

# Andhra Pradesh State Council of Higher Education

## Notations :

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

<b>Question Paper Name :</b>	Metallurgy 29th Sep 2021 Shift1
<b>Duration :</b>	120
<b>Total Marks :</b>	120
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console? ( SA type of questions will be always auto saved ) :</b>	Yes
<b>Is this Group for Examiner? :</b>	No

Section Id :	8737183
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	120
Section Marks :	120
Enable Mark as Answered Mark for Review and Clear Response :	Yes

Question Number : 1 Question Id : 873718241 Display Question Number : Yes Is Question

Mandatory : No

In a closed system ----- can be exchanged to its surroundings, but not -----.

Options :

1. ✘ matter, energy
2. ✔ energy, matter
3. ✘ pressure, volume
4. ✘ volume, pressure

Question Number : 2 Question Id : 873718242 Display Question Number : Yes Is Question

Mandatory : No

Which one of the following is considered as intensive property of a system?

Options :

1. ✘ Volume
2. ✘ Internal energy
3. ✘ Mass

4. ✓ Density

Question Number : 3 Question Id : 873718243 Display Question Number : Yes Is Question

Mandatory : No

The law of conservation of energy represents ----- law of thermodynamics.

Options :

1. ✓ first

2. ✗ second

3. ✗ third

4. ✗ zeroth

Question Number : 4 Question Id : 873718244 Display Question Number : Yes Is Question

Mandatory : No

The amount of heat required to raise its temperature by one degree is known as

Options :

1. ✗ activation energy

2. ✗ chemical potential

3. ✓ heat capacity

4. ✗ specific heat

Question Number : 5 Question Id : 873718245 Display Question Number : Yes Is Question

Mandatory : No

Ellingham diagrams are the ----- vs ----- relationships which were plotted for various oxidation and sulphidation processes of several metals and gases.

**Options :**

1. ✘ pressure vs volume
2. ✔ free energy vs temperature
3. ✘ pressure vs temperature
4. ✘ free energy vs volume

**Question Number : 6 Question Id : 873718246 Display Question Number : Yes Is Question Mandatory : No**

Phase diagrams are nothing but the depiction of equilibria between ----- and -----

**Options :**

1. ✘ composition, pressure
2. ✘ pressure, temperature
3. ✘ pressure, volume
4. ✔ composition, temperature

**Question Number : 7 Question Id : 873718247 Display Question Number : Yes Is Question Mandatory : No**

Which one of the following law states “activity of a solute in a solution is equal to its atom or mole fraction”?

**Options :**

1. ✔ Raoult’s Law

2. ✘ Henry's Law
3. ✘ Sievert's Law
4. ✘ Hildbrand Law

**Question Number : 8 Question Id : 873718248 Display Question Number : Yes Is Question Mandatory : No**

Identify the system where only one solid solution exists over the entire composition range.

**Options :**

1. ✘ Pb-Sn
2. ✘ Fe-C
3. ✔ Cu-Ni
4. ✘ Al-Cu

**Question Number : 9 Question Id : 873718249 Display Question Number : Yes Is Question Mandatory : No**

Rate constant of a reaction does not depend on -----

**Options :**

1. ✘ temperature
2. ✔ concentration of reactants and products
3. ✘ activation energy

4. ✘ catalyst

Question Number : 10 Question Id : 873718250 Display Question Number : Yes Is Question

Mandatory : No

Rate of a reaction may be expressed in terms of

Options :

1. ✘ change in volume with temperature
2. ✘ change in volume per unit time
3. ✘ change in mass of a component with temperature
4. ✔ change in mass of a component per unit time

Question Number : 11 Question Id : 873718251 Display Question Number : Yes Is Question

Mandatory : No

When heating one end of a metal plate, other end gets hot because of

Options :

1. ✘ the resistance of the metal
2. ✘ the mobility of atoms in the metal
3. ✔ the energized electrons moving to other end of metal
4. ✘ minor perturbation in the energy of atoms

Question Number : 12 Question Id : 873718252 Display Question Number : Yes Is Question

Mandatory : No

How many modes of heat transfer are generally recognized?

**Options :**

1. ✘ One
2. ✘ Two
3. ✔ Three
4. ✘ Four

**Question Number : 13 Question Id : 873718253 Display Question Number : Yes Is Question**

**Mandatory : No**

What is the unit of the 'rate of heat transfer'?

**Options :**

1. ✔ Watt
2. ✘ Joule
3. ✘ Newton
4. ✘ Pascal

**Question Number : 14 Question Id : 873718254 Display Question Number : Yes Is Question**

**Mandatory : No**

Diffusion of a component in a system is governed by

**Options :**

1. ✘ Stokes' law
2. ✔ Fick's first law

3. ✘ Newton's law

4. ✘ Sievert's law

Question Number : 15 Question Id : 873718255 Display Question Number : Yes Is Question

Mandatory : No

Thermal conductivity of solid metals ----- with rise in temperature.

Options :

1. ✘ increases

2. ✔ decreases

3. ✘ remains constant

4. ✘ unpredictable

Question Number : 16 Question Id : 873718256 Display Question Number : Yes Is Question

Mandatory : No

Heat transfer by molecular collision is referred to as heat transfer by -----

Options :

1. ✘ conduction

2. ✔ convection

3. ✘ radiation

4. ✘ scattering



**Question Number : 17 Question Id : 873718257 Display Question Number : Yes Is Question**

**Mandatory : No**

Heat is transferred by all three modes of transfer, viz, conduction, convection and radiation in -----

**Options :**

1. ✘ electric heater
2. ✘ steam condenser
3. ✘ melting of ice
4. ✔ boiler

**Question Number : 18 Question Id : 873718258 Display Question Number : Yes Is Question**

**Mandatory : No**

Find the operation where diffusion of solids does not occur.

**Options :**

1. ✔ Distillation
2. ✘ Leaching
3. ✘ Drying
4. ✘ Adsorption

**Question Number : 19 Question Id : 873718259 Display Question Number : Yes Is Question**

**Mandatory : No**

Identify the fluid having highest viscosity.

**Options :**

1. ✘ Water
2. ✔ Honey
3. ✘ Blood
4. ✘ Air

**Question Number : 20 Question Id : 873718260 Display Question Number : Yes Is Question Mandatory : No**

The pressure for an ideal gas can be given by -----

**Options :**

1. ✔  $pV = nRT$
2. ✘  $p = RT$
3. ✘  $pV = T$
4. ✘  $p = VT$

**Question Number : 21 Question Id : 873718261 Display Question Number : Yes Is Question Mandatory : No**

Bernoulli's principle is derived from -----

**Options :**

1. ✘ Conservation of mass
2. ✘ Newton's law of motion

3. ✓ Conservation of energy

4. ✗ Conservation of momentum

**Question Number : 22 Question Id : 873718262 Display Question Number : Yes Is Question Mandatory : No**

Frictional force encountered after commencement of motion is called -----

**Options :**

1. ✗ Kinematic friction

2. ✗ Frictional resistance

3. ✗ Limiting friction

4. ✓ Dynamic friction

**Question Number : 23 Question Id : 873718263 Display Question Number : Yes Is Question Mandatory : No**

Which of the following is found in the form of Monazite sand along the Kerala coast?

**Options :**

1. ✗ Uranium

2. ✓ Thorium

3. ✗ Chromite

4. ✗ Graphite

Question Number : 24 Question Id : 873718264 Display Question Number : Yes Is Question

Mandatory : No

Which one of the following is the ore for iron?

Options :

1. ✘ Chalcocite
2. ✔ Magnetite
3. ✘ Bauxite
4. ✘ Wolframite

Question Number : 25 Question Id : 873718265 Display Question Number : Yes Is Question

Mandatory : No

Electrolytic refining is used to purify ----- metals.

Options :

1. ✘ Zn and Hg
2. ✘ Ti and Zr
3. ✔ Cu and Zn
4. ✘ Ge and Si

Question Number : 26 Question Id : 873718266 Display Question Number : Yes Is Question

Mandatory : No

The energy expended during comminution is proportional to the area of the new surface produced because of particle fragmentation is known as ----- law.

Options :

1. ✓ Rittinger's

2. ✗ Faraday's

3. ✗ Henry's

4. ✗ Hess's

**Question Number : 27 Question Id : 873718267 Display Question Number : Yes Is Question**

**Mandatory : No**

When a sulphide ore is roasted to a point where almost the entire sulphur content is eliminated, the residue is called -----

**Options :**

1. ✗ volatilizing roast

2. ✗ sulphating roast

3. ✗ calcination

4. ✓ dead roast

**Question Number : 28 Question Id : 873718268 Display Question Number : Yes Is Question**

**Mandatory : No**

Hydrometallurgical methods are ideally suited for -----

**Options :**

1. ✗ rich and complex ores

2. ✓ lean and complex ores

3. ✖ rich and simple ores

4. ✖ all of these

**Question Number : 29 Question Id : 873718269 Display Question Number : Yes Is Question Mandatory : No**

Production of magnesium from sea water is called -----

**Options :**

1. ✖ Magnotherm process

2. ✖ Kroll process

3. ✔ Dow process

4. ✖ Down process

**Question Number : 30 Question Id : 873718270 Display Question Number : Yes Is Question Mandatory : No**

Which one of the following process is direct smelting?

**Options :**

1. ✔ COREX

2. ✖ Vacuum Arc Degassing (VAD)

3. ✖ Blast Furnace

4. ✖ LD

Question Number : 31 Question Id : 873718271 Display Question Number : Yes Is Question

Mandatory : No

Identify the basic oxygen furnace from the following.

Options :

1. ✘ Open hearth furnace
2. ✘ Bessemer converter
3. ✔ LD converter
4. ✘ Cupola

Question Number : 32 Question Id : 873718272 Display Question Number : Yes Is Question

Mandatory : No

Hall – Heroult Process involves dissolution of ----- in -----.

Options :

1. ✘ brucite, cryolite
2. ✘ carnallite, alumina
3. ✔ alumina, cryolite
4. ✘ olivine, brucite

Question Number : 33 Question Id : 873718273 Display Question Number : Yes Is Question

Mandatory : No

Which one is the correct sequence of operations in the case of copper extraction from sulphide ore?

Options :

1. ✘ Roasting – smelting – concentration – converting – refining

2. ✘ Concentration – smelting – converting – roasting – refining
3. ✔ Concentration – roasting – smelting – converting – refining
4. ✘ Smelting – concentration – Roasting – converting – refining

Question Number : 34 Question Id : 873718274 Display Question Number : Yes Is Question

Mandatory : No

----- is used for bauxite ore leaching in Bayer process.

Options :

1. ✘  $\text{Fe}_2\text{O}_3$
2. ✘  $\text{TiO}_2$
3. ✘  $\text{SiO}_2$
4. ✔  $\text{NaOH}$

Question Number : 35 Question Id : 873718275 Display Question Number : Yes Is Question

Mandatory : No

----- is used as a reducing metal in Kroll's process for titanium production.

Options :

1. ✘ Manganese
2. ✔ Magnesium
3. ✘ Zinc



4. ✖ Lead

Question Number : 36 Question Id : 873718276 Display Question Number : Yes Is Question

Mandatory : No

----- can be used to produce alloy steels.

Options :

1. ✖ L D process

2. ✖ Open hearth furnace

3. ✔ Electric arc furnace

4. ✖ Acid Bessemer process

Question Number : 37 Question Id : 873718277 Display Question Number : Yes Is Question

Mandatory : No

Which one of the following is main source of sulphur in the blast furnace charge?

Options :

1. ✔ Coke

2. ✖ Iron ore

3. ✖ Flux

4. ✖ Scrap

Question Number : 38 Question Id : 873718278 Display Question Number : Yes Is Question

Mandatory : No

Microstructure of duplex stainless steel is -----

**Options :**

1. ✘ ferrite + pearlite
2. ✔ ferrite + austenite
3. ✘ ferrite + cementite
4. ✘ pearlite + cementite

**Question Number : 39 Question Id : 873718279 Display Question Number : Yes Is Question**

**Mandatory : No**

Argon Oxygen Decarburization (AOD) is employed during refining process to produce steel with low -----

**Options :**

1. ✘ iron
2. ✘ chromium
3. ✘ nickel
4. ✔ carbon

**Question Number : 40 Question Id : 873718280 Display Question Number : Yes Is Question**

**Mandatory : No**

Continuous casting process is employed in industries that require ----- of steel cast.

**Options :**

1. ✘ high quality

2. ✘ low yield
3. ✔ high yield
4. ✘ low carbon

**Question Number : 41 Question Id : 873718281 Display Question Number : Yes Is Question Mandatory : No**

Which one of the following cannot be used for steel melting?

**Options :**

1. ✔ Blast Furnace
2. ✘ Bessemer Converter
3. ✘ Electric Arc Furnace
4. ✘ Electric Induction Furnace

**Question Number : 42 Question Id : 873718282 Display Question Number : Yes Is Question Mandatory : No**

Capacity of a refractory brick to withstand sudden changes in temperature is called -----

**Options :**

1. ✘ refractoriness
2. ✔ spalling resistance
3. ✘ refractoriness under load (RUL)
4. ✘ all of these

**Question Number : 43 Question Id : 873718283 Display Question Number : Yes Is Question Mandatory : No**

The heat required to run the ESR process is generated by the ----- in the slag bath.

**Options :**

1. ✘ Electrode potential
2. ✘ Activation energy
3. ✘ Free energy
4. ✔ Joule effect

**Question Number : 44 Question Id : 873718284 Display Question Number : Yes Is Question Mandatory : No**

Which among the following is not a factor that leads to macro-segregation in ingots?

**Options :**

1. ✔ Expansion due to mild heating
2. ✘ Density differences between the solid and liquid
3. ✘ Density differences in the interdendritic liquid
4. ✘ Shrinkage due to solidification and thermal contraction

**Question Number : 45 Question Id : 873718285 Display Question Number : Yes Is Question Mandatory : No**

The packing factor for face centered cubic structure is

**Options :**

1. ✘ 0.50

2. ✘ 0.68

3. ✔ 0.74

4. ✘ 0.82

**Question Number : 46 Question Id : 873718286 Display Question Number : Yes Is Question Mandatory : No**

Hexagonal crystal system has

**Options :**

1. ✘ three unequal axes, no two of which are perpendicular

three equal coplanar axes at  $120^\circ$  and a fourth unequal axis perpendicular to their plane

2. ✔

3. ✘ three unequal axes, one of which is perpendicular to the other two

4. ✘ three equal axes, mutually perpendicular

**Question Number : 47 Question Id : 873718287 Display Question Number : Yes Is Question Mandatory : No**

A covalent bond is a chemical bond that involves

**Options :**

1. ✔ sharing of electron pairs between atoms

2. ✘ sharing of free electrons among a structure of positively charged ions

- ✘ electrostatic attraction between oppositely charged ions in a chemical compound
- ✘ attraction and repulsions between atoms, molecules, and surfaces

**Question Number : 48 Question Id : 873718288 Display Question Number : Yes Is Question Mandatory : No**

Ceramics are -----, ----- and -----

**Options :**

- ✘ strong, ductile, and opaque to light
- ✘ soft, ductile, and combustible
- ✘ hard, ductile, and opaque to light
- ✓ hard, brittle, and opaque to light

**Question Number : 49 Question Id : 873718289 Display Question Number : Yes Is Question Mandatory : No**

Identify from the following that represents interstitial solid solution.

**Options :**

- ✘ copper and zinc
- ✓ carbon and iron
- ✘ silver and gold
- ✘ copper and tin

Question Number : 50 Question Id : 873718290 Display Question Number : Yes Is Question

Mandatory : No

What are the factors that favor substitutional solid solutions?

Options :

1. ✘ crystal structure
2. ✘ relative size
3. ✘ chemical affinity
4. ✔ all of the above

Question Number : 51 Question Id : 873718291 Display Question Number : Yes Is Question

Mandatory : No

Phase diagram is also known as

Options :

1. ✔ equilibrium diagram
2. ✘ stress-strain diagram
3. ✘ S-curve
4. ✘ Ellingham diagram

Question Number : 52 Question Id : 873718292 Display Question Number : Yes Is Question

Mandatory : No

Solid solution is one in which

Options :



1. ✘ two metals are not soluble in solid state
2. ✘ two metals are partially soluble in solid state
3. ✔ two metals are completely soluble in solid state
4. ✘ two metals are not soluble in liquid stage

**Question Number : 53 Question Id : 873718293 Display Question Number : Yes Is Question Mandatory : No**

Eutectic temperature is the one at which

**Options :**

1. ✘ liquid on cooling gives liquid and solid
2. ✔ liquid on cooling gives two solids
3. ✘ solid on heating gives new solid
4. ✘ solid on heating gives liquid and solid

**Question Number : 54 Question Id : 873718294 Display Question Number : Yes Is Question Mandatory : No**

Peritectoid reaction involves

**Options :**

1. ✔ solid 1 + solid 2 on cooling give new solid 3
2. ✘ solid 1 on cooling gives solid 2 + solid 3
3. ✘ liquid on cooling gives solid 1 + solid 2



4. ✘ liquid on cooling gives solid

Question Number : 55 Question Id : 873718295 Display Question Number : Yes Is Question Mandatory : No

Identify allotropic metal.

Options :

1. ✘ silver
2. ✘ copper
3. ✘ aluminium
4. ✔ iron

Question Number : 56 Question Id : 873718296 Display Question Number : Yes Is Question Mandatory : No

Pearlite is nothing but combination of

Options :

1. ✔ ferrite + cementite
2. ✘ austenite + cementite
3. ✘ austenite + ferrite
4. ✘ ledeburite + ferrite

Question Number : 57 Question Id : 873718297 Display Question Number : Yes Is Question

**Mandatory : No**

Full annealing consists in

**Options :**

1. ✘ heating the steel to the proper temperature and then oil quenching
2. ✘ heating the steel to the proper temperature and then air cooling
3. ✔ heating the steel to the proper temperature and then cooling slowly in the furnace
4. ✘ heating the steel to the proper temperature and then water quenching

**Question Number : 58 Question Id : 873718298 Display Question Number : Yes Is Question**

**Mandatory : No**

Finer the grain better the strength. This is arrived empirically by

**Options :**

1. ✘ Bragg equation
2. ✔ Hall Petch equation
3. ✘ Willingham equation
4. ✘ Renault equation

**Question Number : 59 Question Id : 873718299 Display Question Number : Yes Is Question**

**Mandatory : No**

Morphology of carbon in grey cast iron is

**Options :**

1. ✘ spheroidal

2. ✘ combined form as cementite
3. ✘ nodular
4. ✔ flaky

**Question Number : 60 Question Id : 873718300 Display Question Number : Yes Is Question Mandatory : No**

In building construction, the steel which is used for pillars, slabs, etc. is called

**Options :**

1. ✘ alloy steel
2. ✔ mild steel
3. ✘ high carbon steel
4. ✘ high carbon high chromium steel

**Question Number : 61 Question Id : 873718301 Display Question Number : Yes Is Question Mandatory : No**

X-ray diffraction patterns are used for studying crystal structure of solids because

**Options :**

1. ✔ their wavelengths are comparable to inter atomic distances
2. ✘ they are electromagnetic radiation, and hence do not interact with crystals
3. ✘ their high frequency enables rapid analysis
4. ✘ they have very high energy, hence they can penetrate through solids

**Question Number : 62 Question Id : 873718302 Display Question Number : Yes Is Question Mandatory : No**

Which thermoplastic resin is used for mounting a specimen in metallography?

**Options :**

1. ✘ Polycarbonate
2. ✘ Acetal copolymer
3. ✔ Lucite
4. ✘ Polystyrene

**Question Number : 63 Question Id : 873718303 Display Question Number : Yes Is Question Mandatory : No**

Which of the following is used in electron microscope?

**Options :**

1. ✘ Electron beams
2. ✘ Light waves
3. ✘ Magnetic fields
4. ✔ Electron beams and magnetic fields

**Question Number : 64 Question Id : 873718304 Display Question Number : Yes Is Question Mandatory : No**

Which of the following property can be enhanced by reinforcing SiC in aluminium alloy?

**Options :**

1. ✘ Ductility
2. ✘ Density
3. ✘ Toughness
4. ✔ Wear resistance

**Question Number : 65 Question Id : 873718305 Display Question Number : Yes Is Question Mandatory : No**

----- ceramic product is mostly used as pigment in paints.

**Options :**

1. ✘  $ZrO_2$
2. ✔  $TiO_2$
3. ✘  $SiO_2$
4. ✘  $UO_2$

**Question Number : 66 Question Id : 873718306 Display Question Number : Yes Is Question Mandatory : No**

Important assumptions in strength of materials are that the 'body which is being analyzed' is

**Options :**

1. ✔ continuous, homogeneous, and isotropic
2. ✘ porous, heterogeneous, and isotropic

3. ✘ continuous, homogeneous, and anisotropic
4. ✘ discontinuous, homogeneous, and anisotropic

**Question Number : 67 Question Id : 873718307 Display Question Number : Yes Is Question**

**Mandatory : No**

Concept of Hooke's law is

**Options :**

1. ✘ pressure is inversely proportional to temperature
2. ✘ pressure is proportional to temperature
3. ✔ stress is proportional to strain
4. ✘ stress is inversely proportional to strain

**Question Number : 68 Question Id : 873718308 Display Question Number : Yes Is Question**

**Mandatory : No**

Modulus of elasticity (E) is expressed as

**Options :**

1. ✘ average strain / average stress
2. ✔ average stress / average strain
3. ✘ average pressure / average temperature
4. ✘ average temperature / average pressure

Question Number : 69 Question Id : 873718309 Display Question Number : Yes Is Question

Mandatory : No

Identify the material exhibiting upper and lower yield points in stress-strain diagram.

Options :

1. ✘ Grey cast iron
2. ✘ Aluminium
3. ✘ Copper
4. ✔ Mild steel

Question Number : 70 Question Id : 873718310 Display Question Number : Yes Is Question

Mandatory : No

Dislocation is also known as

Options :

1. ✘ point defect
2. ✔ line defect
3. ✘ plane defect
4. ✘ vacancy

Question Number : 71 Question Id : 873718311 Display Question Number : Yes Is Question

Mandatory : No

Which of the following dislocation can glide but not climb?

Options :



1. ✘ Edge dislocation
2. ✔ Screw dislocation
3. ✘ Jog dislocation
4. ✘ Mixed dislocation

**Question Number : 72 Question Id : 873718312 Display Question Number : Yes Is Question Mandatory : No**

What is the unit of dislocation density?

**Options :**

1. ✔  $\text{mm}^{-2}$
2. ✘  $\text{mm}^{-3}$
3. ✘ mm
4. ✘  $\text{mm}^2$

**Question Number : 73 Question Id : 873718313 Display Question Number : Yes Is Question Mandatory : No**

Identify the one which is not a strengthening mechanism

**Options :**

1. ✔ grain size increment
2. ✘ grain size reduction
3. ✘ strain hardening



4. ✘ solid solution strengthening

Question Number : 74 Question Id : 873718314 Display Question Number : Yes Is Question

Mandatory : No

Which of the following is not a way of interaction between solute atoms and dislocations?

Options :

1. ✘ stacking fault interaction

2. ✘ modulus interaction

3. ✔ plastic interaction

4. ✘ elastic interaction

Question Number : 75 Question Id : 873718315 Display Question Number : Yes Is Question

Mandatory : No

Identify the odd point in the following:

Options :

1. ✘ proportional limit

2. ✘ elastic limit

3. ✘ yield point

4. ✔ fracture point

Question Number : 76 Question Id : 873718316 Display Question Number : Yes Is Question

Mandatory : No

Time dependent recoverable deformation under load is called ----- deformation.

**Options :**

1. ✘ elastic
2. ✔ anelastic
3. ✘ elastic after effect
4. ✘ visco elastic

**Question Number : 77 Question Id : 873718317 Display Question Number : Yes Is Question**

**Mandatory : No**

----- of material can be defined as its ability to resist a fluctuating or repetitive stress.

**Options :**

1. ✘ Tensile strength
2. ✘ Impact strength
3. ✔ Fatigue strength
4. ✘ Creep strength

**Question Number : 78 Question Id : 873718318 Display Question Number : Yes Is Question**

**Mandatory : No**

Fatigue curves are popularly known as ----- curves.

**Options :**

1. ✔ S-N
2. ✘ N

3. ✘ R

4. ✘ S

**Question Number : 79 Question Id : 873718319 Display Question Number : Yes Is Question**

**Mandatory : No**

In which of the following stage the deformation rate increases and causes failure?

**Options :**

1. ✘ transient creep stage

2. ✘ constant creep stage

3. ✘ steady stage creep stage

4. ✔ fracture stage

**Question Number : 80 Question Id : 873718320 Display Question Number : Yes Is Question**

**Mandatory : No**

Ternary stage creep is associated with -----

**Options :**

1. ✘ strain hardening

2. ✘ recovery

3. ✔ necking

4. ✘ all of the above

**Question Number : 81 Question Id : 873718321 Display Question Number : Yes Is Question Mandatory : No**

Which of the following part of mechanics deals with study of crack propagation?

**Options :**

1. ✘ solid mechanics
2. ✘ fluid mechanics
3. ✘ applied mechanics
4. ✔ fracture mechanics

**Question Number : 82 Question Id : 873718322 Display Question Number : Yes Is Question Mandatory : No**

Fracture voids usually form at

**Options :**

1. ✘ inclusions
2. ✘ second phase particles
3. ✘ grain boundary triple points
4. ✔ all of the above

**Question Number : 83 Question Id : 873718323 Display Question Number : Yes Is Question Mandatory : No**

What causes brittle fracture?

**Options :**

1. ✓ notch
2. ✗ vacancy
3. ✗ dislocation
4. ✗ holes

**Question Number : 84 Question Id : 873718324 Display Question Number : Yes Is Question**

**Mandatory : No**

Which factor affects ductile brittle transition behaviour the most?

**Options :**

1. ✗ strain rate
2. ✓ temperature
3. ✗ triaxiality
4. ✗ notching

**Question Number : 85 Question Id : 873718325 Display Question Number : Yes Is Question**

**Mandatory : No**

Hounsfield tensometer can be used to perform

**Options :**

1. ✓ tensile test
2. ✗ compressive test

3. ✘ hardness test

4. ✘ toughness test

**Question Number : 86 Question Id : 873718326 Display Question Number : Yes Is Question Mandatory : No**

Which among the following is a type of destructive test?

**Options :**

1. ✘ ultrasonic test

2. ✔ cupping test

3. ✘ magnetic particle test

4. ✘ dye penetrant

**Question Number : 87 Question Id : 873718327 Display Question Number : Yes Is Question Mandatory : No**

What indenter is used for Brinell test?

**Options :**

1. ✔ hardened steel ball

2. ✘ diamond ball

3. ✘ diamond prism

4. ✘ steel prism

Question Number : 88 Question Id : 873718328 Display Question Number : Yes Is Question

Mandatory : No

Sprue in casting refers to -----

Options :

1. ✘ gate
2. ✘ runner
3. ✘ riser
4. ✔ vertical passage

Question Number : 89 Question Id : 873718329 Display Question Number : Yes Is Question

Mandatory : No

In permanent mold casting method -----

Options :

1. ✘ molten metal is forced into mould under high pressure
2. ✘ molten metal is poured into a rotating mould
3. ✔ molten metal is fed into the cavity in metallic mould by gravity

cavity is filled with a precalculated quantity of metal and a core is inserted to force

4. ✘ the metal into cavity

Question Number : 90 Question Id : 873718330 Display Question Number : Yes Is Question

Mandatory : No

In hot chamber method of die casting -----

Options :

1. ✔ the melting pot is integral with die casting machine

2. ✘ the melting pot is separate from the die casting machine
3. ✘ the melting pot location has nothing to do with such a classification
4. ✘ high temperature and low pressure alloys are used

**Question Number : 91 Question Id : 873718331 Display Question Number : Yes Is Question Mandatory : No**

Which of the following casting methods utilizes wax pattern?

**Options :**

1. ✘ Shell moulding
2. ✔ Investment casting
3. ✘ Slush casting
4. ✘ Plaster moulding

**Question Number : 92 Question Id : 873718332 Display Question Number : Yes Is Question Mandatory : No**

In centrifugal casting,

**Options :**

1. ✘ steel core is used
2. ✘ cast iron core is used
3. ✘ hard sand core is used



4. ✓ no core is used

**Question Number : 93 Question Id : 873718333 Display Question Number : Yes Is Question**

**Mandatory : No**

Which of the following metal forming processes performs squeezing out of material through a hole?

**Options :**

1. ✗ forging

2. ✗ rolling

3. ✓ extrusion

4. ✗ drawing

**Question Number : 94 Question Id : 873718334 Display Question Number : Yes Is Question**

**Mandatory : No**

What is the best suitable process for making the wires?

**Options :**

1. ✗ forging

2. ✓ drawing

3. ✗ extrusion

4. ✗ rolling

Question Number : 95 Question Id : 873718335 Display Question Number : Yes Is Question

Mandatory : No

Which of the following components are manufactured by the sheet metal forming process?

Options :

1. ✘ connecting rods
2. ✘ engine blocks
3. ✔ car bodies
4. ✘ electric wires

Question Number : 96 Question Id : 873718336 Display Question Number : Yes Is Question

Mandatory : No

Good surface finish and better dimensional accuracy can be achieved in

Options :

1. ✔ cold working process
2. ✘ hot working process
3. ✘ both cold and hot working processes
4. ✘ neither cold nor hot working process

Question Number : 97 Question Id : 873718337 Display Question Number : Yes Is Question

Mandatory : No

A moving mandrel is used in

Options :

1. ✘ wire drawing
2. ✔ tube drawing
3. ✘ metal cutting
4. ✘ forging

Question Number : 98 Question Id : 873718338 Display Question Number : Yes Is Question

Mandatory : No

Hot extrusion involves prior heating of steel billet to ----- temperature.

Options :

1. ✔ above its recrystallization
2. ✘ below its recrystallization
3. ✘ low
4. ✘ high

Question Number : 99 Question Id : 873718339 Display Question Number : Yes Is Question

Mandatory : No

The most commonly used flame in gas welding is -----

Options :

1. ✔ neutral
2. ✘ oxidizing
3. ✘ carburizing

4. ✘ all of the above

Question Number : 100 Question Id : 873718340 Display Question Number : Yes Is Question Mandatory : No

Distortion in welding occurs due to -----

Options :

1. ✘ use of excessive current

2. ✔ improper clamping methods

3. ✘ use of wrong electrodes

4. ✘ oxidation of weld pool

Question Number : 101 Question Id : 873718341 Display Question Number : Yes Is Question Mandatory : No

Which of the following is strongest for brazing joints?

Options :

1. ✘ butt

2. ✘ scarf (inclined)

3. ✔ lap

4. ✘ all are equally strong

Question Number : 102 Question Id : 873718342 Display Question Number : Yes Is Question

**Mandatory : No**

Which of the following equipment is generally used for arc welding?

**Options :**

1. ✘ single phase alternator
2. ✘ two phase alternator
3. ✘ three phase alternator
4. ✔ transformer

**Question Number : 103 Question Id : 873718343 Display Question Number : Yes Is Question**

**Mandatory : No**

Which of the following welding processes use consumable electrode?

**Options :**

1. ✘ Submerged arc welding
2. ✔ MIG welding
3. ✘ TIG welding
4. ✘ CIG welding

**Question Number : 104 Question Id : 873718344 Display Question Number : Yes Is Question**

**Mandatory : No**

Pure copper powder can be effectively produced by

**Options :**

1. ✘ atomization

2. ✘ reduction
3. ✘ crushing
4. ✔ electrolysis

**Question Number : 105 Question Id : 873718345 Display Question Number : Yes Is Question Mandatory : No**

Sintering temperature for aluminium and its alloys is

**Options :**

1. ✘ 100°C - 150°C
2. ✘ 150°C - 200°C
3. ✘ 250°C - 350°C
4. ✔ 450°C - 550°C

**Question Number : 106 Question Id : 873718346 Display Question Number : Yes Is Question Mandatory : No**

Tungsten carbide tools are made by

**Options :**

1. ✔ powder metallurgy
2. ✘ machining
3. ✘ welding

4. ✘ casting

**Question Number : 107 Question Id : 873718347 Display Question Number : Yes Is Question Mandatory : No**

----- are used in radiography for the inspection of castings.

**Options :**

1. ✔ X- rays
2. ✘ Infrared rays
3. ✘ Ultraviolet rays
4. ✘ Visible rays

**Question Number : 108 Question Id : 873718348 Display Question Number : Yes Is Question Mandatory : No**

----- test uses the principle of capillary action.

**Options :**

1. ✘ Radiography
2. ✘ Ultrasonic
3. ✔ Dye penetrant
4. ✘ Eddy current

**Question Number : 109 Question Id : 873718349 Display Question Number : Yes Is Question**



**Mandatory : No**

Non-destructive testing is used to determine

**Options :**

1. ✘ location of defects
2. ✘ chemical composition
3. ✘ corrosion of metal
4. ✔ all of the above

**Question Number : 110 Question Id : 873718350 Display Question Number : Yes Is Question**

**Mandatory : No**

Which of the following methods of inspection is mostly used for ferromagnetic materials?

**Options :**

1. ✘ Acoustic emission test
2. ✘ Ultrasonic inspection
3. ✔ Magnetic particle inspection
4. ✘ Visual inspection

**Question Number : 111 Question Id : 873718351 Display Question Number : Yes Is Question**

**Mandatory : No**

The following differential equation has

$$2\frac{d^2y}{dt^2} + 4\left(\frac{dy}{dt}\right)^3 + y^2 + 2 = t$$

Options :

1. ✘ degree =2, order =1
2. ✔ degree =1, order =2
3. ✘ degree =4, order =3
4. ✘ degree =1, order =1

Question Number : 112 Question Id : 873718352 Display Question Number : Yes Is Question Mandatory : No

For  $\frac{d^2y}{dx^2} + 4\left(\frac{dy}{dx}\right) + 3y = 3e^{2x}$ , the particular integral is

Options :

1. ✔  $\frac{1}{5}e^{2x}$
2. ✘  $\frac{1}{3}e^{2x}$
3. ✘  $\frac{1}{17}e^{2x}$
4. ✘  $\frac{1}{2}e^{2x}$

Question Number : 113 Question Id : 873718353 Display Question Number : Yes Is Question

Mandatory : No

The directional derivative of  $f = x^2yz + 4xz^2$  at  $(1, -2, -1)$  in the direction of

$2\bar{i} - \bar{j} - 2\bar{k}$  is

Options :

1. ✓  $\frac{37}{3}$

2. ✗  $\frac{3}{37}$

3. ✗  $\frac{13}{3}$

4. ✗  $\frac{22}{3}$

Question Number : 114 Question Id : 873718354 Display Question Number : Yes Is Question

Mandatory : No

If  $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$ , then  $\nabla \cdot \bar{r} =$

Options :

1. ✗ 1

2. ✗ 0

3. ✗ 2

4. ✓ 3

Question Number : 115 Question Id : 873718355 Display Question Number : Yes Is Question

Mandatory : No

In the case of bisection method, the convergence is

Options :

1. ✘ biquadratic

2. ✘ quadratic

3. ✔ linear

4. ✘ cubic

Question Number : 116 Question Id : 873718356 Display Question Number : Yes Is Question

Mandatory : No

A continuous random variable  $X$  that can assume any value between  $x = 2$  and  $x = 5$  has

a density function given by  $f(x) = k(1+x)$ . Then  $P[X < 4] =$

Options :

1. ✘  $\frac{5}{27}$

2. ✘  $\frac{1}{27}$

3. ✔  $\frac{16}{27}$

4. ✘  $\frac{1}{4}$

Question Number : 117 Question Id : 873718357 Display Question Number : Yes Is Question Mandatory : No

The median of the numbers 11, 10, 12, 13, 9 is

Options :

1. ✘ 9

2. ✔ 11

3. ✘ 9.5

4. ✘ 10.5

Question Number : 118 Question Id : 873718358 Display Question Number : Yes Is Question Mandatory : No

If  $A = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$ , then  $A^8 =$

Options :

1. ✔  $625 I$

2. ✘  $5 I$

3. ✘  $6 I$

4. ✘  $10 I$

Question Number : 119 Question Id : 873718359 Display Question Number : Yes Is Question Mandatory : No

If  $\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n$  are the latent roots of a matrix A, then  $A^2$  has the latent roots

Options :

1. ✘  $\lambda_1, \lambda_2, \lambda_3, \dots, \lambda_n$

2. ✔  $\lambda_1^2, \lambda_2^2, \lambda_3^2, \dots, \lambda_n^2$

3. ✘  $\lambda_1^3, \lambda_2^3, \lambda_3^3, \dots, \lambda_n^3$

4. ✘  $1 + \lambda_1, 1 + \lambda_2, 1 + \lambda_3, \dots, 1 + \lambda_n$

Question Number : 120 Question Id : 873718360 Display Question Number : Yes Is Question

Mandatory : No

Consider the function  $f(z) = u + iv = \bar{z}$

Options :

1. ✘  $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$

2. ✘  $\frac{\partial u}{\partial y} \neq -\frac{\partial v}{\partial x}$

3. ✘  $f(z)$  is analytic everywhere

4. ✔  $f(z)$  is not analytic at any point