscope
3. Stethoscope
4. Seismometer

Options :

94091813797. 1

94091813798. 2

94091813799. 3

94091813800. 4

Question Number : 30 Question Id : 9409183760 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The simplest type of machine that is used for fatigue test

1. Rotating type
2. Bending type
3. Rotating-bending type
4. Reciprocating type

Options :

94091813801. 1

94091813802. 2

94091813803. 3

94091813804. 4

Question Number : 31 Question Id : 9409183761 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The maximum number of cycles beyond which a fatigue test is rarely continued

1. 10^5
2. 10^4
3. 10^7
4. 10^8

Options :

94091813805. 1

94091813806. 2

94091813807. 3

94091813808. 4

Question Number : 32 Question Id : 9409183762 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The fatigue strength of a material is defined as

1. Maximum alternating stress which a material will withstand for given number of cycles
2. Minimum stress which a material will withstand for infinite number of cycles
3. Maximum alternating stress which a material will withstand for infinite number of cycles
4. Minimum alternating stress which a material will withstand for given number of cycles

Options :

94091813809. 1

94091813810. 2

94091813811. 3

94091813812. 4

Question Number : 33 Question Id : 9409183763 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Fatigue crack generally initiates from

1. inside of the material
2. corner edges of the material
3. bottom centre of the material
4. surface of the material

Options :

94091813813. 1

94091813814. 2

94091813815. 3

94091813816. 4

Question Number : 34 Question Id : 9409183764 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Most materials lose their strength at high temperature because of

1. Greater mobility of atoms at higher temperature
2. The elastic constants reduce at high temperature
3. Oxidation of material
4. All of the above

Options :

94091813817. 1

94091813818. 2

94091813819. 3

94091813820. 4

Question Number : 35 Question Id : 9409183765 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The progressive deformation of a material at high temperature under constant stress is termed as

1. Elongation
2. Creep
3. Strain
4. Offset

Options :

94091813821. 1

94091813822. 2

94091813823. 3

94091813824. 4

Question Number : 36 Question Id : 9409183766 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The three basic raw materials in iron and steel production are

1. Iron ore, limestone and coke
2. Iron ore, lime and carbon
3. Aluminium oxide, iron ore and coke
4. Iron ore, silica and graphite

Options :

94091813825. 1

94091813826. 2

94091813827. 3

94091813828. 4

Question Number : 37 Question Id : 9409183767 Question Type : MCQ Option Shuffling : No Is Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

If no carbon is present in iron, then

1. It crystallises in form of austenite which is body centred cubic and ductile
2. It crystallises in form of ferrite which is body centred cubic and very ductile
3. It crystallises in form of cementite which is body centred cubic and very brittle
4. It crystallises in form of pearlite which is body centred cubic and very ductile

Options :

94091813829. 1

94091813830. 2

94091813831. 3

94091813832. 4

Question Number : 38 Question Id : 9409183768 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

In the iron-carbon mixture, almost total area consists of pearlite at

1. 0.5% carbon
2. 0.3% carbon
3. 0.6% carbon
4. 0.8% carbon

Options :

94091813833. 1

94091813834. 2

94091813835. 3

94091813836. 4

Question Number : 39 Question Id : 9409183769 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Eutectoid steel ideally contains

1. 1% carbon
2. 2% carbon
3. 0.83% carbon
4. 0.78% carbon

Options :

94091813837. 1

94091813838. 2

94091813839. 3

94091813840. 4

Question Number : 40 Question Id : 9409183770 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Ledeburite is the

1. eutectic mixture of austenite and ferrite
2. eutectic mixture of austenite and cementite
3. eutectoid mixture of austenite and ferrite
4. eutectoid mixture of ferrite and cementite

Options :

94091813841. 1

94091813842. 2

94091813843. 3

94091813844. 4

Question Number : 41 Question Id : 9409183771 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Drawbacks of iron carbon diagram are

1. It shows equilibrium cooling which is not obtained in practice
2. The influence of alloying elements in steel and cast iron is not represented
3. Both 1 and 2
4. None of these

Options :

94091813845. 1

94091813846. 2

94091813847. 3

94091813848. 4

Question Number : 42 Question Id : 9409183772 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

The process of sudden cooling from the upper critical temperature of 910°C by plunging in water or any other medium in the iron carbon diagram is known as

1. Honing
2. Quenching
3. Tempering
4. Annealing

Options :

94091813849. 1

94091813850. 2

94091813851. 3

94091813852. 4

Question Number : 43 Question Id : 9409183773 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

For the annealing process

1. The heating and cooling both are done at a controlled rate in a furnace
2. The heating and cooling both are done at an uncontrolled rate in a furnace
3. The heating is done at a controlled rate in a furnace and cooling is done in open air
4. The heating is done at a controlled rate in a furnace and cooling is done at a fast rate in a freezer

Options :

94091813853. 1

94091813854. 2

94091813855. 3

94091813856. 4

Question Number : 44 Question Id : 9409183774 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Case hardness is due to

1. Residual compressive stress introduced on the surface by penetration of C and N₂
2. Residual tensile stress introduced on the surface by penetration of C and N₂
3. Residual compressive stress introduced on the surface by penetration of CO and N₂
4. Residual compressive stress introduced on the surface by penetration of Ar and N₂

Options :

94091813857. 1

94091813858. 2

94091813859. 3

94091813860. 4

Question Number : 45 Question Id : 9409183775 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Assertion (A): If the furnace atmosphere is gaseous, there are a number of disadvantages

Reason (B): Nitrogen causes rusting, tarnishing and decarburization (M)

1. Only A is true
2. Only B is true
3. A and B are both false
4. A and B are both true

Options :

94091813861. 1

94091813862. 2

94091813863. 3

94091813864. 4

Question Number : 46 Question Id : 9409183776 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Thermal fatigue in a material occurs due to

1. Temperatures imposed upon a body change and cause alternating thermal gradients which result in alternating stresses
2. Sudden uniform decrease in temperature
3. Gradual uniform decrease in temperature
4. Both temperature and pressure variations

Options :

94091813865. 1

94091813866. 2

94091813867. 3

94091813868. 4

Question Number : 47 Question Id : 9409183777 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Match the following:

A. Piezoelectric material	I. Electrical field -change in viscosity
B. Electro-rheological material	II. Heat-original memorized shape
C. Shape memory alloy	III. Pressure-change in opto-electric signals
D. Optical fibre	IV. Stress-electrical charge

Choose the **correct** answer from the options given below:

1. A - III, B - IV, C - II, D - I
2. A - IV, B - I, C - II, D - III
3. A - I, B - II, C - III, D - IV
4. A - II, B - III, C - I, D - IV

Options :

94091813869. 1

94091813870. 2

94091813871. 3

94091813872. 4

Question Number : 48 Question Id : 9409183778 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Which one does not broadly classify as a polymer?

1. Plastics
2. Elastomers
3. Fibres
4. Silicon

Options :

94091813873. 1

94091813874. 2

94091813875. 3

94091813876. 4

Question Number : 49 Question Id : 9409183779 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Ceramics are generally produced by

1. Melting and solidification
2. Emulsification
3. Powder compacting and sintering at high temperature
4. Pulverising

Options :

94091813877. 1

94091813878. 2

94091813879. 3

94091813880. 4

Question Number : 50 Question Id : 9409183780 Question Type : MCQ Option Shuffling : No Is

Question Mandatory : No

Correct Marks : 2 Wrong Marks : 0

Which of the following is best in ductility?

1. Mechanite cast iron
2. Gray cast iron
3. Nodular cast iron
4. White cast iron

Options :

94091813881. 1

94091813882. 2

94091813883. 3

94091813884. 4