

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.

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

Metallurgy

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. ✖ Fe_2O_3
2. ✖ TiO_2
3. ✖ SiO_2
4. ✔ 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

2. ✔ three equal coplanar axes at 120° and a fourth unequal axis perpendicular to their plane

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

3. ✖ electrostatic attraction between oppositely charged ions in a chemical compound
4. ✖ 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 :

1. ✖ strong, ductile, and opaque to light
2. ✖ soft, ductile, and combustible
3. ✖ hard, ductile, and opaque to light
4. ✔ 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 :

1. ✖ copper and zinc
2. ✔ carbon and iron
3. ✖ silver and gold
4. ✖ 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. ✔ mm^{-2}
2. ✖ mm^{-3}
3. ✖ mm
4. ✖ 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

Tertiary 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