

(D) None of these
Answer: Option B

02. The only suitable method for hardening the low carbon steel is case hardening. Which of the following is a case hardening process?

- (A) Cyaniding
 - (B) Sherardizing
 - (C) Spheroidising
 - (D) None of these
- Answer: Option A

03. Filler material used in welding should have _____ as compared to the parent metal to be welded.

- (A) Lower melting temperature
 - (B) Same melting temperature
 - (C) Same composition
 - (D) Both 'b' & 'c'
- Answer: Option D

04. The temperature at which the magnetic property of iron disappears (i.e., it becomes non-magnetic) and its electrical conductivity & specific heat also changes, is called the 'Curie point', which is _____ °C.

- (A) 768
 - (B) 908
 - (C) 1400
 - (D) 1539
- Answer: Option A

05. About _____ ton of coke is required in a cupola to produce one ton of casting.

- (A) 0.03
 - (B) 0.3
 - (C) 0.8
 - (D) 1.5
- Answer: Option B

06. Referring to the periodic table of elements, it is found that with increasing atomic number. The atomic size in the same

- (A) Period increases
 - (B) Period decreases
 - (C) Group increases
 - (D) Both 'b' & 'c'
- Answer: Option D





07. Satellites burn off during re-entry to earth's atmosphere, because of the

- (A) Combustion with air
 - (B) Gravitational pull by earth
 - (C) Friction with earth's atmosphere
 - (D) Loss in weight of the satellite
- Answer: Option C

08. Joining of thin foils is preferred to be done by

- (A) Gamma rays
 - (B) X-rays
 - (C) Microwaves
 - (D) Gas welding
- Answer: Option C

09. Which of the following is the correct nature of shear stress distribution along the cross section in a horizontal circular pipe under steady state fluid flow condition?

- (A)  (B) 
- (C)  (D) 

Answer: Option C

10. With increase in temperature, the electrical conductivity of semiconductors

- (A) Increases
- (B) Decreases
- (C) Remain constant
- (D) Either (A) or (B), depends on the type of semi-conductor

Answer: Option A

11. Laser welding is widely employed in the _____ industries.

- (A) Electronic
- (B) Structural
- (C) Process
- (D) Heavy

Answer: Option A

12. Which of the following approaches the ideal gas behaviour most closely?

- (A) Wet steam
- (B) Saturated steam
- (C) Superheated steam
- (D) Saturated water

Answer: Option C

13. Lap joints are preferred over butt joints in soldering/brazing, because these joints are

- (A) Weaker in tension but stronger in shear
- (B) Weaker in shear but stronger in tension
- (C) Stronger in both shear and tension
- (D) The lap joints are easily made

Answer: Option D

14. Normalising does not _____ of a metal.

- (A) Improve machinability & tensile strength
- (B) Remove internal stresses
- (C) Refine the structure
- (D) Remove strains caused by cold working

Answer: Option B

15. Which of the following hardness tests does not measure the indentation hardness of metals and alloys?

- (A) Vickers hardness test
- (B) Shore scleroscope test
- (C) Brinell hardness test
- (D) Rockwell hardness test

Answer: Option B

16. Gratings is associated with the measurement of

- (A) Linear displacement
- (B) Concavity/convexity
- (C) Surface texture
- (D) Flatness

Answer: Option A

17. Fibre reinforced plastic (FRP) are

- (A) Made of glass fibre and thermoplastic resins
- (B) Anisotropic
- (C) Made of thermosetting resin and glass fibre
- (D) Both 'b' & 'c'

Answer: Option D

18. Water flow in the river during flood can be categorised as the _____ flow.

- (A) Unsteady uniform
- (B) Unsteady non-uniform
- (C) Steady uniform
- (D) Steady non-uniform

Answer: Option B

19. Pick out the correct statement.

- (A) Materials exhibiting high elasticity obey Hooke's law
- (B) The elastic behaviour of rubber under compression is the same as its behaviour under tension
- (C) The damping capacity of a material is due to its plastic deformation
- (D) The stress required to cause plastic flow in polycrystalline material is higher as compared to monocrystalline materials due to the presence of grains of different orientations

Answer: Option B

20. Which of the following test is used for distinguishing among dry oils, semi-drying oils and non drying oils?

- (A) Elaiden test
- (B) Reichert-Meissl value test
- (C) Hunter value test
- (D) Iodine value test

Answer: Option A

21. Silicon percentage in silicon steel used for electrical equipments is about

- (A) 1
- (B) 4.0
- (C) 8
- (D) 14

Answer: Option B

22. Window panes of aeroplanes are normally made of

- (A) Perspex (PMMA)
- (B) Teflon (PTFE)
- (C) Bakelite (phenol formaldehyde)
- (D) Polystyrene

Answer: Option A

23. Galvanic corrosion cannot be prevented by

- (A) Cathodic protection
- (B) Anodic protection
- (C) Usage of largest possible anodic area
- (D) Any one of these

Answer: Option B

24. Babbitt lining is used on brass/bronze bearings to increase the

- (A) Antifriction properties
- (B) Compressive strength
- (C) Bearing resistance
- (D) Wear resistance

Answer: Option D

25. Ceramic compounds as compared to metallic compounds

- (A) Crystallise faster
- (B) Resist greater tensile stress at room temperature
- (C) Have higher melting temperature
- (D) Are better conductor of electricity at higher temperature

Answer: Option C

26. _____ has the highest melting point out of the following.

- (A) Tungsten
- (B) Zirconium
- (C) Molybdenum
- (D) Tantalum

Answer: Option A

27. Air-petrol ratio for maximum power generation in spark ignition engine is about

- (A) 6 : 1
- (B) 12 : 1
- (C) 18 : 1
- (D) 24 : 1

Answer: Option B

28. The most serious manufacturing defect from fracture toughness point of view is

- (A) Surface roughness
- (B) Pores
- (C) Spherical inclusion
- (D) Crack

Answer: Option D

29. In an amorphous material, atoms defy any definite atomic structure and exist in random pattern just like in liquid. Which of the following is an amorphous material?

- (A) Tin
- (B) Lead
- (C) Zinc
- (D) Glass

Answer: Option D

30. Out of the following, the best material capable of withstanding shock & vibration without the danger of cracking is

- (A) Malleable iron
- (B) Grey cast iron
- (C) Chilled cast iron
- (D) White cast iron

Answer: Option A

31. The dew point temperature lines on psychrometric charts are straight inclined sloping downwards to the right. When relative humidity of moist air is 100%, then

- (A) Wet bulb temperature=dry bulb temperature
- (B) Wet bulb temperature=dew point temperature
- (C) Saturation temperature=dew point temperature
- (D) All 'a', 'b' & 'c'

Answer: Option D

32. Fatigue limit improvement by over stressing the metal by successively increasing the load is called coxing. In fatigue failure, the material fails

- (A) Below the yield point
- (B) Above the yield point
- (C) Below the elastic limit
- (D) At the elastic limit

Answer: Option A

33. Addition of silicon to cast iron

- (A) Promotes graphite module formation
- (B) Improves its ductility
- (C) Does not promote graphite flakes formation
- (D) Increases the fluidity of molten metal

Answer: Option D

34. The materials which fracture even at small strains are termed as brittle, while those materials which exhibit an appreciable deformation before failure are termed as

- (A) Rigid
- (B) Tough
- (C) Ductile
- (D) Plastic

Answer: Option C

35. _____ is used as a material of construction for the blade of power saw.

- (A) Wrought iron
- (B) Stainless steel
- (C) Mild steel
- (D) High speed steel

Answer: Option D

36. A steam carrying pipeline is insulated with two layers of insulating materials with the inferior insulation material forming the inner part. If the two insulating layers are interchanged, the heat conducted will

- (A) Increase
- (B) Decrease
- (C) Remain unaffected
- (D) May increase or decrease; depends on the thickness of each layer

Answer: Option C

37. Pick out the wrong statement.

- (A) Cold cracking of a weld is due to the presence of hydrogen gas in the weld
- (B) True stress is given by, $\sigma = \sigma E (1 + \epsilon E)$, where σE and ϵE are engineering stress and engineering strain respectively
- (C) Phosphorous can be easily recovered in the iron blast furnace
- (D) High residual stress at the surface is beneficial for fatigue properties of a material

Answer: Option C

38. The capacity of a spring to store energy is called the spring form co-efficient. Stiffness of a spring is measured by the

- (A) Ability to absorb shock
- (B) Capacity to store energy
- (C) Ratio of the wire & coil diameters
- (D) Load to produce unit deflection

Answer: Option D

39. The elastic strain energy of a unit length of an edge dislocation as compared to that of a screw dislocation is

- (A) More
- (B) Equal
- (C) Less
- (D) Double

Answer: Option A

40. Which of the following is not the function of a volute casing provided in a centrifugal pump?

- (A) To reduce the head loss in discharge
- (B) To increase the pump efficiency
- (C) To collect liquid from the periphery of the impeller and to transmit it to the delivery pipe at constant velocity
- (D) To increase the pump discharge rate

Answer: Option D

41. Pick out the wrong statement.

- (A) For a pressure vessel to be classified as 'thin vessel', the ratio of wall thickness to mean radius is less than 0.1
- (B) For calculating forces and efficiency of riveted joint, either rivet diameter or rivet hole diameter is used in case of pressure vessel and in structural work
- (C) Longitudinal joint is normally made butt joint to maintain the circularity of the vessel
- (D) Maximum diameter of the opening provided in a pressure vessel, which does not require any compensation is 200 mm

Answer: Option B

42. The main reducing agent in iron blast furnace is

- (A) Carbon dioxide
- (B) Carbon monoxide
- (C) Oxygen
- (D) Air

Answer: Option B

43. Broaching tools are usually made of

- (A) Cermets
- (B) High speed steel
- (C) Tungsten carbide
- (D) Stellite

Answer: Option B

44. Which of the following is the most suitable material of construction for the condenser tubes, where the cooling medium is brine (salty water)?

- (A) Aluminium

- (B) Copper
 - (C) Titanium
 - (D) Stainless steel
- Answer: Option C

45. $\text{Fe}_2\text{O}_3(\text{s}) + \text{CO}(\text{g}) = \text{Fe}(\text{s}) + \text{CO}_2(\text{g})$, $K = 0.435$ at 1173E ; at equilibrium, what will be the number of moles of CO gas required to reduce one mole of Fe_2O_3 at 1173 K ?

- (A) 1.0
- (B) 1.3
- (C) 2.3
- (D) 3.3

Answer: Option D

46. Magnetic permeability of iron is increased by its

- (A) Decarburising
- (B) Alloying with cobalt
- (C) Purification
- (D) Alternate heating & cooling

Answer: Option B

47. Temper brittleness of a material can be fairly detected by the _____ test.

- (A) Fatigue
- (B) Notched bar impact
- (C) Tensile
- (D) Hardness

Answer: Option B

48. The escape velocity of a body on earth which is independent of its mass is about _____ km/second.

- (A) 3
- (B) 7
- (C) 11
- (D) 15

Answer: Option C

49. There are one octahedral void and _____ tetrahedral void in the closest packing of atoms.

- (A) One
- (B) Two
- (C) Three
- (D) None of these

Answer: Option B

50. Fibrous fracture is normally encountered in the _____ materials.

- (A) Hard
- (B) Elastic
- (C) Ductile
- (D) Brittle

Answer: Option C

51. Fire in fuel gas pipelines is extinguished most effectively by

- (A) Spraying water
- (B) Blanketing the area with nitrogen atmosphere
- (C) Fire fighting foam
- (D) None of these

Answer: Option B

52. Addition of small amount of _____ to grey cast iron is done to produce nodular grey cast iron.

- (A) Manganese
- (B) Phosphorous
- (C) Magnesium
- (D) Chromium

Answer: Option C

53. Pick out the wrong statement.

- (A) A soft magnetic material should have high permeability and small area of hysteresis loop
- (B) Poisson's ratio of high melting point metals is more than unity
- (C) Solders generally melt at less than 185°C
- (D) Steel produced by B.O.F process is ideally suited for manufacturing flat product

Answer: Option B

54. In fluid flow, and heat and mass transfer, one encounters (i) kinematic velocity (μ), (ii) molecular diffusivity (θ) and thermal diffusivity (α). The units of these quantities are.

- (A) μ , α and θ all have units of m/s
- (B) μ , α and θ all have units of m²/s
- (C) α and θ have units of m²/s, while μ has unit of m/s
- (D) α and θ have units of m/s, while μ has unit of m²/s

Answer: Option C

55. Drills are usually made of

- (A) Cermets
- (B) High speed steel
- (C) Alloy steel
- (D) Tungsten carbide

Answer: Option B

56. Shaft/rotor speed is most accurately measured by a

- (A) Frequency counter
- (B) Tachometer
- (C) Strobometer
- (D) Speedometer

Answer: Option C

57. Maraging steels derive their strength from the following mechanism:

- (A) A fine, highly dislocated and strong martensite
- (B) Fine dispersions of inter-metallic of Fe, Ni, Ti etc
- (C) Fine dispersions of alloy carbides in a ferrite matrix
- (D) Fine dispersions of Fe₃C nucleated on dislocations in austenite

Answer: Option A

58. Factor of safety is the ratio of the _____ stress to the working stress.

- (A) Tensile
- (B) Compressive
- (C) Yield
- (D) Bearing

Answer: Option C

59. In chemical dehumidification process

- (A) Wet bulb temperature increases
- (B) Dry bulb temperature remains constant
- (C) Dew point temperature increases
- (D) Dry bulb temperature increases

Answer: Option B

60. A solution which resists change in its pH value on addition of acid/alkali is called the _____ solution.

- (A) Neutral
- (B) Ideal
- (C) Buffer
- (D) Zero pH

Answer: Option C

61. The material used for coating the welding electrode is termed as the

- (A) Flux
- (B) Slag
- (C) Protective layer
- (D) Binder

Answer: Option B

62. In an eutectic system, two elements are completely

- (A) Soluble in solid state
- (B) Insoluble in liquid state
- (C) Insoluble in both solid & liquid state
- (D) Soluble in liquid state

Answer: Option D

63. Identify the correct statement.

- (A) Sphalerite is zinc oxide
- (B) The first law of the thermodynamics is stated as $\delta E = \delta Q - \delta W$
- (C) Lead can be produced in a blast furnace
- (D) *T. ferrooxidans* is a fungus that can be used for leaching chalcopyrite

Answer: Option C

64. Hot extrusion process is not used for making

- (A) Cast iron pipe for domestic water supply
- (B) Aluminium curtain rods
- (C) Stainless steel tubes used in furnitures
- (D) Any of these

Answer: Option A

65. _____ remains constant during the adiabatic cooling of moist air.

- (A) Wet bulb temperature
- (B) Dry bulb temperature
- (C) Relative humidity
- (D) Specific humidity

Answer: Option A

66. Basicity [$\%CaO + \%MgO + \%SiO_2$] of the slag in Indian blast furnace is in the range of

- (A) 0.7-1.0
- (B) 1.1-1.4
- (C) 1.5 - 1.8
- (D) 2.0 - 2.5

Answer: Option B

67. Dryness factor of steam is defined as the ratio of the mass of vapor in the mixture to the mass of the mixture. Dryness factor of steam is measured by a _____ calorimeter.

- (A) Bomb
- (B) Throttling
- (C) Junker's
- (D) Boy's

Answer: Option B

68. The most commonly used moderator in nuclear power plants is

- (A) Graphite
- (B) Light water
- (C) Heavy water
- (D) Beryllium

Answer: Option A

69. The dew point of moist air becomes _____ with decrease in its relative humidity.

- (A) Less than the wet bulb temperature
- (B) More than the wet bulb temperature
- (C) More than the dry bulb temperature
- (D) Equal to wet bulb temperature

Answer: Option A

70. Yield strength of a material is determined by the _____ test.

- (A) Creep
- (B) Tension
- (C) Compression
- (D) Endurance

Answer: Option B

71. Thermistors are used in _____ devices.

- (A) Voltage measuring
- (B) Temperature measuring
- (C) Temperature compensating
- (D) Both (B) & (C)

Answer: Option D

72. An ideal material for making cooking vessels should have

- (A) High heat capacity
- (B) Low heat capacity
- (C) High thermal conductivity
- (D) Both (B) and (C)

Answer: Option D

73. Which of the following is an example of stress corrosion?

- (A) Season cracking of brass
- (B) Caustic embrittlement of steel
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option C

74. Annealing of cast iron

- (A) Softens it to facilitate machining
- (B) Decreases the free carbon
- (C) Increases the strength
- (D) None of these

Answer: Option A

75. Secondary hardening in steels arises out of the

- (A) Precipitation of fine alloy carbides at high temperatures
- (B) Refinement of ferrite grain size by working
- (C) Decomposition of retained austenite upon heat treatment
- (D) Precipitation of complex inter-metallic upon heat treatment

Answer: Option C

76. _____ joint is mostly used for joining pipes carrying water at low pressure.

- (A) Nipple
- (B) Socket
- (C) Union
- (D) Bell and spigot

Answer: Option B

77. Pressure exerted by a liquid depends upon its

- (A) Surface tension
- (B) Density
- (C) Viscosity
- (D) Buoyancy

Answer: Option B

78. Silicon percentage in the silicon steel used for electrical appliances/equipments is

- (A) 0.3-0.4
- (B) 12-14
- (C) 3-4
- (D) 20-25

Answer: Option C

79. Brinell Hardness Number (BHN) for talc is approximately in the range of

- (A) 1-5
- (B) 20-30
- (C) 100-150
- (D) 200-250

Answer: Option B

80. Catalyst used in the 'catalytic converter' employed in automobile exhaust line for complete combustion/oxidation of carbon monoxide, nitrogen oxides and hydrocarbons is

- (A) Alumina

- (B) Platinum
 - (C) Vanadium pentoxide
 - (D) Iron oxide
- Answer: Option B

81. Vibration upto 100 kilo hertz can be most accurately measured by a _____ type accelerometer.

- (A) Preloaded spring
 - (B) Piezoelectric
 - (C) Bonded strain gauge
 - (D) None of these
- Answer: Option B

82. Dowtherm is a

- (A) High temperature heating medium (a petroleum product)
 - (B) Product of coal tar distillation
 - (C) Very heat sensitive material
 - (D) None of these
- Answer: Option A

83. Pick out the wrong statement.

- (A) Weldability of high carbon steel is poorer compared to low carbon steel
 - (B) Invar is a magnetic alloy
 - (C) Magnetic permeability of the diamagnetic material is less than one
 - (D) Martenistic transformation never goes to completion (i.e., 100%) at room temperature
- Answer: Option B

84. _____ test can be termed as the semi-destructive test.

- (A) Impact
 - (B) Torsion
 - (C) Hardness
 - (D) Charpy
- Answer: Option C

85. Which of the following is not a ferromagnetic material?

- (A) Nickel
 - (B) Cobalt
 - (C) Aluminium
 - (D) Iron
- Answer: Option C

86. Brass parts with high residual tensile stress at the surface are susceptible to season cracking (i.e. spontaneous cracking occurring on exposure to atmospheric corrosion), if its zinc percentage is more than

- (A) 5
 - (B) 10
 - (C) 20
 - (D) 35
- Answer: Option C

87. Which of the following is normally not found in both the S.I. (petrol) & C.I. (diesel) engines?

- (A) Air filter
 - (B) Fuel injector
 - (C) Exhaust silencer
 - (D) Battery
- Answer: Option B

88. Addition of _____ to steel does not help in improving its machinability.

- (A) Sulphur
 - (B) Silicon
 - (C) Lead
 - (D) Phosphorous
- Answer: Option B

89. Silicon crystal can be converted to p-type semi-conductor by doping with

- (A) Phosphorous
 - (B) Nitrogen
 - (C) Carbon
 - (D) Boron
- Answer: Option D

90. A gas which is collected over water becomes moistened due to water vapor, exerts its own partial pressure at the gas temperature, which is termed as its

- (A) Aqueous tension
- (B) Saturated humidity
- (C) Vapor pressure
- (D) Absolute humidity

Answer: Option A

91. Corona discharge is related to the operation of a/an

- (A) Induction motor
- (B) Electrostatic precipitator
- (C) Fast breeder reactor
- (D) Magneto hydrodynamic generator (MHD)

Answer: Option B

92. With increase in annealing temperature, the following defect density decreases.

- (A) Vacancy
- (B) Dislocation
- (C) Grain boundary
- (D) All of these

Answer: Option D

93. Minimum thermal efficiency of a steam boiler may be around _____ percent

- (A) 25
- (B) 45
- (C) 65
- (D) 20

Answer: Option D

94. The leaching solvent used in Baeyer's process for the purification of bauxite is

- (A) Ammonium hydroxide
- (B) Sodium carbonate
- (C) Sodium hydroxide
- (D) Ammonium carbonate

Answer: Option B

95. Eutectic reaction for iron-carbon system occurs at a temperature of _____ °C.

- (A) 723
- (B) 959
- (C) 1147
- (D) 1493

Answer: Option A

96. Boiling point of water gets lowered at high altitudes (e.g., hills), because

- (A) Temperature is low
- (B) Atmospheric pressure is low
- (C) Atmospheric pressure is high
- (D) None of these

Answer: Option B

97. Consider the equilibrium $A_{(g)} + B_{(g)} = AB_{(g)}$. When the partial pressure of A is 10^{-2} atm, the partial pressure of B is 10^{-3} atm and the partial pressure of AB is 1 atm, the equilibrium constant 'K' is

- (A) 10 atm^{-1}
- (B) 10^5 atm^{-1}
- (C) 10 (dimensionless)
- (D) 10^5 (dimensionless)

Answer: Option B

98. The process of removal of scale formed during hot rolling of steel is termed as

- (A) Descaling
- (B) Shot blasting
- (C) Pickling
- (D) Skimming

Answer: Option C

99. Tesla metre per ampere ($T. m/A$) is the unit for the measurement of

- (A) Magnetic susceptibility
- (B) Magnetic moment
- (C) Permeability of free space
- (D) Flux density

Answer: Option C

100. Alcohols are not suitable as diesel engine fuel because the cetane number of alcohols is

- (A) Very low which prevents their ignition by compression
- (B) Very high which prevents their ignition by compression
- (C) Zero
- (D) None of these

Answer: Option A

101. The joint for soldering is supported by binding wire made of

- (A) Mild steel
- (B) Copper
- (C) Soft iron
- (D) Stainless steel

Answer: Option C

102. Which of the following is used to produce draught in the locomotive boilers?

- (A) Chimney
- (B) Induced draught fan
- (C) Forced draught fan
- (D) Steam jet arrangement

Answer: Option D

103. The bolt is subjected to _____ when the nut is tightened by putting the washer beneath it.

- (A) Tension
- (B) Shear
- (C) Compression
- (D) Bending & tension

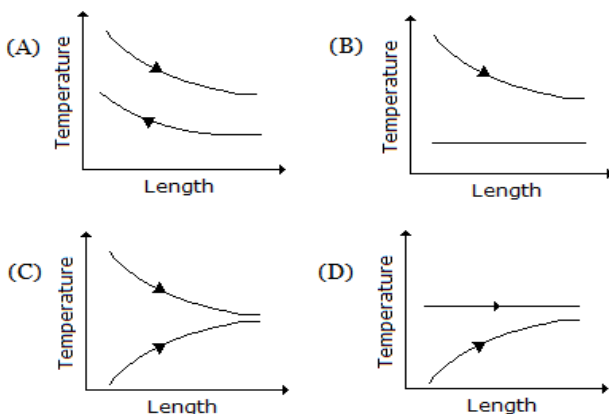
Answer: Option A

104. Which of the following materials has the least scrap value?

- (A) Aluminium
- (B) Stainless steel
- (C) Brass
- (D) Copper

Answer: Option B

105. Temperature profile along the length of a gas-gas counter flow heat exchanger is correctly represented by



Answer: Option A

106. Which of the following is not a characteristic observed in material failure by fatigue fracture?

- (A) Plastic deformation of material does not occur
- (B) Initiation of crack from below the surface does not occur
- (C) Initiation of crack occurs on the surface of the machine part
- (D) Presence of both rough & smooth zone with conchoidal markings in smooth zone of the surface

Answer: Option B

107. Propulsion of rocket follows from the

- (A) Newton's second law of motion
- (B) Newton's third law of motion
- (C) Law of projectiles
- (D) Archimedes principle

Answer: Option B

108. Leakage in a cooking gas cylinder is detected by

- (A) Radio-isotopes
- (B) Pouring soap solution on the surface and locating the gas bubbles
- (C) Halide torch
- (D) Pungent smell of mercaptans present in the gas

Answer: Option D

109. Which of the following is an example of cathodic protection of metals against corrosion?

- (A) Painted steel
- (B) Galvanised iron
- (C) Case hardened steel
- (D) Lead lined reactor

Answer: Option B

110. Out of the following, the alloy which has equal percentage of constituents, is

- (A) White metal
- (B) Gun metal
- (C) Duralumin
- (D) Constantan

Answer: Option D

111. With increase in _____ Knocking tendency in a spark ignition petrol engine decreases.

- (A) Supercharging
- (B) Wall temperature
- (C) Compression ratio
- (D) Engine speed

Answer: Option D

112. The _____ of a double acting reciprocating pump as compared to the single acting pump will be almost double.

- (A) Flow output
- (B) Head developed
- (C) Overall efficiency
- (D) Weight

Answer: Option A

113. A psychrometer does not measure the _____ temperature of moist air.

- (A) Dew point
- (B) Dry bulb
- (C) Wet bulb
- (D) None of these

Answer: Option A

114. Alloying elements present in Haynes stellite, which has superior performance than high speed steel, are:

- (A) Nickel, cobalt & chromium
- (B) Tungsten, chromium & cobalt

- (C) Manganese, chromium & cobalt
 - (D) Tungsten, molybdenum & nickel
- Answer: Option B

115. An atom bomb works on the principle of

- (A) Nuclear fission
- (B) Nuclear fusion
- (C) Both the nuclear fission & fusion
- (D) Ionisation

Answer: Option A

116. Young's modulus of a material is the measure of its

- (A) Stiffness
- (B) Malleability
- (C) Creep resistance
- (D) Tensile strength

Answer: Option A

117. Neutrons are present in all atoms except that of

- (A) He
- (B) C
- (C) H
- (D) Ar

Answer: Option C

118. Which of the following is not categorised as the ore agglomeration process?

- (A) Nodulising
- (B) Pelletising
- (C) Balling
- (D) Briquetting

Answer: Option C

119. Principal alloying element in Elinvar (used for making hair springs for watches) is

- (A) Copper
- (B) Aluminium
- (C) Nickel
- (D) Zinc

Answer: Option C

120. In Newton's law of viscosity, which states that the shear stress is proportional to the _____ Co-efficient of viscosity is called dynamic or absolute viscosity (where, $V =$ velocity, $V_g =$ velocity gradient).

- (A) V^2
- (B) $1/V^2$
- (C) $1/V_g$
- (D) V_g

Answer: Option D

121. Between 230 and 370°C, blue brittleness is caused in mild steel because of the

- (A) Immobility of dislocation
- (B) Strain-ageing
- (C) Increase in Young's modulus
- (D) Strain hardening

Answer: Option B

122. Sub zero treatment of steel is done to

- (A) Suppress martensite transformation
- (B) Enhance its working performance in sub zero atmosphere
- (C) Reduce the retained austenite in hardened steel
- (D) Induce temper brittleness after its hardening

Answer: Option C

123. The units of the rate constant for a second order reaction are

- (A) $\text{Sec}^{-1} \cdot \text{mole}^{\circ}$
- (B) $\text{Moles}^1 \cdot \text{sec}^{-1}$

(C) Moles⁻¹. sec¹

(D) Moles¹. sec¹

Answer: Option C

124. Pick out the wrong statement about the machinability of metals. Machinability of a metal

(A) Decreases with increase in strain hardening tendencies

(B) Decreases with increase in hardness, in general

(C) Depend on the composition, microstructure and physical & mechanical properties

(D) Decreases with increases in tensile strength & decrease in grain size

Answer: Option D

125. The most detrimental impurity in high pressure boiler feed water is

(A) Suspended salt

(B) Dissolved salt

(C) Silica

(D) Turbidity

Answer: Option C

126. A polymer is termed as an 'elastomer', if its percentage elongation is more than 100%. An elastomer is termed as 'rubber' if its percentage elongation is more than _____ percent.

(A) 150

(B) 200

(C) 300

(D) 400

Answer: Option B

127. Biological shield in a nuclear reactor is generally provided to protect against the

(A) α -rays

(B) β -rays

(C) Gamma rays & neutrons

(D) Electrons

Answer: Option C

128. The wet bulb temperature is lower in dry air than in wet air at the same temperature. A dry bulb thermometer registers a higher temperature than a wet bulb thermometer except at _____ percent relative humidity.

(A) 0

(B) 100

(C) 50

(D) None of these

Answer: Option B

129. The thickness of oxide film is y at time t . If K_1 , K_2 and K_3 are the temperature dependent constants, the parabolic law of oxidation is given by

(A) $y^2 = 2k_1t + k_2$

(B) $y = k_1 \ln(k_2t + k_3)$

(C) $y = k_1 t + k_2$

(D) $y = k_1t^3 + k_2$

Answer: Option A

130. Even though heat transfer co-efficient in boiling liquids is large, use of fins is advantageous, when the entire surface is exposed to _____ boiling.

(A) Film

(B) Nucleate

(C) Transition

(D) All modes of

Answer: Option A

131. Plastics as a material of construction suffer from the drawback of low

(A) Machinability

(B) Density

(C) Strength

(D) Plastic deformation

Answer: Option C

132. Normalising does not _____ of a metal.

- (A) Improve machinability & tensile strength
- (B) Remove internal stresses
- (C) Refine the structure
- (D) Remove strains caused by cold working

Answer: Option B

133. Which of the following is an ore dressing operation?

- (A) Classification
- (B) Smelting
- (C) Roasting
- (D) None of these

Answer: Option A

134. Material of construction of the electrode used in the electric resistance welding is

- (A) Stainless steel
- (B) Graphite
- (C) Copper
- (D) Steel

Answer: Option C

135. Shampoos are commercially not available in the form of

- (A) Powder
- (B) Gaseous mixture
- (C) Solution
- (D) Emulsion

Answer: Option B

136. Which of the following materials has the maximum shrinkage allowance?

- (A) Brass
- (B) Cast iron
- (C) Lead
- (D) Aluminium alloy

Answer: Option C

137. In multipass welds, shot peening is done after each pass to

- (A) Close the surface porosity
- (B) Break the continuity of columnar grains
- (C) Flatten the weldment
- (D) Introduce texture in the weld

Answer: Option A

138. A reduction in thermal resistance during heat transfer does not occur in the

- (A) Convection heat transfer by stirring the fluid and cleaning the heating surface
- (B) Conduction heat transfer by reduction in the material thickness and increase in the thermal conductivity
- (C) Radiation heat transfer by increasing the temperature and reducing the emissivity
- (D) None of these

Answer: Option C

139. Pick out the correct combination about the role of various additives used in polymers.

- (A) Plasticiser: increases the polymer strength
- (B) Heat stabiliser: increases the maximum service temperature
- (C) Fillers: Does not affect the property of polymer but increases its weight
- (D) Lubricants: increases the flexibility of polymers

Answer: Option C

140. Colour comparator is used to measure the

- (A) pH value
- (B) Electrode potential
- (C) Colour intensity
- (D) None of these

Answer: Option A

141. Which of the following is not used as a bearing material?

- (A) Copper-lead alloys
 - (B) Babbitts
 - (C) Bronzes
 - (D) Cermets
- Answer: Option D

142. Tumbling is the process of improving the _____ of the materials/parts.

- (A) Surface finish
 - (B) Fatigue limit
 - (C) Creep limit
 - (D) Surface cleanliness
- Answer: Option D

143. The malleability of a material is the property by virtue of which it can be rolled or hammered into thin sheets. Which of the following materials has the maximum malleability?

- (A) Lead
 - (B) Copper
 - (C) Aluminium
 - (D) Wrought iron
- Answer: Option A

144. Volume of blast furnace slag is about _____ times the volume of hot metal (pig iron) of the same weight

- (A) 1.5
 - (B) 3
 - (C) 5
 - (D) 7
- Answer: Option B

145. Oxide layer formed on the non-ferrous metal surface after its annealing is

- (A) Removed by acid pickling
 - (B) Hammered into the surface
 - (C) Removed with coarse emery cloth
 - (D) Left as such to protect the surface
- Answer: Option A

146. Chlorine acts as a bleaching agent only in the presence of

- (A) Dry air
 - (B) Pure oxygen
 - (C) Moisture
 - (D) Sunlight
- Answer: Option C

147. Case hardening is not done by

- (A) Nitriding
 - (B) Hot dipping
 - (C) Electroplating
 - (D) Both 'b' & 'c'
- Answer: Option D

148. Powder metallurgy technique is used in the production of _____ tools.

- (A) Tungsten carbide
 - (B) High carbon steel
 - (C) High speed steel
 - (D) Drilling
- Answer: Option A

149. Upto the critical radius of insulation, added insulation, will

- (A) Increase the heat loss
 - (B) Decrease heat loss and will have no effect beyond that
 - (C) Decrease heat flux
 - (D) Reduce convection heat loss compared to conduction heat loss
- Answer: Option B

150. Rain drops falling through atmospheric air attain limited terminal velocity, because of

- (A) Upward thrust due to air
- (B) Viscous force exerted by air
- (C) Surface tension effects of water
- (D) Force of gravity

Answer: Option B

151. Boiler tube size is specified by its thickness and _____ diameter.

- (A) Outside
- (B) Inside
- (C) Mean
- (D) None of these

Answer: Option A

152. In case of condensers & evaporators operating under given terminal conditions, LMTD (logarithmic mean temperature difference) for counter flow as compared to that for parallel flow is

- (A) More
- (B) Less
- (C) Equal
- (D) Much more

Answer: Option C

153. The rolling process cannot be used to produce

- (A) Plates
- (B) Rods
- (C) Tubes
- (D) Wires

Answer: Option C

154. At the point of boundary layer separation in fluid flow, the

- (A) Shear stress is maximum
- (B) Velocity gradient is flat
- (C) Density variation is maximum
- (D) Shear stress is zero

Answer: Option A

155. In "Imperial Smelting Process" for extraction of zinc, zinc vapour thus produced is quenched in the external condenser by the use of the following:

- (A) Jet of water at high pressure
- (B) Blast of air
- (C) Mixture of water and air
- (D) Rain of molten lead

Answer: Option D

156. _____ flux is used for the extraction of metal from its self fluxing ores.

- (A) No
- (B) Acid
- (C) Basic
- (D) Neutral

Answer: Option A

157. The most suitable material of construction for a sewer to carry sewage under high pressure is

- (A) Asbestos cement
- (B) Steel
- (C) Cement concrete
- (D) Stoneware

Answer: Option B

158. Uniform ramming of sand in green sand moulding process leads to

- (A) Reduced chance of gas porosity
- (B) Greater dimensional stability of the casting
- (C) Uniform flow of molten metal into the mould cavity
- (D) Less sand expansion type of casting defect

Answer: Option B

159. Percentage of differential pressure lost in a Venturimeter with a tapering of 15° may be about

- (A) 1
- (B) 10
- (C) 25
- (D) 50

Answer: Option B

160. Which of the following is not a dielectric material?

- (A) Cotton, silk and paper
- (B) Asbestos, glass, porcelain and mica
- (C) Rubber and polymeric resins
- (D) All refractory materials

Answer: Option C

161. During decarburising of a plain carbon steel, the thickness of ferrite layer growth is proportional to

- (A) Time
- (B) Square root of time
- (C) Square of time
- (D) Cube of time

Answer: Option B

162. Particle nature of cathode rays is proved due to the fact that they

- (A) Travel in a straight line
- (B) Get deflected by magnetic electric field
- (C) Produce fluorescence
- (D) Heat the exposed material

Answer: Option B

163. Property responsible for the talcum powder to cling to the skin is the

- (A) Capillary action
- (B) Adhesion
- (C) Cohesion
- (D) Surface tension

Answer: Option B

164. Which of the following is prone to cup and cone fracture?

- (A) Cast iron
- (B) Soft brass
- (C) Round specimen of ductile metal
- (D) Flat tensile specimen of ductile metal

Answer: Option C

165. Breakeven point represents the condition, when the company runs under no profit no loss condition. In break even analysis, total cost comprises of fixed cost

- (A) Only
- (B) Plus variable cost
- (C) Plus overhead cost
- (D) Plus selling expenses

Answer: Option B

166. Minimum safe distance between two liquid fuel storage tanks is equal to (where, H = height of the tank)

- (A) H
- (B) $H/2$
- (C) $H/4$
- (D) $H/6$

Answer: Option D

167. Principal alloying elements of cast tool alloys which have very high wear resistance & high temperature strength are

- (A) Cobalt, chromium & tungsten
- (B) Cobalt, chromium & nickel

- (C) Molybdenum, tungsten & chromium
 - (D) Cobalt, zirconium & molybdenum
- Answer: Option A

168. Austempering process results in the formation of _____ structure.

- (A) Martensitic
- (B) Bainitic
- (C) Carburised
- (D) Stressed

Answer: Option B

169. Heating of ferromagnetic materials to a temperature above Curie temperature makes it

- (A) Insulator for heat & electricity transmission
- (B) Ferritic
- (C) Behave like paramagnetic materials
- (D) Superconductor

Answer: Option C

170. Good design of the casing of a centrifugal pump aims at minimising the

- (A) Cavitation
- (B) Frictional losses
- (C) Kinetic energy loss
- (D) Static head

Answer: Option C

171. Oxygen cylinders used for autogenous (cutting/welding) purposes are

- (A) Seamless & made of steel
- (B) Heat treated before use
- (C) Made by sand casting
- (D) Welded steel cylinders

Answer: Option A

172. The ratio of mass of a neutron to that of an electron is about 1839. What is the ratio of the mass of a proton to that of an electron?

- (A) 159
- (B) 1837
- (C) 2537
- (D) 10000

Answer: Option C

173. Alumina, silica, lime and iron oxide are the basic raw material for the manufacture of Portland cement. The component of Portland cement which first hardens is

- (A) $5\text{CaO} \cdot 3\text{Al}_2\text{O}_3$
- (B) $3\text{CaO} \cdot \text{Al}_2\text{O}_3$
- (C) $3\text{CaO} \cdot \text{SiO}_2$
- (D) $2\text{CaO} \cdot \text{SiO}_2$

Answer: Option A

174. Matte smelting is used in the extraction of

- (A) Lead
- (B) Zinc
- (C) Aluminium
- (D) Copper

Answer: Option D

175. Which of the, following is not associated with the functioning of a petrol engine?

- (A) Compression ignition system
- (B) Spark plug
- (C) Carburettor
- (D) Otto cycle

Answer: Option A

176. Carnot cycle is also termed as the constant _____ cycle in thermodynamics.

- (A) Entropy
- (B) Pressure

- (C) Volume
 - (D) Heat
- Answer: Option D

177. The pressure outside a bubble/droplet of liquid is _____ the internal pressure.

- (A) Greater than
- (B) Less than
- (C) Equal to
- (D) Unpredictable; depends on the bubble size

Answer: Option B

178. Large diameter reinforced cement concrete (RCC) pipes are generally joined by _____ joint.

- (A) Flanged iron
- (B) Collar
- (C) Flexible
- (D) Expansion

Answer: Option B

179. _____ joint is usually used for joining cast iron pipes mostly used for temporary pipelines, where it may be necessary to dismantle & reassemble the pipeline very frequently.

- (A) Collar
- (B) Flanged
- (C) Bell and Spigot
- (D) Expansion

Answer: Option B

180. A dummy activity is used in PERT network to describe the

- (A) Precedence relationship
- (B) Resource idleness
- (C) Resource restriction
- (D) Necessary time delay

Answer: Option A

181. Which of the following varies as the square root of oil pressure during atomisation of fuel oil through a pressure jet burner?

- (A) Output & fineness
- (B) Velocity
- (C) Both (A) & (B)
- (D) None of these

Answer: Option C

182. Unit of viscosity in CGS system is

- (A) $\text{gm} \cdot \text{cm}^{-1} \cdot \text{sec}^{-1}$
- (B) $\text{gm} \cdot \text{cm}^2 \cdot \text{sec}^{-2}$
- (C) $\text{gm} \cdot \text{cm}^{-2}, \text{sec}^{-1}$
- (D) $\text{gm} \cdot \text{cm} \cdot \text{sec}^{-1}$

Answer: Option A

183. The value of $y = c_p/c_v$, at $< 500^\circ\text{C}$ for air & most common gases can be safely assumed to be

- (A) 0.8
- (B) 1
- (C) 1.4
- (D) 1.8

Answer: Option C

184. The refractory lining of the bottom in a basic electric arc furnace is made of

- (A) Silica
- (B) Alumina
- (C) Magnesite
- (D) Fireclay

Answer: Option C

185. 'Cryogenics' is concerned with the generation & use of low temperature in the range of

- (A) 0°K to 123°K

(B) 0°C to - 123°C

(C) 0°C to - 273°C

(D) 0°K to 273°K

Answer: Option A

186. The specific gravity of coal depends mainly on its _____ content.

(A) Carbon

(B) Volatile matter

(C) Ash

(D) Moisture

Answer: Option D

187. The heat of neutralisation remains constant, when there is a reaction between dilute solutions of strong

(A) Base and strong acid

(B) Base and weak acid

(C) Acid and weak base

(D) None of these

Answer: Option A

188. In practice, the compression ratio of compression-ignition (CI) engine ranges from

(A) 15 to 25

(B) 5 to 10

(C) 40 to 55

(D) 60 to 70

Answer: Option A

189. Carbon is present in the form of _____ in grey cast iron.

(A) Spheroids

(B) Nodular aggregates of graphite

(C) Flakes

(D) Cementite

Answer: Option C

190. Brittleness induced due to the presence of sulphur in steel can be reduced by adding

(A) Manganese

(B) Magnesium

(C) Vanadium

(D) Copper

Answer: Option A

191. Spherical shape of mercury droplets is due to its

(A) High viscosity

(B) Low surface tension

(C) High density

(D) High surface tension

Answer: Option D

192. With increase in temperature, the surface tension of water

(A) Increases

(B) Decreases

(C) Remain constant

(D) Increases linearly

Answer: Option B

193. Increase in the entropy of a system represents the

(A) Degradation of energy

(B) Decrease in system pressure

(C) Increase in the availability of energy

(D) Increase in the temperature

Answer: Option A

194. Compressed dry air is used as the cutting fluid, while machining

(A) Steel

(B) Cast iron

- (C) Aluminium
 - (D) None of these
- Answer: Option B

195. Minimum number of members required to form a Public Limited Joint Stock Com-pany is

- (A) 7
- (B) 10
- (C) 12
- (D) 17

Answer: Option A

196. With increase in compression ratio, the volumetric efficiency of air compressor

- (A) Increases
- (B) Decreases
- (C) Remain same
- (D) May increase or decrease (depends on the suction pressure)

Answer: Option A

197. Damage to metal surface by mechanical action is called

- (A) Pitting
- (B) Corrosion
- (C) Erosion
- (D) None of these

Answer: Option C

198. Which of the following has the least value of ultimate tensile strength (UTS)?

- (A) Medium carbon steel
- (B) High carbon steel
- (C) Cast iron
- (D) Wrought iron

Answer: Option B

199. Stresses encountered in the metal forming processes are less than the _____ of the material.

- (A) Fracture strength
- (B) Yield strength
- (C) Elastic limit
- (D) Limit of proportionality

Answer: Option A

200. Current employed in resistance welding ranges from _____ kVA/cm².

- (A) 1.2 to 2.5
- (B) 4.5 to 6.2
- (C) 7.5 to 8.5
- (D) 10.5 to 15.5

Answer: Option B

201. _____ of air does not increase with increase in temperature.

- (A) Density
- (B) Thermal diffusivity
- (C) Viscosity
- (D) Thermal conductivity

Answer: Option A

202. Presence of nickel & chromium in steel does not raise its

- (A) Elastic limit
- (B) Machining properties
- (C) Ductility
- (D) Resilience

Answer: Option A

203. _____ property of steel increases by addition of large amount of silicon in it.

- (A) Mechanical
- (B) Machining
- (C) Magnetic

(D) Refractory
Answer: Option C

204. Materials having _____ lattice structure are usually the most ductile.

- (A) Body centred cubic (bcc)
 - (B) Hexagonal close packed (hcp)
 - (C) Face centred cubic (fcc)
 - (D) None of these
- Answer: Option C

205. Material of construction of foundry crucible is

- (A) Lead
 - (B) Stainless steel
 - (C) Graphite
 - (D) Cast iron
- Answer: Option C

206. When the wavelength of incident X-rays increases, the angle of diffraction

- (A) Decreases
 - (B) Increases
 - (C) Remain constant
 - (D) Shows no systematic variation
- Answer: Option A

207. _____ test determines the yield strength, Young's modulus of elasticity, percentage reduction in area & percentage elongation of a material.

- (A) Tensile
 - (B) Fatigue
 - (C) Impact
 - (D) None of these
- Answer: Option A

208. The minimum and the maximum number of members required to form a Private Limited Joint Stock Company are respectively

- (A) 7 and 30
 - (B) 10 and 50
 - (C) 2 and 50
 - (D) 13 and 55
- Answer: Option C

209. Liquid nitrogen containers can be made from

- (A) Ferritic stainless steel
 - (B) HSLA steel
 - (C) Titanium
 - (D) Austenitic stainless steel
- Answer: Option B

210. Bad odour in sanitary latrines is reduced by periodically sprinkling

- (A) Bleaching powder
 - (B) Lime powder
 - (C) Aluminium sulphate
 - (D) None of these
- Answer: Option B

211. To counteract the bad effects of strain hardening on a cold formed part, it must be

- (A) Tempered
 - (B) Normalised
 - (C) Annealed
 - (D) Hardened
- Answer: Option C

212. Which of the following metals reacts violently with water?

- (A) Mercury
- (B) Sodium
- (C) Calcium

(D) Magnesium
Answer: Option B

213. The thermodynamic law, $PV^n = \text{constant}$, is not followed by the

- (A) Free expansion of an ideal gas
- (B) Adiabatic expansion of steam in turbine
- (C) Adiabatic compression of air
- (D) Ideal compression of air

Answer: Option A

214. Steel is welded using the _____ flame.

- (A) Carburising
- (B) Neutral
- (C) Oxidising
- (D) All (A), (B) & (C)

Answer: Option B

215. The majority charge carriers in p-type silicon are

- (A) Free electrons
- (B) Ions
- (C) Conduction electrons
- (D) Holes

Answer: Option D

216. _____ is a special constituent of chlorophyll without which photosynthesis is not possible.

- (A) Calcium
- (B) Nitrogen
- (C) Phosphorous
- (D) Hydrogen

Answer: Option B

217. Quartz is a _____ material.

- (A) Diamagnetic
- (B) Ferromagnetic
- (C) Ferroelectric
- (D) Piezoelectric

Answer: Option D

218. The highest stress that a material can withstand for a specified length of time without excessive deformation is called the _____ strength.

- (A) Creep
- (B) Endurance
- (C) Fatigue
- (D) None of these

Answer: Option A

219. Force between the molecules of the same substance is called _____ force.

- (A) Adhesive
- (B) Cohesive
- (C) Molecular
- (D) Vander Walls

Answer: Option B

220. Coating thickness in case of galvanising of steel sheet generally corresponds to the deposition of _____ gms of zinc per m^2 of steel strip.

- (A) 5-10
- (B) 1000-1500
- (C) 120-500
- (D) 1500-3000

Answer: Option C

221. Which of the following is the most suitable abrasive for grinding high tensile strength materials?

- (A) Silicon carbide

- (B) Corundum
 - (C) Aluminium oxide
 - (D) Boron carbide
- Answer: Option C

222. Two wires of the same radius & material having length in the ratio of 1 : 2 are stretched by the same force. The strain produced in the two wires will be in the ratio of

- (A) 1 : 1
- (B) 1 : 2
- (C) 2 : 1
- (D) 1 : 4

Answer: Option A

223. The noble metals

- (A) Are exemplified by Na, K and Li
- (B) Do not resist corrosion very strongly
- (C) Are the lowermost in the electro-chemical series of metals
- (D) None of these

Answer: Option C

224. Lead is poured into the joint between two _____ pipes.

- (A) Mild steel
- (B) Concrete
- (C) Cast iron
- (D) Asbestos cement

Answer: Option C

225. Unit of surface tension in S.I. unit is

- (A) Watt/m
- (B) Joule/m²
- (C) Newton/m²
- (D) Joule/m

Answer: Option B

226. _____ circuit is most commonly used to measure strain with the help of a strain gauge.

- (A) Ballast
- (B) Voltage balancing potentiometric
- (C) Simple current sensitive
- (D) None of these

Answer: Option B

227. Co-efficient of performance of a Carnot cycle refrigerator operating between - 23°C and + 27°C is

- (A) 3
- (B) 5
- (C) 0.5
- (D) 1.5

Answer: Option B

228. Basic open hearth furnace (BOF) is not used for producing _____ steel.

- (A) Killed
- (B) Rimming
- (C) High alloy
- (D) None of these

Answer: Option C

229. The ratio of the shear stress to the principal stress on a principal plane is

- (A) 0
- (B) 1
- (C) 1/2
- (D) 1/3

Answer: Option A

230. Laser is a device to produce

- (A) Gamma rays
- (B) Microwaves
- (C) A beam of white light
- (D) A beam of coherent light

Answer: Option D

231. Which of the following is a commonly used manometric liquid for low pressure range?

- (A) Ethyl alcohol
- (B) Carbon tetrachloride
- (C) Glycerol
- (D) Ethylene glycol

Answer: Option B

232. Which of the following is the most wear resistant grade of carbide used for the cutting tools?

- (A) Aluminium carbide
- (B) Tungsten carbide
- (C) Nickel carbide
- (D) Iron carbide

Answer: Option B

233. _____ has a negative co-efficient of linear expansion.

- (A) Iron
- (B) Copper
- (C) Rubber
- (D) Nickel

Answer: Option B

234. Thermal efficiency of an internal combustion engine is around _____ percent.

- (A) 8
- (B) 35
- (C) 65
- (D) 80

Answer: Option B

235. Maximum permissible sulphur content in steel is _____ percent.

- (A) 0.015
- (B) 0.055
- (C) 0.505
- (D) 0.805

Answer: Option A

236. Hydrogen in liquid steels is dissolved

- (A) As tiny gas bubbles
- (B) In the atomic form
- (C) In the ionic form
- (D) In the molecular form

Answer: Option A

237. A spring material should have low

- (A) Elastic limit
- (B) Deflection value
- (C) Fatigue resistance
- (D) None of these

Answer: Option D

238. Nickel and _____ are the alloying element added in steel to increase its toughness.

- (A) Molybdenum
- (B) Chromium
- (C) Vanadium
- (D) Silicon

Answer: Option D

239. A common disinfectant used in village wells for disinfection of water is

- (A) Free chlorine

- (B) Bromine
 - (C) Iodine
 - (D) Potassium permanganate
- Answer: Option D

240. The lightest non-inflammable gas is

- (A) H₂
- (B) He
- (C) Ar
- (D) O₂

Answer: Option B

241. Which of the following is not an ore of copper?

- (A) Cryolite
- (B) Azurite
- (C) Chalcopyrite
- (D) Malachite

Answer: Option A

242. The surface tension of a liquid, at critical temperature is

- (A) Indeterminate
- (B) Zero
- (C) Infinity
- (D) Same as that at any other temperature

Answer: Option B

243. Dislocations are _____ defects.

- (A) Point
- (B) Line
- (C) Volume
- (D) None of these

Answer: Option B

244. 'Amortization' in respect of financial obligation of a company means the

- (A) Liquidation of financial obligations on instalment basis
- (B) Commitment of financial obligation on priority
- (C) Liquidation of all the obsolete equipments of the company
- (D) Modernisation of the plant equipments

Answer: Option A

245. M₁₀ index of coke indicates its

- (A) Compressive strength
- (B) Hardness
- (C) Abrasion resistance
- (D) Impact strength

Answer: Option C

246. The function of neutral flux used in the pyrometallurgy of metal extraction is to increase the _____ of the slag.

- (A) Fluidity
- (B) Basicity
- (C) Acidity
- (D) Viscosity

Answer: Option A

247. Addition of _____ to steel does not impart hardness.

- (A) Nickel
- (B) Copper
- (C) Chromium
- (D) Silicon

Answer: Option B

248. The same volume of all gases is representative of their

- (A) Specific gravities
- (B) Densities

- (C) Gas characteristic constants
 - (D) Molecular weights
- Answer: Option D

249. Which of the following is an acidic constituent of B.F. slag?

- (A) SiO₂
- (B) FeO
- (C) MgO
- (D) CaO

Answer: Option A

250. For infinite parallel planes having emissivities ϵ_1 & ϵ_2 , the interchange factor for radiation from surface 1 to surface 2 is given by

- (A) $(\epsilon_1 + \epsilon_2)/\epsilon_1 \cdot \epsilon_2$
- (B) $\epsilon_1 \cdot \epsilon_2 / (\epsilon_1 + \epsilon_2 - \epsilon_1 \cdot \epsilon_2)$
- (C) $\epsilon_1 \cdot \epsilon_2$
- (D) $\epsilon_1 + \epsilon_2$

Answer: Option B

251. Larger length & diameter water pipes are made by

- (A) Electrical resistance welding
- (B) Die casting
- (C) Semi-centrifugal casting
- (D) Continuous casting

Answer: Option C

252. Wave length of X-rays is about 1 angstrom; however it cannot pass through a sheet of

- (A) Paper
- (B) Cloth
- (C) Lead
- (D) Aluminium

Answer: Option C

253. Eutectoid composition of carbon steel at room temperature is

- (A) Cementite
- (B) Pearlite
- (C) Martensite
- (D) Ferrite

Answer: Option B

254. Which of the following is an unconventional source of energy?

- (A) Thermal power
- (B) Hydroelectric power
- (C) Nuclear-fusion power
- (D) Solar power

Answer: Option D

255. The refrigerant freon-12 is chemically

- (A) CCl₂F₂
- (B) CCl₃F
- (C) CClF₃
- (D) CCl₄F

Answer: Option A

256. Temperature of hot gases flowing in a pipe is measured by a thermocouple inserted in the thermal well. The thermal well made of _____ will facilitate the most accurate measurement of the temperature.

- (A) Copper
- (B) Steel
- (C) Aluminium
- (D) Brass

Answer: Option A

257. Water-tube boiler is the one, in which

- (A) Water passes through tubes and flue gases around it

- (B) Tube carrying hot flue gases are immersed in a pool of water
 - (C) Tubes are placed in vertical position
 - (D) None of these
- Answer: Option A

258. Silicon in steel

- (A) Makes it usable in almost all magnetic circuits where alternating current is used
 - (B) Increases its electrical resistivity and decreases the hysteresis loss
 - (C) Is present upto 5% & 4% respectively when used in transformers & motor armatures
 - (D) All 'a', 'b' & 'c'
- Answer: Option D

259. Ferromagnetic materials owe their properties to _____ inner sub-shells.

- (A) Completely filled
 - (B) Partially filled
 - (C) Equally filled
 - (D) Vacant
- Answer: Option B

260. Superheating of steam is done at constant

- (A) Enthalpy
 - (B) Entropy
 - (C) Pressure
 - (D) Volume
- Answer: Option C

261. The yield point phenomenon observed in annealed low carbon steel is due to the presence of the following element.

- (A) Silicon
 - (B) Carbon
 - (C) Phosphorous
 - (D) Chromium
- Answer: Option B

262. Corrosion is

- (A) A physical phenomenon
 - (B) A chemical phenomenon
 - (C) Same as erosion
 - (D) An uncontrollable phenomenon
- Answer: Option B

263. Pick out the wrong statement.

- (A) Copper is the metal having the highest electronic conductivity
 - (B) Hardenability & Weldability of metals are inversely related
 - (C) Covalent bonding formed by sharing of electrons is present in all semi-conductor materials
 - (D) Glass transition temperature applies to 'polymers' but not to 'glasses'
- Answer: Option A

264. Which of the following phenomenon will exhibit the minimum heat transfer?

- (A) Boiling
 - (B) Forced convection in air
 - (C) Free convection in air
 - (D) Conduction in air
- Answer: Option D

265. Out of the following, which will fracture most readily, when hit with a hard hammer?

- (A) Brass
 - (B) Bronze
 - (C) German silver
 - (D) Cast iron
- Answer: Option D

266. Which of the following metals cannot be hot worked at room temperature?

- (A) Zinc
- (B) Nickel

- (C) Lead
 - (D) Tin
- Answer: Option B

267. _____ stress cannot be sustained by a fluid in equilibrium.

- (A) Shear
 - (B) Tensile
 - (C) Compressive
 - (D) None of these
- Answer: Option A

268. Which of the following equipments is used for liquid dispersion?

- (A) Packed column
 - (B) Venturi scrubber
 - (C) Bubble cap plate column
 - (D) Wetted wall column
- Answer: Option B

269. Oxyacetylene reducing flame is used while carrying out welding on

- (A) Alloy steel
 - (B) Grey cast iron
 - (C) Mild steel
 - (D) High carbon steel
- Answer: Option C

270. Limestone is added in the blast furnace (during pig iron manufacture) to

- (A) Form slag by combining with impurities
 - (B) Supply heat by undergoing exothermic reaction with impurities
 - (C) Reduce the coke consumption
 - (D) Reduce slag viscosity
- Answer: Option A

271. For a spontaneous natural process at constant temperature and pressure, the free energy of the system always

- (A) Increases
 - (B) Decreases
 - (C) Remain constant
 - (D) Increases to a maximum before decreasing
- Answer: Option A

272. The boiling & freezing points on a newly defined temperature scale in degree 'D' are 400°D & 100°D respectively. The temperature reading corresponding to 60°C on this new temperature scale will be equal to _____ °D.

- (A) 140
 - (B) 180
 - (C) 240
 - (D) 280
- Answer: Option D

273. To improve the machinability of steel, it is generally subjected to

- (A) Spheroidising
 - (B) Tempering
 - (C) Normalising
 - (D) Annealing
- Answer: Option A

274. Difference at any instant between the value of the controlled variable and the set point is called the

- (A) Deviation
 - (B) Derivative time
 - (C) Error ratio
 - (D) Differential gap
- Answer: Option A

275. Dephosphorization of molten pig iron is favoured by

- (A) Oxidising and basic slag
 - (B) Reducing and basic slag
 - (C) High activity co-efficient of phosphorous in metal
 - (D) Oxidising and neutral slag
- Answer: Option B

276. Cementite is in the lamellar form in the _____ phase of steel.

- (A) Martenistic
- (B) Bainitic
- (C) Pearlitic
- (D) Ferritic

Answer: Option C

277. Inertial forces are obtained, when the elastic forces are multiplied by _____ number.

- (A) Mach
- (B) Froude
- (C) Reynolds
- (D) Euler

Answer: Option A

278. Brazing is the joining of metals

- (A) Without melting the base metal
- (B) With a non-ferrous filler
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option C

279. Metal shots used in shot blasting are made of

- (A) Stellite
- (B) Steel
- (C) Bronze
- (D) Lead

Answer: Option B

280. Midrex process of sponge iron production uses reformed natural gas as the reducing agent, which uses iron ore in the form of

- (A) Lumps
- (B) Pellets
- (C) Briquettes
- (D) Sinter

Answer: Option B

281. Circular cross section machine parts which are symmetrical about the axis of rotation are made by hot

- (A) Piercing
- (B) Spinning
- (C) Drawing
- (D) Extrusion

Answer: Option B

282. Specific gravity of a metal, which weighs 5 kg in air and 4 kg when submerged in water, will be

- (A) 5
- (B) 1.25
- (C) 2.5
- (D) 3.75

Answer: Option A

283. A pycnometer is used for the measurement of

- (A) Flow rate of molten metal
- (B) Specific gravity of a liquid
- (C) Composition of alloys
- (D) Concentration of a solution

Answer: Option B

284. Which of the following low melting alloy containing bismuth and lead is used for electric fuse?

- (A) Wood's metal
 - (B) Babbitt metal
 - (C) Monel metal
 - (D) Duralumin
- Answer: Option A

285. Wavelength of radiation emitted by a body depends on the _____ of its surface.

- (A) Temperature
 - (B) Area
 - (C) Nature
 - (D) All 'a', 'b' & 'c'
- Answer: Option A

286. Carbide tipped cutting tools are manufactured by powder metallurgy techniques and have a composition of

- (A) 90% tungsten carbide and 10% cobalt
 - (B) 70% aluminium oxide & 30% silica
 - (C) 30% nickel, 15% chromium & 55% tungsten
 - (D) 65% tungsten & 35% zirconium
- Answer: Option A

287. Which of the following metals is the most prone to work hardening?

- (A) Brass
 - (B) Aluminium
 - (C) Copper
 - (D) Lead
- Answer: Option A

288. The mechanism which changes the value of manipulated variable in response to the output signal from the control unit is called the

- (A) Final control element
 - (B) On-off control
 - (C) Floating control action
 - (D) None of these
- Answer: Option A

289. A cylindrical rod subjected to a tensile strain within the elastic limit undergoes a volume change. If the volume strain is equal to half the tensile strain, then the Poisson's ratio of the rod is

- (A) 0
 - (B) 0.33
 - (C) 0.44
 - (D) 0.25
- Answer: Option C

290. The substance used as a smoke screen in warfare is

- (A) C_2H_2
 - (B) $SiCl_4$
 - (C) P_2O_5
 - (D) PCl_5
- Answer: Option B

291. Working of linear variable differential transducer (LVDT) is based on the principle of variable

- (A) Capacitance
 - (B) Resistance
 - (C) Mutual inductance
 - (D) None of these
- Answer: Option C

292. Increasing sulphur content in pig iron tends to make it

- (A) Soft
- (B) Hard

- (C) Tough
 - (D) Ductile & malleable
- Answer: Option B

293. The dimensional formula of bulk modulus of elasticity is same as that of the

- (A) Pressure
 - (B) Density
 - (C) Force
 - (D) None of these
- Answer: Option A

294. Fahrenheit and Centigrade scales have the same readings at

- (A) -55°
 - (B) -40°
 - (C) -33°
 - (D) -58°
- Answer: Option B

295. A highly elastic material is deformed least on loading and retains its original form on removal of the load. Which of the following is the most elastic material?

- (A) Steel
 - (B) Glass
 - (C) Rubber
 - (D) Brass
- Answer: Option A

296. For separating small pieces of metal from engine oil of a car, the best separating technique is the

- (A) Chromatography
 - (B) Evaporation
 - (C) Filtration
 - (D) Fractional distillation
- Answer: Option C

297. The expected efficiency of a single riveted lap joint is of the order of 50%. If the thickness of the plate is increased four times, then the rivet diameter will have to be increased _____ times.

- (A) Two
 - (B) Four
 - (C) Six
 - (D) Eight
- Answer: Option A

298. In the formation of cermets, the ratio of ceramic material to metallic material is usually 80:20. Which of the following is a cermet?

- (A) Zirconia
 - (B) Alumina
 - (C) Bakelite
 - (D) Tungsten carbide
- Answer: Option D

299. Machinability of hard alloys and tool steels is improved by

- (A) Spheroidising
 - (B) Annealing
 - (C) Tempering
 - (D) Normalising
- Answer: Option B

300. In TIG welding, thoriated tungsten electrodes are used, because it

- (A) Has higher current carrying capacity
 - (B) Has better electron emissivity
 - (C) Is stronger than ordinary tungsten
 - (D) Is easy to prepare
- Answer: Option B

301. Runge-Kutta method is used to solve a/an

- (A) Ordinary differential equation of nth order
- (B) Simultaneous non-linear equation
- (C) Linear differential equation
- (D) None of these

Answer: Option B

302. Which of the following fastening devices has a head at one end and a nut fitted to the other?

- (A) Bolt
- (B) Stud
- (C) Top bolt
- (D) None of these

Answer: Option B

303. Factor of safety in machine design is defined as the ratio of ultimate stress to _____ stress.

- (A) Working
- (B) Bearing
- (C) Yield
- (D) None of these

Answer: Option A

304. _____ is the trade name assigned to a non-ferrous cast alloy composed of cobalt, chromium & tungsten.

- (A) Stellite
- (B) High speed steel
- (C) Cermet
- (D) Alnico

Answer: Option A

305. Chromium molybdenum steel cannot be welded using _____ welding.

- (A) Thermit
- (B) Electrical resistance
- (C) Oxy-acetylene
- (D) Any of these

Answer: Option B

306. The minimum carbon content in steel should be _____ percent for it to respond to a hardening treatment.

- (A) 0.2
- (B) 0.4
- (C) 0.6
- (D) 0.8

Answer: Option A

307. Nitriding of a steel part does not increase its

- (A) Grain size
- (B) Fatigue limit
- (C) Surface hardness
- (D) Wear resistance

Answer: Option A

308. Which one of the following is incombustible?

- (A) H₂
- (B) CCl₄
- (C) C₂H₂
- (D) S

Answer: Option B

309. Heat transfer to the water wall in a high pressure water wall type boiler furnace is mainly by

- (A) Conduction
- (B) Convection
- (C) Radiation

(D) Both 'a' & 'b'
Answer: Option C

310. As the fluid flow rate increases, the float of the Rotameter

- (A) Rises in the tube
 - (B) Rotates at higher speed
 - (C) Rotates at lower speed
 - (D) Drops down in the tube
- Answer: Option A

311. Evaporative cooling process employs a combination of cooling and humidification in which the

- (A) Sensible heat is added
 - (B) Sensible heat is removed and the latent heat is added
 - (C) Latent heat is removed
 - (D) Sensible heat is added and latent heat is removed
- Answer: Option B

312. High speed steel tools retain their hardness upto a temperature of _____ °C.

- (A) 500
 - (B) 750
 - (C) 900
 - (D) 1100
- Answer: Option C

313. Heating the Hypo-eutectoid steels to 30°C above the upper critical temperature line, soaking at that temperature and then cooling slowly to the room temperature to form a pearlite & ferrite structure is called

- (A) Tempering
 - (B) Hardening
 - (C) Annealing
 - (D) Normalising
- Answer: Option C

314. Pick out the wrong statement.

- (A) A ferromagnetic material becomes paramagnetic above the 'Curie temperature'
 - (B) Permanent magnets are made of hard materials, whereas electromagnets require soft magnetic materials
 - (C) Soft magnetic materials (e.g., pure iron) have higher permeability and low hysteresis loss and coercive forces
 - (D) Tungsten steel and alnico are not hard magnetic materials
- Answer: Option D

315. The elastic strain in copper is due to the

- (A) Motion of dislocations
 - (B) Stretching of atomic bonds
 - (C) Breakage of atomic bonds
 - (D) None of the above
- Answer: Option A

316. The difference in one unit of Rockwell hardness number corresponds to a difference in the depth of indentation of _____ mm.

- (A) 0.001
 - (B) 0.01
 - (C) 0.002
 - (D) 0.02
- Answer: Option C

317. Transformation range for ferrous material is the temperature interval during which _____ is formed during its heating.

- (A) Cementite
 - (B) Austenite
 - (C) Martensite
 - (D) Pearlite
- Answer: Option B

318. Pick out the wrong statement.

- (A) Both annealing and normalising release the internal stresses of the material besides improving the mechanical properties
- (B) Low carbon steel does not respond to the heat treatment for hardening of the material, hence it is subjected to case hardening or surface hardening processes like cyaniding, carburising, nitriding etc., which produces high carbon outer layers resulting in increase of surface hardness
- (C) Induction hardening and flame hardening techniques are also used for surface hardening
- (D) Martempering of a material is a hardening process

Answer: Option C

319. Which of the following is not a charge material for cupola?

- (A) Limestone
- (B) Iron scrap
- (C) Iron ore
- (D) Pig iron

Answer: Option C

320. Electrical conductivities of semi-conductors are of the order of _____ ohm/cm.

- (A) 10^{-3}
- (B) 10^3
- (C) 10^{-15}
- (D) 10^{15}

Answer: Option A

321. With increase in steam pressure, its specific volume decreases

- (A) Rapidly first and then slowly
- (B) Linearly
- (C) Slowly first and then rapidly
- (D) Exponentially

Answer: Option A

322. Maximum hardenability of steel depends upon its

- (A) Chemical composition
- (B) Carbon content
- (C) Grain size
- (D) Alloying elements content

Answer: Option D

323. Sudden fall of atmospheric pressure by a large amount is an indication of the

- (A) Rain
- (B) Cold wave
- (C) Storm
- (D) Fair weather

Answer: Option C

324. Angular displacement can be measured suitably by a

- (A) Shaft encoder
- (B) Linear variable differential transducer (LVDT)
- (C) Stroboscope
- (D) Tachometer

Answer: Option A

325. _____ of grey cast iron produces white cast iron.

- (A) Tempering
- (B) Rapid heating
- (C) Rapid cooling
- (D) Slow cooling

Answer: Option B

326. Nusselt number is related to Grashoff number (Gr) in turbulent & laminar flow respectively, in respect of free convection over a vertical flat plate as

- (A) $Gr^{0.25}$, Gr
- (B) $Gr^{0.25}$, $Gr^{0.33}$

- (C) Gr , $Gr^{0.25}$
(D) $Gr^{0.33}$, $Gr^{0.25}$

Answer: Option A

327. Stainless steel is welded with difficulty because of

- (A) Its high melting temperature
(B) Chances of cracking
(C) Oxide film formation
(D) Chromium carbide formation

Answer: Option C

328. Titanium is added to molten aluminium alloys before casting for the purpose of

- (A) Grain refinement
(B) Increasing corrosion resistance
(C) Reducing porosity
(D) Improving fluidity

Answer: Option D

329. The softness or hardness of a grinding wheel depends upon the type & amount of bonding material used. For general purpose cutter grinding _____ grinding wheel is normally used.

- (A) Hard
(B) Soft
(C) Silicon carbide
(D) Aluminium oxide

Answer: Option D

330. Theoretical volume of oxygen required for complete combustion of 1Nm^3 of acetylene, in oxy-acetylene welding is _____ Nm^3 .

- (A) 0.5
(B) 1
(C) $1/3$
(D) 2.5

Answer: Option D

331. What is the value of entropy at 273°K ?

- (A) 0
(B) 1
(C) ∞
(D) None of these

Answer: Option A

332. A high pressure boiler generates steam at a pressure greater than _____ kg/cm^2 .

- (A) 10
(B) 30
(C) 50
(D) 80

Answer: Option D

333. Vernier calipers cannot be used to measure the

- (A) I.D. & O.D. of the shaft
(B) Thickness of parts
(C) Depth of holes
(D) Clearance between two mating surfaces

Answer: Option D

334. The best lubricants for a machine working at high temperature & load is

- (A) Grease
(B) Solid lubricant
(C) Animal oils
(D) Mineral oils

Answer: Option B

335. Powder metallurgy process does not make metal powder by

- (A) Atomisation

- (B) Grinding/milling
 - (C) Hammering
 - (D) Electrolytic deposition
- Answer: Option C

336. Ammonia leakage in the refrigeration system is detected by

- (A) Sulphur stick, which on detection gives white smoke
- (B) Using chemical reagents
- (C) Its smell
- (D) Soap solution

Answer: Option A

337. Wrought iron is not

- (A) Ductile & resistant to corrosion/rusting
- (B) Weldable easily
- (C) Having uniform strength in all directions
- (D) Having maximum tensile strength along the lines of slag distribution

Answer: Option C

338. Which of the following parameters is not responsible for the heat loss from a hot steam carrying bare pipe surface located in a room without fans?

- (A) Emissivity of pipe surface
- (B) Diameter & length of the pipe
- (C) Temperature of hot pipe surface & that of air in the room
- (D) None of these

Answer: Option D

339. Cast iron contains _____ percent carbon.

- (A) 2.5
- (B) 3.75
- (C) 4.75
- (D) 5.25

Answer: Option A

340. Blast furnace slag is mainly molten

- (A) Sand
- (B) Magnesium silicate
- (C) Calcium silicate
- (D) Iron pyrite

Answer: Option C

341. Transition from laminar to turbulent zone in free convection heat transfer is governed by the critical value of

- (A) Grashoff number
- (B) Grashoff number & Reynolds number
- (C) Reynolds number
- (D) Grashoff number & Prandtl number

Answer: Option D

342. Minimum temperature upto which water can be theoretically cooled down in the cooling tower by evaporative cooling is equal to the _____ temperature of air.

- (A) Wet bulb
- (B) Dry bulb
- (C) Saturation
- (D) Dew point

Answer: Option A

343. Square steel key is normally strong in failure by shear & crushing. Keys are normally made of _____ steel bars.

- (A) Hot rolled mild
- (B) Cold rolled mild
- (C) Forged
- (D) Machinable stainless

Answer: Option B

344. Speisses is a mixture of the following:

- (A) Arsenides of heavy metals
- (B) Antimonides of heavy metals
- (C) Arsenides & antimonides of heavy metals
- (D) Iron, cobalt and nickel

Answer: Option A

345. Wrought iron does not have

- (A) Uniform strength in all directions
- (B) Ability to hold protective coating
- (C) High ductility & corrosion resistance
- (D) Easily weldable characteristics

Answer: Option A

346. The difference between gross & net calorific values of fuel is due to the

- (A) Sensible heat carried away by the flue gases
- (B) Heat carried away by the steam from the moisture content of the fuel
- (C) Heat lost by radiation
- (D) Heat carried away by steam from the combustion of hydrogen in the fuel

Answer: Option D

347. A solar cell converts the sunlight directly into _____ energy.

- (A) Thermal
- (B) Electrical
- (C) Mechanical
- (D) Chemical

Answer: Option B

348. The starting of a car takes time in winter, because the

- (A) Octane number of fuel is decreased
- (B) Fuel supply for ignition is not sufficient
- (C) Vaporisation of the fuel is decreased
- (D) Pour point of fuel decreases

Answer: Option C

349. The friction factor for the turbulent fluid flow in a rough pipe does not depend upon the

- (A) Pipe roughness & pipe diameter
- (B) Fluid velocity
- (C) Type of flowing fluid
- (D) Both 'b' & 'c'

Answer: Option D

350. An alloy of Fe - 0.4 % C is

- (A) Cast iron
- (B) Hypo-eutectoid steel
- (C) Hyper-eutectoid steel
- (D) Eutectoid steel

Answer: Option B

351. Which of the following does not discharge the dust collected as a dry solid?

- (A) Electrostatic precipitator
- (B) Wet scrubber
- (C) Bag filter
- (D) Gravity settling chamber

Answer: Option B

352. Pressure required to increase the density of water by about 1% is _____ atmosphere.

- (A) 10
- (B) 50
- (C) 200
- (D) 1000

Answer: Option C

353. If the demand for an item is trebled and the order cost is reduced to one third, then the economic order quantity

- (A) Is trebled
- (B) Remains unchanged
- (C) Decreases by a factor of 3
- (D) Decreases by a factor of 1/3

Answer: Option B

354. Hydro-cyclone is a

- (A) Crusher
- (B) wet classifier
- (C) Dry classifier
- (D) Magnetic separator

Answer: Option B

355. A dense structure of grinding wheel is not used for the

- (A) Ductile material
- (B) Hard materials
- (C) Brittle materials
- (D) Finishing cuts

Answer: Option A

356. Tin based white metals are used, where bearings are subjected to

- (A) High pressure & load
- (B) Low pressure & load
- (C) High temperature
- (D) Large surface wear

Answer: Option A

357. Direct conversion of thermal energy to electrical energy is facilitated by the

- (A) Fuel cells
- (B) Photo voltaic cell
- (C) Magneto hydrodynamic generator
- (D) None of these

Answer: Option C

358. The cooling rate required to freeze 1 ton of water at 0°C into ice at 0°C in 24 hours is _____ BTU/hr.

- (A) 100
- (B) 200
- (C) 1000
- (D) 2000

Answer: Option B

359. Annealing of white cast iron produces _____ iron.

- (A) Grey
- (B) Nodular
- (C) Malleable
- (D) Spheroidal

Answer: Option C

360. For preparation of porous bearings by powder metallurgy, preferred particle shape is

- (A) Spherical
- (B) Nodular
- (C) Irregular
- (D) No preferred shape

Answer: Option A

361. Cemented carbide tools are not suitable for cutting

- (A) Aluminium
- (B) Brass
- (C) Cast iron
- (D) Steel

Answer: Option A

362. _____ is the hardest oxide and is hence used where high wear resistance at high temperature is required.

- (A) Beryllium
 - (B) Zirconia
 - (C) Alumina
 - (D) Magnesia
- Answer: Option C

363. Milk is fat dispersed in water. It is an example of

- (A) Suspension
- (B) Emulsion
- (C) Gel
- (D) Solution

Answer: Option B

364. Case hardening of a material is

- (A) Followed by tempering or carburising
- (B) Preceded by its tempering
- (C) Done to get a soft ductile interior with a very hard surface
- (D) Carried out to get extreme hardness in its core

Answer: Option D

365. Cobalt - 60 is used as a source of _____ in medical therapy & industrial radiography.

- (A) X-rays
- (B) γ -rays
- (C) α -rays
- (D) β -rays

Answer: Option B

366. According to thermodynamic Fahrenheit scale, the fundamental interval between ice point to steam point is

- (A) 180°
- (B) 212°
- (C) 32°
- (D) 273°

Answer: Option A

367. _____ is used for tying the steel columns to concrete foundation.

- (A) Grouting
- (B) Eyebolt
- (C) Anchor bolts
- (D) Refractory castables

Answer: Option C

368. Energy of the sun arises mainly from _____ reactions.

- (A) Fusion
- (B) Fission
- (C) Combustion
- (D) None of these

Answer: Option A

369. Alloys having more than 80% copper are generally more

- (A) Abrasion resistant
- (B) Corrosion resistant
- (C) Prone to season cracking
- (D) Machinable

Answer: Option B

370. The phenomenon occurring during explosion of a hydrogen bomb is

- (A) Nuclear fission
- (B) Nuclear fusion
- (C) A combination of both nuclear fission & fusion
- (D) None of these

Answer: Option C

371. Friction factor for fluid flow in pipe does not depend upon the

- (A) Pipe length

- (B) Pipe roughness
 - (C) Fluid density & viscosity
 - (D) Mass flow rate of fluid
- Answer: Option A

372. Which of the following has the highest value of refractive index?

- (A) Brine (sea water)
- (B) Diamond
- (C) Distilled water
- (D) Glass

Answer: Option B

373. Which of the following is preferred for riveting?

- (A) Lap joint
- (B) Butt joint
- (C) Either (A) or (B)
- (D) Neither (A) nor (B)

Answer: Option B

374. Resistance of an electrical conductor is proportional to its (where, l = length and A = cross-sectional area of the conductor)

- (A) A
- (B) l
- (C) A^2
- (D) Both 'a' & 'b'

Answer: Option D

375. In case of simple harmonic motion, displacement is proportional to the

- (A) Velocity
- (B) Acceleration
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option B

376. Thermit welding uses the following energy source.

- (A) Electrical energy
- (B) Chemical energy
- (C) Energy of high velocity electrons
- (D) Heat generated by friction

Answer: Option B

377. A material in which the atoms are arranged regularly in some directions but not in others, is termed as 'mesomorphous material'; an example of which is

- (A) Lead
- (B) Glass
- (C) Mica
- (D) Silver

Answer: Option A

378. Out of the following, the _____ pipe has the least corrosion resistance.

- (A) Mild steel
- (B) Copper
- (C) Cast iron
- (D) Wrought iron

Answer: Option D

379. The best guide to judge the general quality of water is the measurement of its

- (A) pH value
- (B) Electrical conductivity
- (C) Turbidity
- (D) Dissolved oxygen content

Answer: Option B

380. The most economical channel section for the fluid flow is the one for which the discharge is maximum for a given cross-sectional area. Vertical velocity distribution in an open channel for laminar flow can be assumed to be

- (A) Parabolic
 - (B) Hyperbolic
 - (C) Straight line
 - (D) None of these
- Answer: Option A

381. The maximum thickness of the metal which can be welded using ultrasonic welding is _____ mm.

- (A) 0.5
 - (B) 3
 - (C) 10
 - (D) 25
- Answer: Option B

382. Lead is poured into the joints between two _____ pipes.

- (A) Cast iron
 - (B) Steel
 - (C) Concrete
 - (D) Plastic
- Answer: Option A

383. All of the following alloying elements of steel increases hardness but sacrifice ductility, except

- (A) Nickel
 - (B) Vanadium
 - (C) Molybdenum
 - (D) Chromium
- Answer: Option A

384. Reduction in the grain size reduces the _____ of the material.

- (A) Fatigue resistance
 - (B) Tensile strength
 - (C) Creep resistance
 - (D) All (A), (B) & (C)
- Answer: Option D

385. Stainless steel is welded using

- (A) Oxy-acetylene flame
 - (B) Oxy-hydrogen flame
 - (C) Arc welding
 - (D) Inert gas arc welding
- Answer: Option D

386. Wrought iron is never shaped by

- (A) Casting
 - (B) Cold working
 - (C) Forging
 - (D) Welding
- Answer: Option A

387. Fibre glass is a composite material of

- (A) Glass fibre in a polymer matrix
 - (B) Glass fibre in a metallic matrix
 - (C) Polymer fibre in a glassy matrix
 - (D) Both 'b' & 'c'
- Answer: Option A

388. Mild steel has _____ crystal lattice structure.

- (A) Face centred cubic (fcc)
- (B) Body centred cubic (bcc)
- (C) Orthorhombic
- (D) Cubic

Answer: Option B

389. Nuclear fission of one atom of uranium-235 produces the energy equivalent to about _____ MeV.

- (A) 20
- (B) 200
- (C) 500
- (D) 2000

Answer: Option B

390. Diffusion co-efficient of a metal in a solid solution depends upon its

- (A) Composition
- (B) Temperature
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option C

391. One face of a furnace wall is at 1030°C and the other face is exposed to room temperature (30°C). If the thermal conductivity of furnace wall is 3 W. m⁻¹. k⁻¹ and the wall thickness is 0.3 m, the maximum heat loss (in W/m) is

- (A) 100
- (B) 900
- (C) 9000
- (D) 10000

Answer: Option D

392. The following type of bonding is strongly directional in solids.

- (A) Vander Waal's
- (B) Ionic
- (C) Metallic
- (D) Covalent

Answer: Option D

393. On being hit with a hammer, _____ will readily fracture.

- (A) Brass
- (B) Mild steel
- (C) Cast iron
- (D) Lead

Answer: Option C

394. Which of the following is not a principal alloying element for the structural steel?

- (A) Molybdenum
- (B) Nickel
- (C) Manganese
- (D) Chromium

Answer: Option A

395. The usual energy consumption in electric arc furnace steel making is _____ KWh/ton of steel.

- (A) 60 - 100
- (B) 400 - 700
- (C) 1200 -1500
- (D) 2000 - 2300

Answer: Option B

396. Which of the following rays has the least wavelength?

- (A) Ultraviolet rays
- (B) Infrared rays
- (C) Cosmic rays
- (D) X-rays

Answer: Option C

397. Which of the following does not have a sharp melting point?

- (A) Thoria
- (B) Glass

- (C) Ice
 - (D) Pig iron
- Answer: Option B

398. Absolute zero pressure can be attained at a temperature of

- (A) 0°C
 - (B) 50°K
 - (C) 0°R
 - (D) None of these
- Answer: Option C

399. Other parameters remaining same, the recrystallisation temperature of an alloy is lowered, when

- (A) Strain rate is increased
 - (B) Grain size is increased
 - (C) Prior cold deformation is increased
 - (D) Not affected by any of the above parameters
- Answer: Option A

400. Recrystallisation temperature of steel is _____ °C.

- (A) 50
 - (B) 300
 - (C) 500
 - (D) 800
- Answer: Option D

401. Corrosion of metals cannot be prevented by its

- (A) Tempering
 - (B) Chromising
 - (C) Aluminising
 - (D) Alloying
- Answer: Option A

402. _____ is the most suitable lubricant for drawing mild steel wires?

- (A) Kerosene
 - (B) Water
 - (C) Sodium stearate
 - (D) Lime water
- Answer: Option C

403. Metalloids

- (A) Are good conductor of heat & electricity
 - (B) Act as electron donors with metals & as electron acceptor with non-metals
 - (C) Are not necessarily solids at room temperature
 - (D) Are compounds that exhibit both metallic & non-metallic properties to some extent and are exemplified by elements like germanium, silicon & boron
- Answer: Option D

404. Fog is an example of colloidal system of

- (A) Solid dispersed in gas
 - (B) Solid dispersed in liquid
 - (C) Liquid dispersed in gas
 - (D) Gas dispersed in liquid
- Answer: Option C

405. Use of flux during soldering is done to

- (A) Increase fluidity of solder by lowering its melting temperature
 - (B) Prevent oxide formation
 - (C) Wash away surplus solder
 - (D) Full up the joint gap
- Answer: Option B

406. A jet engine turbine blade is normally manufactured by

- (A) Forging
- (B) Shell moulding

- (C) Investment casting
 - (D) Pressure die casting
- Answer: Option C

407. If a nuclear reactor produces more fissile nuclear fuel than it consumes, then it is called a _____ reactor.

- (A) Critical
 - (B) Breeder
 - (C) Fertile
 - (D) Heterogeneous
- Answer: Option B

408. X-rays are

- (A) Positively charged
 - (B) Negatively charged
 - (C) Neutral
 - (D) Of higher wavelength than visible light
- Answer: Option C

409. Aluminium is extracted from

- (A) Chalcocite
 - (B) Bauxite
 - (C) Galena
 - (D) None of these
- Answer: Option B

410. In extrusion of metals, which of the following statement is true?

- (A) Speed of the extruded material is same as that of ram speed
 - (B) Redundant work is a function of the die angle
 - (C) Relative motion between the billet surface and the container wall is always present
 - (D) Hollow ram is used for indirect extrusion
- Answer: Option D

411. Out of the following, the joint produced by _____ has the lowest strength.

- (A) Soldering
 - (B) Welding
 - (C) Brazing
 - (D) Riveting
- Answer: Option A

412. _____ fluid force is not considered in the Navier-Stokes equation.

- (A) Turbulent
 - (B) Viscous
 - (C) Gravity
 - (D) Pressure
- Answer: Option A

413. Copper deposits are found in India at the following location:

- (A) Kudremukh
 - (B) Kolar
 - (C) Khetri
 - (D) Ramagundam
- Answer: Option C

414. The most important consideration in value engineering is the

- (A) Profit maximisation
 - (B) Customer satisfaction
 - (C) Cost reduction
 - (D) Process improvement
- Answer: Option B

415. Which of the following is an undesirable property of slag produced during the Pyrometallurgical method of metal extraction from its ore?

- (A) High fusibility & fluidity
- (B) High thermal conductivity

- (C) Low density
 - (D) High chemical activity
- Answer: Option B

416. Which of the following is not an explosive?

- (A) TNT
- (B) CMC
- (C) RDX
- (D) Lead azide

Answer: Option B

417. Dies for wire drawing are generally made of

- (A) Mild steel
- (B) Stainless steel
- (C) Carbides
- (D) High carbon steel

Answer: Option A

418. 'Ice point' is designated on Fahrenheit temperature scale by

- (A) 0°
- (B) 32°
- (C) 62°
- (D) 212°

Answer: Option B

419. Auto collimator is used to check

- (A) Flatness
- (B) Angle
- (C) Rotor balancing
- (D) Roughness

Answer: Option B

420. Maximum consumption of limestone is in the _____ industry.

- (A) Iron and steel
- (B) Cement
- (C) Glass
- (D) Fertiliser

Answer: Option D

421. Steel balls are manufactured by

- (A) Sintering
- (B) Casting
- (C) Cold heading
- (D) Spinning

Answer: Option C

422. In condensers used in thermal power plants, steam is normally used in shell side and cooling water on the tube side, because of the reason that

- (A) Compared to the mass flow rate of cooling water, the rate of condensation of steam is invariably smaller
- (B) Maintaining vacuum on tube side is more difficult than that on the shell side
- (C) Water velocity can be increased conveniently to increase the overall heat transfer co-efficient because of its lower specific volume compared to steam
- (D) Condenser can act as a storage unit for condensed steam

Answer: Option C

423. _____ are normally subjected to sub-zero treatment.

- (A) Highly stressed parts
- (B) Gauges or precision parts
- (C) Cold rolled sheets
- (D) Non machinable materials

Answer: Option B

424. Pick out the wrong statement

- (A) Processing of thermosetting plastics is ideally done by injection moulding

- (B) Processing of thermoplastics is ideally done by compression moulding
 - (C) Mass production of seamless pipes are done by electrical resistance welding (ERW)
 - (D) Stretch forming is a process of cold drawing
- Answer: Option C

425. In the blast furnace, incorporation of water vapour in the blast gives the following effect.

- (A) Increases the reducing potential of the gas
- (B) Increases the flame temperature
- (C) No significant change occurs
- (D) Increases the hydrogen content in the metal

Answer: Option A

426. Wood is a/an _____ material.

- (A) Amorphous
- (B) Cellular
- (C) Homogeneous
- (D) Granular

Answer: Option B

427. Flue gases pass through the following boiler accessories in a high pressure natural circulation boiler.

- A. Induced draft fan**
- B. Economiser**
- C. Air preheater**
- D. Steam superheater**

Which of the following gives the correct sequence of flow of the flue gases through the above mentioned boiler accessories?

- (A) A, C, B, D
- (B) D, B, C, A
- (C) D, C, B, A
- (D) D, A, B, C

Answer: Option B

428. The product out from a cupola is called

- (A) Wrought iron
- (B) Pig iron
- (C) Cast iron
- (D) None of these

Answer: Option C

429. Induced draft fans provided in large thermal power plant boilers have _____ blades.

- (A) Forward curved
- (B) Backward curved
- (C) Double curved
- (D) Radial or straight

Answer: Option B

430. The transition temperature at which all the ferromagnetic materials become paramagnetic materials is termed as the 'Curie temperature'. Its value for cobalt is _____ °C.

- (A) 768
- (B) 1127
- (C) 1359
- (D) 1480

Answer: Option B

431. In troposphere (the weather domain), the temperature 't' at height 'h' above the sea level in metres is given by (where, temperature at sea level is 15°C and t is in °C.)

- (A) $t = 15 - 0.0065 h$
- (B) $t = 15 + 0.0065 h$
- (C) $t = 0.0035 h - 15$
- (D) $t = 15 - 0.0035 h$

Answer: Option A

432. Super conduction in metals is observed at a temperature of _____ °K.

- (A) <100

- (B) >100
 - (C) About 273
 - (D) About 373
- Answer: Option B

433. Work done by a/an _____ process is determined by $\int p. dv$
(A) Adiabatic
(B) Quasi-static
(C) Isothermal
(D) Isentropic
Answer: Option B

434. Maximum amount of thermal radiation is emitted at all wavelengths at any specified temperature by a/an _____ body.
(A) Grey
(B) Black
(C) Opaque
(D) White
Answer: Option A

435. Use of economiser in a boiler plant reduces the fuel consumption for steam generation by about _____ percent.
(A) 1
(B) 10
(C) 30
(D) 50
Answer: Option B

436. Which of the following is the largest quantum of pressure?
(A) 1 kg/cm²
(B) 1 bar
(C) 1 atmosphere
(D) 1 kilo Pascal
Answer: Option C

437. The refractory brick which has good thermal shock resistance at high temperature but cracks on cooling below 400°C is
(A) Magnesite
(B) Chrome
(C) Silica
(D) Fireclay
Answer: Option C

438. Absolute zero, pressure will occur, when the molecular momentum of the system becomes zero. A liquid will cease to exist as liquid at
(A) High vacuum
(B) Zero pressure
(C) 0°K
(D) Earth's centre
Answer: Option B

439. _____ temperature remains constant during adiabatic saturation process of unsaturated air.
(A) Dew point
(B) Dry bulb
(C) Wet bulb
(D) None of these
Answer: Option C

440. In case of water (Prandtl number ≈ 6) flowing over a flat plate heated over the entire length, the thermal boundary layer thickness as compared to hydrodynamic boundary layer thickness is
(A) Less
(B) More
(C) Equal

(D) Unpredictable
Answer: Option A

441. Resilience of a bolt can be increased by increasing its

- (A) Length
 - (B) Shank diameter
 - (C) Head diameter
 - (D) None of these
- Answer: Option A

442. The maximum stress below which a material can withstand an infinite number of cycle of stress, is termed as the

- (A) Fatigue strength
 - (B) Creep strength
 - (C) Resilience
 - (D) Endurance limit
- Answer: Option D

443. Maximum permissible air velocity in pipelines is about _____ metre/second.

- (A) 5
- (B) 10
- (C) 20
- (D) 40

Answer: Option B

444. Hot working of lead is carried out at

- (A) 75°C
- (B) 373°K
- (C) 150°C
- (D) Room temperature

Answer: Option B

445. Which of the following is not the commercial name of poly-methyl-methacrylate (PMMA)?

- (A) Styrofoam
- (B) Lucite
- (C) Perspex
- (D) Plexiglass

Answer: Option A

446. The Al_2O_3 content of cryolite in Hall-Heroult cell is maintained between _____ percent.

- (A) 2-5
- (B) 18-20
- (C) 12-15
- (D) 6-12

Answer: Option A

447. Elimination of brittleness resulting from welding of saw blades is done by _____ of the welded portion.

- (A) Annealing
- (B) Toughening
- (C) Work hardening
- (D) Tempering

Answer: Option A

448. Fatigue resistance of a material is measured by the

- (A) Elastic limit
- (B) Ultimate tensile strength
- (C) Young's modulus
- (D) Endurance limit

Answer: Option D

449. In a neutral solution

- (A) H^+ ions are absent
- (B) OH^- ions are absent

- (C) Both H^+ and OH^- ions are present in very small but equal concentration
(D) None of these
Answer: Option C

450. Ultimate strength in tension as compared to that in shear for steel is

- (A) Half
(B) One third
(C) One and half times
(D) One fourth

Answer: Option C

451. At 100% relative humidity, the dew point temperature of moist air is

- (A) Less than the wet bulb temperature
(B) More than the wet bulb temperature
(C) Equal to the wet bulb temperature
(D) Equal to the ambient temperature

Answer: Option B

452. Dry saturated steam can be converted into superheated steam by

- (A) Increasing its cross-sectional area of flow
(B) Passing it through a pressure reducing valve
(C) Forcing it downwards through a vertical tube
(D) None of these

Answer: Option B

453. _____ of hard alloy and tool steel is done to make it easily machinable.

- (A) Case carburising
(B) Tempering
(C) Normalising
(D) Annealing

Answer: Option B

454. Which of the following emissions in the exhaust gas of an I.C. engine causes the formation of photochemical smog?

- (A) Nitrogen oxides
(B) Hydrocarbons
(C) Both 'a' & 'b'
(D) Carbon monoxide

Answer: Option C

455. In the Bayer's process, bauxite is digested under pressure using

- (A) H_2SO_4
(B) NaOH
(C) NH_3
(D) HCl

Answer: Option B

456. Dielectric

- (A) Is an electrical insulating material
(B) Of low resistivity is preferred
(C) Should have high thermal conductivity
(D) Need not defy the corrosive action of chemicals

Answer: Option A

457. Closeness of packing is maximum in case of _____ crystal lattice.

- (A) Face centred
(B) Simple cubic
(C) Body centred
(D) None of these

Answer: Option A

458. Enzymes belong to the category of

- (A) Proteins
(B) Carbohydrates
(C) Vitamins

(D) Fats
Answer: Option A

459. For a thermodynamic system undergoing a process, which of the following pairs best expresses the relationship similar to that expressed by the pressure volume plot?

- (A) Temperature - entropy
- (B) Temperature - pressure
- (C) Enthalpy - entropy
- (D) Enthalpy-pressure

Answer: Option A

460. According to maximum shear stress failure criterion, yielding in material occurs, when the maximum shear stress is equal to _____ times the yield stress.

- (A) 0.5
- (B) 2
- (C) $\sqrt{2}$
- (D) $\sqrt{3}/2$

Answer: Option A

461. Brittleness induced due to the presence of sulphur in steel can be reduced by adding

- (A) Manganese
- (B) Magnesium
- (C) Vanadium
- (D) Copper

Answer: Option A

462. Rankine cycle comprises of two isothermal and two _____ processes.

- (A) Isobaric
- (B) Polytropic
- (C) Isentropic
- (D) None of these

Answer: Option D

463. The hardenability of steel decreases with

- (A) Decrease in dislocation density
- (B) Increase in solutionising temperature
- (C) Increase in strength
- (D) Decrease in grain size

Answer: Option D

464. Moist air is cooled along the line of constant _____, when it is passed over a cold & dry cooling coil, such that no condensation occurs?

- (A) Enthalpy
- (B) Relative humidity
- (C) Wet bulb temperature
- (D) Dew point temperature

Answer: Option D

465. Diamagnetic materials

- (A) Are magnetised by eddy currents only
- (B) Are non-magnetic and cannot be magnetised
- (C) Are magnetised in direction opposite to the magnetic field
- (D) Can be magnetised in one direction only

Answer: Option C

466. Alloy powder manufactured by the following process have spherical shapes.

- (A) Electrochemical deposition
- (B) Gaseous reduction
- (C) Atomisation
- (D) Mechanical attrition

Answer: Option C

467. What is the value of included angle of a triangular notch for maximum discharge?

- (A) 30°
- (B) 60°

- (C) 90°
- (D) 120°

Answer: Option C

468. Glycerine is used as a coolant in cooling of some engines instead of water, because

- (A) Its higher boiling point (290°C) increases its heat carrying capacity
- (B) Comparatively less weight of coolant is required
- (C) Smaller radiator can be used
- (D) All a, b & c

Answer: Option D

469. Which of the following is a boiler accessory i.e., not a boiler mounting?

- (A) Blow off cock
- (B) Feed check valve
- (C) Feed water pump
- (D) Stop valve

Answer: Option C

470. The product (s) of roasting of a sulphide ore is (are)

- (A) Oxide only
- (B) Sulphate only
- (C) Oxide and sulphate
- (D) Dependent on temperature and partial pressure of oxygen & sulphur dioxide

Answer: Option A

471. The most important requirement for aluminium industry is the availability of cheap

- (A) Ore
- (B) Electrical power
- (C) Labour
- (D) Abundant water

Answer: Option B

472. A jig is used while _____ a hole.

- (A) Boring
- (B) Counter boring
- (C) Drilling
- (D) Enlarging

Answer: Option C

473. Steel containing low percentage of nickel, chromium & tungsten are termed as the _____ steel.

- (A) Wrought
- (B) Tool
- (C) Alloy
- (D) Plain carbon

Answer: Option D

474. The heat treatment to which the steel wire containing > 0.25% carbon is subjected to is

- (A) Full annealing
- (B) Bright annealing
- (C) Patenting
- (D) None of these

Answer: Option C

475. Materials having resistivity ranging from 1 to 100 ohm. cm is termed as

- (A) Conductor
- (B) Insulator
- (C) Semi-conductor
- (D) None of these

Answer: Option C

476. Gantt charts are used for streamlining the

- (A) Inventory control
- (B) Production schedule
- (C) Sales forecasting

(D) Quality control
Answer: Option B

477. Plasma is

- (A) A high temperature neutral gas
 - (B) Nothing but ionised gas
 - (C) A source of steady and highest controllable pressure
 - (D) Formed at very low temperature
- Answer: Option B

478. Thermodynamic cycle involved in the working of a thermal power plant is the _____ cycle.

- (A) Joule
 - (B) Carnot
 - (C) Rankine
 - (D) Brayton
- Answer: Option C

479. Heat flow across a hollow sphere of inner radius ' r_1 ' and outer radius ' r_2 ' is directly proportional to

- (A) $(r_2 - r_1)/r_1 \cdot r_2$
 - (B) $r_1 \cdot r_2/(r_2 - r_1)$
 - (C) $(r_2 + r_1)/r_1 \cdot r_2$
 - (D) $r_1 \cdot r_2/(r_2 + r_1)$
- Answer: Option B

480. Faraday's law of electrolysis is related to the

- (A) Cation speed
 - (B) Atomic number of the cation
 - (C) Equivalent mass of the electrolyte
 - (D) None of these
- Answer: Option C

481. Tempering of a material does not improve its

- (A) Machinability
 - (B) Toughness
 - (C) Internal stress level
 - (D) Softness
- Answer: Option A

482. Suitability of steel for its use in cable is judged by its strength in

- (A) Tension
 - (B) Compression
 - (C) Torsion
 - (D) Shear
- Answer: Option A

483. In connection with corrosion of metals, passivation is the process that

- (A) Intensifies deterioration
 - (B) Changes the composition of the metal
 - (C) Inhibits further deterioration
 - (D) None of these
- Answer: Option C

484. Change in volume of metals from absolute zero temperature to their melting points is

- (A) Almost same for all metals
 - (B) Different for different metals
 - (C) Less for low melting point metals
 - (D) Less for high melting point metals
- Answer: Option A

485. On oscilloscope screen for dynamic measurement, lissajous diagram is normally used to determine the _____ of the input signal.

- (A) Frequency
- (B) Amplitude

- (C) Damping
 - (D) None of these
- Answer: Option A

486. One ton of refrigeration is not equivalent to the heat removal rate of

- (A) 200 BTU/minute
- (B) 50 kcal/minute
- (C) 50 kJ/sec
- (D) 3.5 KW

Answer: Option C

487. Which of the following forces does not act on a fluid at rest?

- (A) Viscous force
- (B) Gravity force
- (C) Hydrostatic force
- (D) Surface tension force

Answer: Option A

488. Which of the following commonly used condenser tube materials has the lowest thermal conductivity?

- (A) Admiralty brass
- (B) Stainless steel
- (C) Aluminium brass
- (D) Titanium

Answer: Option B

489. Cold cracking in the heat affected zone of a high strength steel weld can take place because of the

- (A) Retained austenite
- (B) Martensite formation
- (C) Relatively high sulphur content in the base metal
- (D) Sufficient hydrogen present in the welding arc

Answer: Option B

490. Gage pressure within a spherical droplet of a fluid is ' p '. What will be gage pressure within a bubble of the same size & of the same fluid?

- (A) p
- (B) $2p$
- (C) $0.5p$
- (D) $0.25p$

Answer: Option B

491. Moist climate is the most favourable factor in the site selection for a

- (A) Steel plant
- (B) Textile factory
- (C) Petroleum refinery
- (D) Coke oven battery

Answer: Option B

492. In chemical dehumidification of air

- (A) Both specific humidity & dry bulb temperature increases
- (B) Both specific humidity & dry bulb temperature decreases
- (C) Specific humidity decreases & dry bulb temperature increases
- (D) Specific humidity increases & dry bulb temperature decreases

Answer: Option C

493. The most important function of a washer is to provide bearing area and washers are normally specified by their hole diameters. The diameter of washer as compared to the nut is

- (A) More
- (B) Less
- (C) Same
- (D) More but less than the diameter of bolt

Answer: Option A

494. Fire refining process is employed in case of

- (A) Tin
 - (B) Copper
 - (C) Zinc
 - (D) Aluminium
- Answer: Option B

495. Powder metallurgy is used to produce

- (A) High precision components with complex cavities and sharp features
 - (B) Components of large size
 - (C) Porosity free components
 - (D) Components of such alloys whose constituents do not form alloys readily
- Answer: Option C

496. _____ test is the appropriate test to determine whether a material is ductile or brittle.

- (A) Impact
 - (B) Cupping
 - (C) Hardness
 - (D) Tensile
- Answer: Option A

497. Primary designation of steel is based on its

- (A) Hardness & tensile strength
 - (B) Carbon content
 - (C) Iron content
 - (D) Alloying elements content
- Answer: Option D

498. The two elements required to form substitutional solid solution should not have

- (A) Same crystalline structure
 - (B) Same valency
 - (C) Widely differing electronegativity
 - (D) Same atomic sizes
- Answer: Option C

499. Wohler test is a destructive test to find out the _____ strength of a prepared metal specimen.

- (A) Creep
 - (B) Fatigue
 - (C) Endurance
 - (D) Tensile
- Answer: Option B

500. The temperature at which ferromagnetic material can no longer be magnetised by the outside forces, is termed as the

- (A) Critical point
 - (B) Curie temperature
 - (C) Inversion temperature
 - (D) Eutectic temperature
- Answer: Option B

501. With increase in impurities in metals, their corrosion resistances

- (A) Increase
 - (B) Decrease
 - (C) Remain same
 - (D) May increase or decrease; depending on the type of metal
- Answer: Option B

502. Density in the solid state is slightly less than that in its liquid state, in case of

- (A) Carbon dioxide
 - (B) Water
 - (C) Mercury
 - (D) None of these
- Answer: Option B

503. _____ iron is produced by the annealing of white cast iron.

- (A) Malleable
- (B) Nodular
- (C) Ductile
- (D) Grey

Answer: Option A

504. Starting friction is low in case of the _____ lubrication.

- (A) Boundary
- (B) Hydrodynamic
- (C) Hydrostatic
- (D) Mixed/semi-fluid

Answer: Option C

505. While the bin cards are used in the effective stores management, the queuing theory is associated with the _____ time.

- (A) Waiting
- (B) Idle
- (C) Inspection
- (D) Tool replacement

Answer: Option A

506. Large scale fire on fuel gas line is normally extinguished by

- (A) Water
- (B) Steam
- (C) Foam
- (D) Nitrogen

Answer: Option D

507. Most of the phosphorous present in the blast furnace burden enters into

- (A) Hot metal
- (B) Flue gases
- (C) Slag
- (D) Refractory lining

Answer: Option A

508. Which of the following metals is not subjected to electrolytic refining/purification?

- (A) Copper
- (B) Zinc
- (C) Tin
- (D) Aluminium

Answer: Option C

509. Baffles provided on the shell side of a shell and tube heat exchanger are meant for

- (A) Providing support for the tubes
- (B) Improving heat transfer
- (C) Both 'a' & 'b'
- (D) Preventing the fouling of tubes & stagnation of shell side fluid

Answer: Option C

510. Pick out the correct statement.

- (A) Hot worked materials are subjected to annealing to remove internal stresses
- (B) Annealing of steel hardens it slightly
- (C) Normalising of a material induces stresses
- (D) Tempering of a material improves ductility & toughness but reduces hardness & brittleness

Answer: Option D

511. Which of the following alloying elements is present in maximum percentage in high speed steel?

- (A) Molybdenum
- (B) Chromium
- (C) Tungsten
- (D) Vanadium

Answer: Option A

512. Strain hardening effect in a metal subjected to cold working is due to the _____ mechanism.

- (A) Fracture
 - (B) Dislocation
 - (C) Slip
 - (D) Twinning
- Answer: Option C

513. The main constituent of bones is

- (A) CaF_2
 - (B) $\text{Ca}_3(\text{PO}_4)_2$
 - (C) CaCO_3
 - (D) CaCl_2
- Answer: Option B

514. Pick out the correct statement about the condensation.

- (A) Filmwise condensation gives a lower heat transfer rate than the dropwise condensation
 - (B) Suitable coating or vapour additive is used to promote film wise condensation
 - (C) If a condensing liquid does not wet the surface dropwise, even then condensation will take place on it
 - (D) Reynolds number of condensing liquid is based on its mass flow rate
- Answer: Option B

515. When an isolated thermodynamic system executes a process,

- (A) Work is done
 - (B) Heat transfer takes place
 - (C) Mass flow occurs across the boundary of the system
 - (D) No chemical reaction takes place within the system
- Answer: Option D

516. Temperature attained in soldering of metals is about _____ °C.

- (A) 150-300
 - (B) 400-500
 - (C) 650-800
 - (D) 1000-1100
- Answer: Option A

517. A material is capable of resisting softening at high temperature, because of its property termed as

- (A) Hot temper
 - (B) Hot hardness
 - (C) Fatigue
 - (D) Creep
- Answer: Option B

518. Which of the following are considered applications of ultrasonic testing?

- (A) Determination of elastic constant
 - (B) Detection of defects in metal
 - (C) Measurement of material thickness
 - (D) None of the above
- Answer: Option B

519. Which of the following heat treatment processes is usually applied to castings?

- (A) Tempering
 - (B) Annealing
 - (C) Normalising
 - (D) Carburising
- Answer: Option D

520. Pick out the wrong statement.

- (A) Complete unity of command exists in a line organisation
 - (B) Line organisation is not suitable for expansion and growth of an industry
 - (C) In line and staff organisation, "line" executes and "staff" directs
 - (D) None of these
- Answer: Option D

521. Atomic _____ of an element is a whole number.

- (A) Weight
- (B) Number
- (C) Volume
- (D) Radius

Answer: Option B

522. Most important property of steels for use in automobile bodies is the

- (A) Formability
- (B) Yield strength
- (C) Toughness
- (D) Resilience

Answer: Option A

523. Strain hardening effect in metals subjected to cold working is due to the _____ mechanism.

- (A) Slip
- (B) Fracture
- (C) Winning
- (D) Dislocation

Answer: Option D

524. Preheating before welding is done to

- (A) Make the plate softer
- (B) Burn oil & grease sticking to plate surfaces
- (C) Avoid plate distortion
- (D) Prevent cold cracks

Answer: Option D

525. Hardening of steel is not possible, unless it is heated _____ critical point.

- (A) Above the highest
- (B) Above the lowest
- (C) Between the first & second
- (D) Between the second & third

Answer: Option B

526. The product of a commercial direct reduction process is

- (A) Liquid iron
- (B) Solid iron
- (C) Sponge iron
- (D) Iron saturated with carbon

Answer: Option C

527. For the irreversible reaction, $C_a + 2C = C_a C_2$, $\Delta H^{298} = -60000 \text{ J} \cdot \text{mole}^{-1}$. If a system initially containing 2 moles of calcium, 3 moles of carbon and 1 mole of calcium carbide is allowed to react to completion, the heat evolved at 298 K will be

- (A) 30,000 J
- (B) 60,000 J
- (C) 90,000 J
- (D) 2,40,000 J

Answer: Option C

528. A 2 kg object weighs 1.8 kgf on a spring balance. The value of 'g' at that location in m/sec^2 is

- (A) 8.82
- (B) 9.81
- (C) 10.88
- (D) 0.95

Answer: Option A

529. Cascade control is

- (A) The continuous adjustment of the set point index of an automatic control loop by a primary (master) controller
- (B) Used when changes in process conditions cause serious upsets in the controlled variable

- (C) Useful to control flow from temperature
 - (D) All 'a', 'b' & 'c'
- Answer: Option D

530. When the wet steam is throttled but still remains wet at the exit of the throttle valve, then its temperature & dryness fraction respectively

- (A) Decreases & increases
- (B) Increases & increases
- (C) Increases & decreases
- (D) Decreases & decreases

Answer: Option A

531. Catalyst used in the catalytic converter employed in automobiles to convert CO into CO₂ and for complete oxidation of un-burnt hydrocarbons is

- (A) Nickel
- (B) Cobalt
- (C) Vanadium
- (D) Platinum

Answer: Option D

532. Which of the following performance characteristics of a S.I engine is not affected by the front end volatility of the petrol used?

- (A) Vapour locking
- (B) Hot starting
- (C) Spark plug fouling
- (D) All 'a', 'b' & 'c'

Answer: Option C

533. Stellite is a _____ material.

- (A) Ferrous
- (B) Ceramic
- (C) Cemented carbide
- (D) Non-ferrous cast alloy cutting tool

Answer: Option D

534. Consideration of the creep is the most important in case of the

- (A) Blades of gas turbine
- (B) Piston of an I. C. engine
- (C) Flywheel of steam engine
- (D) Cycle chain

Answer: Option A

535. _____ number determines whether the fluid flow in an open channel is supercritical, critical or sub-critical.

- (A) Mach
- (B) Reynolds
- (C) Froude
- (D) Weber

Answer: Option C

536. Fine grained steels have

- (A) High brittleness
- (B) Higher tendency to distort
- (C) High ductility
- (D) None of these

Answer: Option C

537. Spheroidising of a material is a/an _____ process.

- (A) Normalising
- (B) Annealing
- (C) Tempering
- (D) Hardening

Answer: Option B

538. If Reynolds number is greater than 1, then the

- (A) Viscous force is larger than the inertia force
- (B) Inertia force is larger than the viscous force
- (C) Inertia force is larger than the surface tension force
- (D) Inertia force is larger than the gravitational force

Answer: Option B

539. Pearlite comprises of

- (A) 87% cementite & 13% Fe
- (B) 87% ferrite & 13% cementite
- (C) 93.33% ferrite & 6.67% C
- (D) 87% ferrite & 13% C

Answer: Option B

540. Normalising of an object does not

- (A) Refine coarse grain structure obtained during hot working
- (B) Improve ductility
- (C) Improve yield strength
- (D) Improve mechanical properties

Answer: Option B

541. Transformer cores are normally made from

- (A) Soft ferrites
- (B) High purity iron
- (C) Grain oriented Fe-Si alloy
- (D) Al-Ni-Co alloy

Answer: Option C

542. As per international norms, the maximum permissible value of noise level in the industrial environment is _____ decibels as measured at a distance of 1.5 metres from the source of noise.

- (A) 110
- (B) 85
- (C) 60
- (D) 45

Answer: Option B

543. Non-ferrous alloys used for making cutting tools need not have high

- (A) Abrasion resistance
- (B) Toughness
- (C) Red hardness
- (D) Cutting speed

Answer: Option B

544. The delivery pressure of boiler feed water pump compared to the boiler steam pressure is

- (A) Same
- (B) Slightly less
- (C) Slightly more
- (D) Much more

Answer: Option C

545. Coating provided on the electrodes used in the arc welding is not expected to

- (A) Add alloying elements
- (B) Prevent electrode from contamination
- (C) Stabilise the arc
- (D) Provide protective atmosphere to weld

Answer: Option B

546. The trace metal present in insulin is

- (A) Cu
- (B) Zn
- (C) Fe
- (D) Ni

Answer: Option B

547. The type of pump used for lifting large quantity of sewage is a _____ pump.

- (A) Gear
 - (B) Centrifugal
 - (C) Reciprocating
 - (D) Plunger
- Answer: Option B

548. For a first order chemical reaction, the concentration of the reactant decreases _____ with time.

- (A) Linearly
 - (B) Exponentially
 - (C) Logarithmically
 - (D) Inversely
- Answer: Option A

549. Thermal conductivity of a material does not depend upon its

- (A) Mass
 - (B) Volume
 - (C) Surface area
 - (D) All 'a', 'b' & 'c'
- Answer: Option D

550. High relative humidity decreases the evaporative process and as the temperature is increased, the relative humidity decreases. The comfort range for human body is the ambient temperature of 22 to 27°C with relative humidity ranging from _____ percent.

- (A) 5 to 10
 - (B) 15 to 25
 - (C) 45 to 50
 - (D) 75 to 80
- Answer: Option C

551. The amount of water evaporated in kg per kg of fuel burnt in a boiler is called the _____ of a boiler.

- (A) Evaporative capacity
 - (B) Evaporation efficiency
 - (C) Thermal efficiency
 - (D) Steam load
- Answer: Option A

552. Globular form of cementite is formed during the _____ process.

- (A) Spheroidising
 - (B) Hardening
 - (C) Annealing
 - (D) Normalising
- Answer: Option B

553. The excess air required for the combustion of pulverised coal is of the order of about _____ percent.

- (A) 5
 - (B) 15
 - (C) 30
 - (D) 45
- Answer: Option B

554. The burnout heat flux in the nucleate boiling regime is not a function of the

- (A) Liquid density
 - (B) Vapour density
 - (C) Temperature difference
 - (D) Heat of evaporation
- Answer: Option B

555. Hollow shafts can be made as strong as solid shafts by making the twisting moments of both the shafts same. Shafts made by _____ have residual stresses.

- (A) Forging
- (B) Cold rolling
- (C) Hot rolling

(D) Casting
Answer: Option B

556. Use of water as a manometric liquid suffers from the disadvantage of its

- (A) Low vapour pressure
 - (B) Corrosive nature
 - (C) High vapour pressure
 - (D) High boiling point
- Answer: Option C

557. Steam condenser tubes are made of admiralty brass, in which percentage of zinc & copper are _____ respectively.

- (A) 70 & 30
- (B) 30 & 70
- (C) 50 & 50
- (D) 90 & 10

Answer: Option A

558. Iron content in Indian iron ore is about _____ percent.

- (A) 80-85
- (B) 60-65
- (C) 40-45
- (D) 20-25

Answer: Option B

559. Heat release during phase change is observed in case of a/an

- (A) Boiler
- (B) Condenser
- (C) Evaporator
- (D) All (A), (B) & (C)

Answer: Option B

560. Shrinkage allowance on pattern is provided to compensate for shrinkage when the

- (A) Metal changes from liquid state to solid state at freezing temperature
- (B) Solid phase temperature drops from freezing temperature to the room temperature
- (C) Liquid metal temperature drops from pouring temperature to room temperature
- (D) Liquid metal temperature drops from pouring temperature to freezing temperature

Answer: Option B

561. Carbon supply in pack carburising process is in the form of

- (A) Charcoal
- (B) Calcium carbide
- (C) Hydrocarbon oil
- (D) Graphite

Answer: Option A

562. _____ of austenite decreases the hardenability in steel.

- (A) Fine grains
- (B) Coarse grains
- (C) Homogeneity
- (D) Dissolved elements (except cobalt)

Answer: Option D

563. Function of gear box is to

- (A) Reduce the speed
- (B) Obtain variable speed
- (C) Increase the speed
- (D) Produce high torque

Answer: Option B

564. Capacity & power requirement for an air compressor working at high altitude compared to sea-level will be

- (A) More
- (B) Less
- (C) Same

(D) Either more or less; depends on the climatic conditions

Answer: Option B

565. During sensible cooling of air, its wet bulb temperature

(A) Decreases but dew point remains constant

(B) Increases but dew point remains constant

(C) Increases & the dew point decreases

(D) Decreases & the dew point increases

Answer: Option B

566. Desalination of water

(A) Makes it potable

(B) Makes it non-potable

(C) Means distillation of water

(D) None of these

Answer: Option A

567. During sensible heating of humid air

(A) Relative humidity increases

(B) Dew point remains constant

(C) Dry bulb & wet bulb temperature increases

(D) Both 'b' & 'c'

Answer: Option D

568. _____ is a non volatile film forming constituent of a paint.

(A) Thinner

(B) Dryer

(C) Drying oil

(D) None of these

Answer: Option C

569. Thermal diffusivity of a substance is proportional to (where, k = Thermal conductivity)

(A) $1/k$

(B) k

(C) k^2

(D) $1/k^2$

Answer: Option B

570. The mechanism involved in the removal of metal in drilling operation is by

(A) Compression

(B) Extrusion

(C) Shearing

(D) Both 'b' & 'c'

Answer: Option D

571. _____ glass is used in the mercury in glass thermometer meant for measuring a temperature of 500°C .

(A) Borosilicate

(B) High silica

(C) Supermax

(D) Lead

Answer: Option C

572. Out of the following _____ iron has the best capability to bear sudden & excessive shocks.

(A) White

(B) Cast

(C) Wrought

(D) Pig

Answer: Option C

573. Cold working of a material results in increase in hardness, which is termed as the _____ hardening.

(A) Cold

(B) Work

- (C) Age
 - (D) Induction
- Answer: Option B

574. Which one is neutral in character?

- (A) N_2O_4
- (B) N_2O
- (C) N_2O_5
- (D) N_2O_3

Answer: Option B

575. Transition from laminar flow to turbulent flow in fluid flow through a pipe does not depend upon the

- (A) Length of the pipe
- (B) Diameter of the pipe
- (C) Density of the fluid
- (D) Velocity of the fluid

Answer: Option A

576. The normal stress is the same in all directions at a point in a fluid, only when the fluid

- (A) Is at rest & has zero viscosity
- (B) Is frictionless
- (C) Fluid layer has no motion relative to an adjacent layer of fluid
- (D) is incompressible & frictionless

Answer: Option D

577. Softening of hardened steel is done by its

- (A) Normalising
- (B) Tempering
- (C) Annealing
- (D) Carburising

Answer: Option A

578. Hot extrusion of aluminium is done in the temperature range of _____ °C.

- (A) 550-600
- (B) 450-500
- (C) 350-400
- (D) 250-300

Answer: Option C

579. Potable water means the water used for

- (A) Fire-fighting
- (B) Cooling
- (C) Drinking
- (D) Evaporation to produce steam

Answer: Option C

580. Diameter of the rivet to be provided on a 20 mm. thick boiler plate will be _____ mm.

- (A) 10
- (B) 20
- (C) 30
- (D) 40

Answer: Option D

581. Which of the following gases cause global warming?

- (A) Carbon monoxide
- (B) Carbon dioxide
- (C) Nitrogen
- (D) Ozone

Answer: Option B

582. What is the pH of distilled water?

- (A) 0
- (B) 1
- (C) 7

(D) 14
Answer: Option C

583. Air/fuel ratio by weight for combustion of methane with theoretical quantity of air will be about

- (A) 9 : 1
- (B) 17 : 1
- (C) 23 : 1
- (D) 29 : 1

Answer: Option B

584. Nusselt number is related to the Reynolds number (Re) in turbulent & laminar flow respectively as

- (A) $Re^{0.5}$, $Re^{0.8}$
- (B) $Re^{0.8}$, $Re^{-0.5}$
- (C) $Re^{0.8}$, $Re^{0.5}$
- (D) $Re^{-0.8}$, $Re^{0.5}$

Answer: Option C

585. Photographic plates are coated with

- (A) Silver nitrate
- (B) Silver halide
- (C) Calcium silicate
- (D) Metallic silver

Answer: Option B

586. Half life of a radioactive isotope corresponds to the time required for half of the _____ to decay.

- (A) Atoms
- (B) Neutrons
- (C) Nucleons
- (D) Electrons

Answer: Option A

587. The approximate height of a blast furnace having a useful volume of 2000 m³ is about _____ metres

- (A) 25
- (B) 35
- (C) 55
- (D) 75

Answer: Option C

588. Which of the following mainly decides the current to be employed in arc welding?

- (A) Electrode size
- (B) Plate thickness
- (C) Voltage across the arc
- (D) Welded portion length

Answer: Option A

589. Main constituent of bone ash is

- (A) Ammonium phosphate
- (B) Calcium phosphate
- (C) Animal charcoal
- (D) Ammonium sulphate

Answer: Option B

590. Probability of cavitation occurring becomes very high, when the local _____ resulting in water bubbles formation, which on rupture cause cavitation

- (A) Pressure falls below the vapour pressure
- (B) Pressure becomes very high
- (C) Temperature becomes low
- (D) All 'a', 'b' & 'c'

Answer: Option D

591. Isotropic materials have the same _____ in all directions.

- (A) Induced stresses
 - (B) Density
 - (C) Elastic properties
 - (D) Thermal properties
- Answer: Option C

592. In the diving apparatus, helium is used along with oxygen, because it is

- (A) Easily available
- (B) Not soluble in blood at high pressure
- (C) Lighter than nitrogen
- (D) Completely miscible with oxygen

Answer: Option B

593. Projection welding & stud welding is categorised as the _____ welding.

- (A) Pressure
- (B) Thermit
- (C) Resistance
- (D) Arc

Answer: Option C

594. Water hammer is caused in steam carrying pipelines, because of

- (A) Partial condensation of steam
- (B) Vibration of the pipeline
- (C) High degree of superheat of steam
- (D) Its exposure to torrential rain

Answer: Option A

595. The following thermocouple may be used for measuring temperature upto 1873°K.

- (A) Chromel-alumel
- (B) Copper-constantan
- (C) Platinum-platinum rhodium
- (D) Iron-constantan

Answer: Option C

596. Hot dipping process is used for coating a low melting point metal (e.g. Pb, Sn, Zn) on iron, steel & copper having relatively higher melting points. Which of the following is not a hot dipping process?

- (A) Galvanising
- (B) Tinning
- (C) Sherardizing
- (D) None of these

Answer: Option C

597. Dressing is a _____ operation.

- (A) Smelting
- (B) Dressing
- (C) Roasting
- (D) Dressing

Answer: Option C

598. The underground well of a biogas plant is called the

- (A) Septic tank
- (B) Oxidation well
- (C) Digester
- (D) Lagoon

Answer: Option C

599. Lead pencil contains

- (A) Graphite
- (B) Lead sulphide
- (C) Lead
- (D) Both (B) & (C)

Answer: Option A

600. A fire tube boiler is limited to a maximum steam pressure of about _____ kg/cm².

- (A) 6
- (B) 18
- (C) 38
- (D) 52

Answer: Option B

601. The amount of different substances produced, when the same quantity of electricity is passed through different solutions are proportional to their

- (A) Equivalent weight
- (B) (Equivalent weight)²
- (C) Molecular weight
- (D) (Molecular weight)²

Answer: Option A

602. Viscoelastic behaviour is observed in _____ materials.

- (A) Non-crystalline organic polymeric
- (B) Ceramic
- (C) All crystalline
- (D) All amorphous

Answer: Option A

603. _____ furnace is generally used in the non-ferrous foundries.

- (A) Direct arc
- (B) Indirect arc
- (C) Resistance
- (D) Induction

Answer: Option B

604. Load cells used for the measurement of weight has

- (A) Compact & rugged construction with an accuracy of 0.1 to 1%
- (B) No moving parts and incurs negligible deflection under load
- (C) Provision of thermal compensation and is hermetically sealed
- (D) All 'a', 'b' & 'c'

Answer: Option D

605. Volumetric composition of flue gas analysed with the Orsat apparatus is : CO₂ = 12%, O₂ = 8%, CO = nil, N₂ = 80%. This flue gas composition indicates that

- (A) Pure oxygen has been used for combustion
- (B) Nitrogen percentage in the fuel is very high
- (C) Excess air has been used for combustion
- (D) Hydrogen is not present in the fuel

Answer: Option C

606. The order of a chemical reaction

- (A) Can be determined only experimentally
- (B) Can be determined from the stoichiometry of the reaction
- (C) Cannot be zero
- (D) Can be fractional

Answer: Option B

607. In a good rimming steel

- (A) Carbon and silicon should be low
- (B) Silicon should be low but carbon should be high
- (C) Both silicon & carbon should be high
- (D) Silicon should be high but carbon should be low

Answer: Option A

608. With increase in temperature, the electrical conductivity of a _____ decreases.

- (A) Semi-conductor
- (B) Metal or alloy
- (C) Dielectric
- (D) None of these

Answer: Option A

609. Out of the following the refractive index is the highest for

- (A) Glass
 - (B) Diamond
 - (C) Brine
 - (D) Kerosene
- Answer: Option B

610. For an ideal gas, $C_p - C_v$ is

- (A) R
- (B) $-R$
- (C) 0
- (D) $(3/2) R$

Answer: Option A

611. Which of the following is present in iron ore, enhances its value?

- (A) Alumina
- (B) Alkali oxide
- (C) Lime & Magnesia
- (D) None of these

Answer: Option C

612. Pick out the wrong statement.

- (A) Seam welding, projection welding & spot welding are the classification of electrical resistance welding
- (B) Electrode tip in spot welding is of copper and the tip diameter should be equal to t (where, t = plate thickness to be welded)
- (C) In spot welding, two pieces to be joined are overlapped and placed between two electrodes
- (D) Mild steel sheet cannot be spot welded

Answer: Option D

613. Name the safety device used to protect the boiler, when the water level falls below a minimum level.

- (A) Blow down valve
- (B) Blow off cock
- (C) Fusible plug
- (D) Safety valve

Answer: Option C

614. Which of the following materials has the poorest electrical conductivity?

- (A) Carbon
- (B) Aluminium
- (C) Silver
- (D) Stainless steel

Answer: Option A

615. _____ rubber is generally used for making 'O' rings used for vacuum sealings.

- (A) Natural
- (B) Neoprene
- (C) Butadiene
- (D) Nitrile

Answer: Option B

616. Highest cutting speed is achieved by the _____ tool material.

- (A) High speed steel
- (B) Carbide
- (C) Cast alloy
- (D) Plain carbon steel

Answer: Option B

617. A fluid is termed as the Newtonian fluid, when the shear stress is _____ the velocity gradient.

- (A) Independent of
- (B) Inversely proportional to
- (C) Directly proportional to
- (D) None of these

Answer: Option C

618. Adhesives

- (A) Can't be used in the form of pressure sensitive tapes
- (B) Can't join two dissimilar metals
- (C) Cure instantaneously after application on a surface
- (D) None of these

Answer: Option D

619. Earing is a defect found in steels after the following metal working operation.

- (A) Extrusion
- (B) Rolling
- (C) Deep drawing
- (D) Wire drawing

Answer: Option C

620. All the atoms of the world comprise of electrons, proton & neutron except that of _____ atom in which neutron is absent.

- (A) Deuterium
- (B) Hydrogen
- (C) Neon
- (D) Helium

Answer: Option B

621. Routing in production, planning & control is concerned with the

- (A) Sequence of operation to be performed
- (B) Progress of work performed
- (C) Authorisation of work to be performed
- (D) Balancing of load on machines

Answer: Option A

622. Magnesium is present in

- (A) Haemoglobin
- (B) Chlorophyll
- (C) Hypo solution
- (D) None of these

Answer: Option B

623. Oxyacetylene reducing flame is used while carrying out welding on

- (A) Alloy steel
- (B) Grey cast iron
- (C) Mild steel
- (D) High carbon steel

Answer: Option C

624. Steel & cast iron pipes are produced by _____ casting.

- (A) Slush
- (B) Die
- (C) Investment
- (D) True centrifugal

Answer: Option D

625. While the oxy-acetylene flame produces a temperature of 3200°C, the temperature produced by oxy-hydrogen flame is about _____ °C.

- (A) 1800
- (B) 2000
- (C) 2400
- (D) 3000

Answer: Option B

626. Pipelines carrying various utilities in chemical industries are identified by their colour codes. The color of pipeline carrying steam is

- (A) Black
- (B) Silver grey
- (C) Green
- (D) Yellow

Answer: Option B

627. Pick out the wrong statement.

- (A) Lead can creep under its own weight at room temperature
- (B) The electrical conductivity of gold is considerably reduced by alloying additions due to the decrease in electron movement
- (C) Recrystallisation temperature decreases with decrease in strain in a cold worked metal
- (D) With increase in temperature, the electrical conductivity of intrinsic semi-conductor will increase

Answer: Option C

628. Out of the following, the most malleable material is

- (A) Copper
- (B) Aluminium
- (C) Wrought iron
- (D) Lead

Answer: Option D

629. The 'transition temperature' for ductile to brittle behaviour of steel increases with increase in the _____ content in steel.

- (A) Carbon
- (B) Manganese
- (C) Both 'a' nor 'b'
- (D) Neither 'a' nor 'b'

Answer: Option A

630. Steel rods are normally used for concrete reinforcement because concrete and steel have almost equal

- (A) Tensile strength
- (B) Compressive strength
- (C) Young's modulus
- (D) Thermal co-efficient of expansion

Answer: Option D

631. Increasing the carbon content of steel

- (A) Reduces the upper shelf energy
- (B) Increasing the ductility transition temperature
- (C) Decreases brittleness
- (D) Decreases hardness

Answer: Option B

632. Spark plug is provided in a/an

- (A) Engine having carburettor
- (B) Diesel engine
- (C) Compression ignition engine
- (D) Both (B) & (C)

Answer: Option A

633. Austempering of steel requires it to be heated to 875°C followed by sudden cooling to 250-525°C, thereby changing austenite to

- (A) Sorbite
- (B) Bainite
- (C) Martensite
- (D) Troostite

Answer: Option B

634. A solid aluminium ball, when quenched in a water bath maintained at 40°C, cools down from 550°C to 450°C in 20 seconds. The expected temperature of the ball after next 20 seconds may be about _____ °C.

- (A) 370
- (B) 340
- (C) 320
- (D) 300

Answer: Option A

635. What is the percentage of chromium in 18-4-1 high speed steel?

- (A) 1
- (B) 4
- (C) 18
- (D) 23

Answer: Option C

636. With decrease in the grain size of a material, its creep resistance

- (A) Increases
- (B) Decreases
- (C) Remain constant
- (D) Either (A) or (B); depends on the material

Answer: Option C

637. For a small scale toy factory, the fixed cost per month is Rs. 5000/-. The variable cost per toy is Rs. 20 and sales price is Rs. 30 per toy. The break even production per month will be _____ toys.

- (A) 250
- (B) 500
- (C) 1000
- (D) 3000

Answer: Option B

638. An oxidation process is accompanied with decrease in the

- (A) Number of electrons
- (B) Oxidation number
- (C) Number of ions
- (D) All (A), (B) & (C)

Answer: Option A

639. In a counter flow heat exchanger, hot fluid enters at 170°C & leaves at 150°C, while the cold fluid enters at 50°C & leaves at 70°C. The arithmetic mean temperature difference in this case is _____ °C.

- (A) 20
- (B) 60
- (C) 120
- (D) ∞

Answer: Option D

640. Consumable electrodes are used in the _____ welding.

- (A) Gas
- (B) Arc
- (C) Thermit
- (D) Resistance

Answer: Option B

641. Dislocation cross-slip is difficult in those materials, which have

- (A) Large number of slip systems
- (B) High work hardening rate
- (C) Coarse grain size
- (D) Low stacking fault energy

Answer: Option D

642. The most important consideration, while designing the refrigeration system of an aircraft is that the refrigeration system

- (A) Is as light as possible
- (B) Has very high C.O.P.
- (C) Employs minimum quantity of refrigerant
- (D) Consumer minimum horse power

Answer: Option A

643. Cold chisel & hammers are made of

- (A) High speed steel
- (B) High carbon steel
- (C) Forged steel

(D) Mild steel
Answer: Option B

644. Dew point temperature always gives an indication of the _____ of the moist air.

- (A) Dryness
 - (B) Moisture content
 - (C) Coolness
 - (D) Latent heat
- Answer: Option B

645. Which of the following relationships is correct for relating the three elastic constants of an isotropic elastic material (where, E = Young's modulus, G = Modulus of rigidity or shear modulus ν = Poisson's ratio)?

- (A) $E = 2G(1 + \nu)$
 - (B) $E = G(1 + \nu)$
 - (C) $E = G(1 + \nu)/2$
 - (D) $E = 2G(1 + 2\nu)$
- Answer: Option A

646. Addition of _____ to steel does not help in improving its machinability.

- (A) Sulphur
 - (B) Silicon
 - (C) Lead
 - (D) Phosphorous
- Answer: Option B

647. The cathode in an electrochemical cell always carries

- (A) Negative charge
 - (B) Positive charge
 - (C) Zero charge
 - (D) Positive or negative charge depending upon the nature of the cell
- Answer: Option A

648. _____ can replace tungsten in high speed steel.

- (A) Chromium
 - (B) Vanadium
 - (C) Cobalt
 - (D) Molybdenum
- Answer: Option C

649. Electrometallurgical methods of metal extraction is normally used for those metals

- (A) Whose oxide/ore is not reduced by carbon
 - (B) Which fall in the category of alkali & alkaline earth metals
 - (C) Which stands higher in the electrochemical series of the metal
 - (D) All (A), (B) & (C)
- Answer: Option D

650. Multistage compression of air as compared to single stage compression offers the advantage of

- (A) Power saving per unit weight of air delivered
 - (B) Moisture elimination in the inter-stage cooler
 - (C) Increased volumetric efficiency
 - (D) All (A), (B) & (C)
- Answer: Option D

651. In electrical resistance welding, distortion results from the use of improper

- (A) Clamping methods
 - (B) Electrodes
 - (C) Current
 - (D) Filler material
- Answer: Option A

652. Work required for compression of a gas contained in a cylinder is 7000 kJ. During compression, heat interaction of 3000 kJ causes the surroundings to be heated. Internal energy change of the gas during the compression is _____ kJ.

- (A) +4000
- (B) -4000
- (C) 10000
- (D) -10000

Answer: Option A

653. Air standard Otto cycle is more efficient than the diesel cycle for the same

- (A) Heat addition & compression ratio
- (B) Heat addition & pressure
- (C) Compression ratio & pressure
- (D) Cylinder dimension & rpm

Answer: Option A

654. Age hardening is connected with

- (A) Babbitt metal
- (B) Gun metal
- (C) Stainless steel
- (D) Duralumin

Answer: Option D

655. Hydrogen can be

- (A) Used in I.C. engines as fuel
- (B) Liquefied & stored under cryogenic conditions
- (C) Produced by electrolysis of water
- (D) All (A), (B) & (C)

Answer: Option D

656. Percentage of argon (by volume) in dry atmospheric air is about

- (A) 0.09
- (B) 0.3
- (C) 0.57
- (D) 0.94

Answer: Option D

657. A compact estimate about the amount of materials handling between various work stations is obtained from the

- (A) Gantt chart
- (B) Bin chart
- (C) String diagram
- (D) Travel chart

Answer: Option D

658. _____ is the process of coating the surface of steel with aluminium oxide, thereby imparting it increased resistance to corrosion & oxidation upto a temperature of 700°C.

- (A) Veneering
- (B) Galvanising
- (C) Electroplating
- (D) Calorising

Answer: Option D

659. In case of brasses, with decreasing zinc percentage and increasing copper percentage, its _____ increases.

- (A) Percentage elongation
- (B) Brinell hardness
- (C) Tensile strength
- (D) All 'a', 'b' & 'c'

Answer: Option A

660. Normalising of a casting does not

- (A) Induce stresses in it
- (B) Refine its grain structure
- (C) Reduce segregation
- (D) Improve its mechanical properties

Answer: Option A

661. Methyl orange indicator turns

- (A) Orange yellow in alkaline medium
- (B) Orange yellow in acidic medium
- (C) Colourless in acidic medium
- (D) Colourless in basic medium

Answer: Option A

662. Limestone addition in the blast furnace is done to flux _____ present in the raw materials.

- (A) SiO_2
- (B) Al_2O_3
- (C) MnO_2
- (D) P

Answer: Option A

663. Metallic surveying tapes are made of _____ which has a low co-efficient of expansion & enough strength.

- (A) Invar
- (B) Hastelloy
- (C) Duralumin
- (D) Monel metal

Answer: Option A

664. Sand used to stop the green sand from sticking to the pattern is termed as the _____ sand.

- (A) Parting
- (B) Synthetic
- (C) Loam
- (D) Dry

Answer: Option A

665. Titanium is produced by _____ of TiCl_4 .

- (A) Electrolytic reduction
- (B) Calcium reduction
- (C) Magnesium reduction
- (D) Thermal dissociation

Answer: Option C

666. For efficient performance of a blast furnace, the extent of reduction of Wustite (FeO) should be

- (A) 100% indirect reduction
- (B) 100% direct reduction
- (C) 50-60% indirect reduction
- (D) 30-40% indirect reduction

Answer: Option C

667. Atomic _____ is a whole number for an element.

- (A) Number
- (B) Weight
- (C) Radius
- (D) None of these

Answer: Option A

668. Tip of the match stick contains a mixture of

- (A) K + S
- (B) K + S + $\text{K}_2\text{Cr}_2\text{O}_7$
- (C) S + $\text{K}_2\text{Cr}_2\text{O}_7$ + White P
- (D) None of these

Answer: Option C

669. Out of the following, the lowest packing of atoms exists in _____ crystal lattice structure.

- (A) Hexagonal close, packed (hcp)
- (B) Face centred cubic (fcc)
- (C) Body centred cubic (bcc)

(D) Simple cubic
Answer: Option D

670. Internal energy of a gas obeying Van-Der-Waals equation of state, $[p + (a/v^2)](V - b) = RT$, depends upon its

- (A) Pressure & temperature
 - (B) Pressure & specific volume
 - (C) Temperature & specific volume
 - (D) Temperature only
- Answer: Option A

671. An abrupt and sudden fall in the reading of barometer is an indication of the

- (A) Storm
 - (B) Rain
 - (C) Clear weather
 - (D) Cold wave
- Answer: Option A

672. The concentration of (H^+) ions is 4×10^{-5} in a solution. Then pH of the solution will be (Given $\log 4 = 0.6$)

- (A) 4.4
 - (B) 5.6
 - (C) 8.4
 - (D) 2.4
- Answer: Option A

673. For the Stoke's law to be valid in the case of a falling sphere in a fluid, the

- (A) Reynolds number (based on sphere diameter) should be < 1
 - (B) Flow around the sphere should be in turbulent region
 - (C) Sphere must be metallic
 - (D) Fluid density should be constant
- Answer: Option C

674. The swift cup test evaluates the following property of a sheet metal.

- (A) Stretchability
 - (B) Drawability
 - (C) Bendability
 - (D) None of these
- Answer: Option B

675. Saturated steam at a pressure of 25 kg/cm^2 is throttled to attain 5 kg/cm^2 . Then the outgoing steam will be

- (A) Wet
 - (B) Saturated
 - (C) Superheated
 - (D) None of these
- Answer: Option C

676. LVDT used for displacement measurement is a/an _____ transducer.

- (A) Passive
 - (B) Active
 - (C) Capacitive
 - (D) None of these
- Answer: Option A

677. Which of the following is resistant to the action of both heat & chemicals?

- (A) Borosilicate glass
 - (B) Silica glass
 - (C) Soda lime glass
 - (D) None of these
- Answer: Option A

678. Cold chisel's hammers are made of

- (A) High speed steel
- (B) High carbon steel

- (C) Forged steel
 - (D) Mild steel
- Answer: Option B

679. The kinematic viscosity (in stoke) and the absolute/dynamic viscosity (in poise) are the same for _____ at room temperature.

- (A) Air
- (B) Water
- (C) Mercury
- (D) Alcohol

Answer: Option B

680. Solidification time of a molten metal in a casting is proportional to (where, V = volume of metal & A = its surface area; in the casting)

- (A) V/A
- (B) V/A^2
- (C) V^2/A
- (D) V^2/A^2

Answer: Option D

681. _____ wire is never used for making the heating element.

- (A) Nichrome
- (B) Kanthal
- (C) Invar
- (D) None of these

Answer: Option C

682. Cassiterite is an ore of

- (A) Tin
- (B) Lead
- (C) Molybdenum
- (D) Chromium

Answer: Option A

683. The heat released by cooling one mole of copper from 400 K to room temperature (300 K) is (assume : C_p of copper is $23 \text{ J K}^{-1}\text{mole}^{-1}$)

- (A) 2300 J
- (B) 4600 J
- (C) 230 J
- (D) $2.3 \times 10^6 \text{ J}$

Answer: Option A

684. Two solutions A_1 & A_2 have pH value of 2 & 6 respectively. It implies that the solution

- (A) A_1 is more alkaline than solution A_2
- (B) A_1 is highly acidic
- (C) A_2 is very slightly acidic
- (D) Both (B) & (C)

Answer: Option D

685. The most suitable material for die casting is

- (A) Iron
- (B) Copper
- (C) Steel
- (D) Nickel

Answer: Option B

686. _____ is the most important element, which controls the physical properties of steel.

- (A) Manganese
- (B) Silicon
- (C) Carbon
- (D) Vanadium

Answer: Option C

687. In a totally irreversible isothermal expansion process for an ideal gas, $\Delta E = 0$, $\Delta H = 0$. Then ΔQ and ΔS will be

- (A) $\Delta Q = 0, \Delta S = 0$
(B) $\Delta Q = 0, \Delta S = +ve$
(C) $\Delta Q = 0, \Delta S = -ve$
(D) $\Delta Q = +ve, \Delta S = +ve$
Answer: Option B

688. _____ is the hardest material out of the following.

- (A) Boron carbide
(B) Tungsten carbide
(C) Hardened steel
(D) Silicon carbide
Answer: Option A

689. The taper provided on pattern for its easy & clean withdrawal from the mould is termed as the _____ allowance.

- (A) Casting
(B) Pattern
(C) Draft
(D) Distortion
Answer: Option C

690. In the X-ray radiography technique, the tube voltage for thicker plates as compared to thin plates, should be

- (A) Higher, as it gives higher wavelength
(B) Lower, as it gives higher wavelength
(C) Higher, as it gives shorter wavelength
(D) Lower, as it gives shorter wavelength
Answer: Option C

691. A thin, flat & square plate measuring $2\text{ m} \times 2\text{ m}$ is freely hanging in ambient air at 25°C . It is exposed to the solar radiation falling on one side of the plate at the rate of 500 W/m^2 . The plate temperature will remain constant at 30°C , if the convective heat transfer co-efficient is _____ $\text{W/m}^2\text{ }^\circ\text{C}$.

- (A) 50
(B) 100
(C) 150
(D) 200
Answer: Option B

692. What is the critical radius of insulation (cms) for a metallic cylinder, if the convective heat transfer co-efficient with the ambient atmosphere is $5\text{ W/m}^2\text{ }^\circ\text{K}$? Thermal conductivity of metal and insulation material are 40 and $0.1\text{ W/m}\text{ }^\circ\text{K}$ respectively.

- (A) 2
(B) 8
(C) 10
(D) 40
Answer: Option A

693. Pick out the correct statement

- (A) Jet engine can work, where there is no atmosphere
(B) Rocket engines cannot work, where there is no atmosphere
(C) Rocket engines carry oxygen required for the combustion in the form of oxidiser
(D) Jet engines also carry oxidiser
Answer: Option C

694. For which pair of the fuel gases, calorific value (C.V.) of one fuel is almost double that of the other on volume basis (i.e., kcal/Nm^3) while the C.V. is same on weight basis (i.e., kcal/kg)?

- (A) Propane and acetylene
(B) Propane and LPG
(C) Sewage gas and gobar gas
(D) B.F gas and coke oven gas
Answer: Option D

695. Lead is poured into the joint between two- _____ pipes.

- (A) Mild steel

- (B) Concrete
 - (C) Cast iron
 - (D) Asbestos cement
- Answer: Option C

696. The critical pressure at which the latent heat of vaporisation of steam becomes zero is _____ Kg/cm².

- (A) 273.15
- (B) 225.65
- (C) 100.03
- (D) 373.15

Answer: Option B

697. In a forced draft cooling tower, water is cooled from 95 to 80°F by exposure to air with a wet bulb temperature of 70°F. In this case, the

- (A) Range is 15°F
- (B) Approach is 10°F
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option C

Explanation:

Temperature range ($T_1 - T_2$) = 15°F

Temperature approach ($T_2 - t_w$) = 10°F

Wet-bulb temperature $t_w = 70^\circ\text{F}$

698. The emf of a Daniell cell “Zn | Zn²⁺ || Cu²⁺ | Cu” can be increased by

- (A) Decreasing the surface area of the electrodes
- (B) Increasing the concentration of zinc sulphate solution
- (C) Increasing the surface area of the electrodes
- (D) Increasing the concentration of copper sulphate solution

Answer: Option D

699. The diffusion co-efficient of Ni in Cu at 1000 K is $1.93 \times 10^{-16} \text{ m}^2\text{S}^{-1}$ and it is $1.94 \times 10^{-14} \text{ m}^2\text{S}^{-1}$ at 1200 K. The activation energy (in k. J.mole⁻¹) for the diffusion of Ni in Cu is

- (A) 130
- (B) 180
- (C) 230
- (D) 250

Answer: Option C

700. Which of the following materials does not form adherent oxide film on surface?

- (A) Copper
- (B) Nickel
- (C) Aluminium
- (D) Gold & silver

Answer: Option D

701. Electrostatic separation of minerals from each other is based on their differences in the following property.

- (A) Densities
- (B) Magnetic permeabilities
- (C) Electrical conductivities
- (D) Hardness

Answer: Option C

702. Steel produced from phosphatic iron is _____ in nature.

- (A) Malleable
- (B) Ductile
- (C) Brittle
- (D) Tough

Answer: Option C

703. While the recrystallisation temperature for pure metals is $0.3 T_m$, the same for alloys is equal to _____ $\times T_m$ (where, T_m Melting temperature).

- (A) 0.25

- (B) 0.45
- (C) 0.70
- (D) 0.95

Answer: Option C

704. Though tin occurs lower than iron in the electrochemical series, yet it is coated on steel for corrosion protection, because of its

- (A) Lower cost
- (B) Abundant availability
- (C) Resistance to vegetable acids as the tin plate are commercially used in 'canning' industry
- (D) None of these

Answer: Option C

705. Which of the following properties of a solid is not dependent on crystal imperfection?

- (A) Ductility
- (B) Semi-conductivity
- (C) Melting point
- (D) Yield stress

Answer: Option C

706. Parallel straight line pattern of temperature distribution for both hot and cold fluids is observed in case of heat exchanger of the type

- (A) Parallel flow with equal heat capacities
- (B) Counter flow with equal heat capacities
- (C) Counter flow with unequal heat capacities
- (D) Parallel flow with unequal heat capacities

Answer: Option B

707. The behaviour of a metal specimen, which when plastically strained in tension reduces its yield stress in compression and vice versa; is termed as the

- (A) Work hardening
- (B) Bauschinger effect
- (C) Creeping effect
- (D) Stress recovery effect

Answer: Option B

708. Maximum heat dissipation occurs from a steel wire ($k = 0.5 \text{ W/m. k}$) of 15 mm diameter exposed to air ($h = 20 \text{ W/m}^2 \cdot \text{k}$), when the insulation thickness is _____ mm.

- (A) 15
- (B) 25
- (C) 10
- (D) 30

Answer: Option B

809. Yield strength of a polycrystalline metal with an average grain size ' d ', is proportional to

- (A) $d^{1/2}$
- (B) $d^{-1/2}$
- (C) d
- (D) d^1

Answer: Option B

710. Out of the following substances, one ton of _____ will store the maximum heat for a rise of 30°C in temperature.

- (A) Steel
- (B) Lignite
- (C) Water
- (D) Lime stone

Answer: Option C

711. The passage between the nozzle and the _____ is called 'sprue' in case of injection moulding.

- (A) Runner
- (B) Cylinder
- (C) Mold
- (D) None of these

Answer: Option A

712. On decreasing the grain size of a polycrystalline material, the property most likely to deteriorate is

- (A) Creep
- (B) Toughness
- (C) Tensile strength
- (D) Fatigue

Answer: Option B

713. Identify the false statement

- (A) Martensitic steels are less susceptible to pitting corrosion than austenitic steels
- (B) Pitting corrosion is usually very localised
- (C) Hydrogen embrittlement is facilitated by tensile stress
- (D) Stress corrosion cracking is facilitated by tensile stress

Answer: Option A

714. 'Dikes' are low height walls made around the storage vessels meant for storing hazardous & inflammable material (e.g., petroleum products). Volume of dikes is equal to (where, V = volume of the storage vessel)

- (A) V
- (B) $V/2$
- (C) $2V$
- (D) $3V$

Answer: Option A

715. The condition of diffraction from a crystal is given by

- (A) $n\lambda = 2d \sin \theta$
- (B) $\lambda = d \sin 2\theta$
- (C) $\lambda = 2d \sin 2\theta$
- (D) $n\lambda = d \sin \theta$

Answer: Option A

716. Pick out the wrong statement.

- (A) The equivalent stiffness of two springs (of equal stiffness 'S') in series is $S/2$ while in parallel is $2S$
- (B) For a helical spring, deflection is proportional to D^3 (D = mean coil diameter) or d^4 (d = wire diameter)
- (C) Crushing load of columns is less than the buckling load
- (D) Modulus of resilience is proportional to (stress at elastic limit)²

Answer: Option C

717. The life of a ball bearing is inversely proportional to

- (A) (Load)¹
- (B) (Load)²
- (C) (Load)³
- (D) (Load)^{0.33}

Answer: Option C

718. Air intake for an air compressor should be preferably taken from

- (A) A site, where cooling towers are located nearby
- (B) A site, where open coal yard is located nearby
- (C) An air conditioned room maintained at a temperature of 18°C
- (D) An outside atmosphere at 10°C

Answer: Option D

719. Corrosion rate cannot be lowered by reducing the _____ of the corroding medium.

- (A) Concentration
- (B) Velocity
- (C) Temperature
- (D) None of these

Answer: Option A

720. Ammonia gas can be dried by

- (A) PCl_5

- (B) Quick lime
 - (C) CaCl_2
 - (D) Concentrated H_2SO_4
- Answer: Option B

721. The pressure drop per unit length for laminar flow of fluid through a long pipe is proportional to (where, A = cross-sectional area of the pipe & D = Diameter of the pipe)

- (A) A
- (B) D
- (C) $1/A$
- (D) $1/A^2$

Answer: Option C

722. The minimum temperature to which the water can be cooled in a cooling tower is the _____ temperature of air.

- (A) Ambient
- (B) Dry bulb
- (C) Dew point
- (D) Wet bulb

Answer: Option C

723. In case of compression of one kg of air, the work done will be the least, when the value of polytropic index ' n ' is

- (A) 1
- (B) 1.4
- (C) 1.5
- (D) $\gamma = C_p/C_v$

Answer: Option A

724. If the head is doubled in & centrifugal pump, the power required will increase in the ratio of

- (A) 2^3
- (B) $2^{3/2}$
- (C) $2^{5/2}$
- (D) $2^{1/3}$

Answer: Option B

725. Consider an ideal solution of components A and B. The entropy of mixing per mole of an alloy containing 50% B is

- (A) $R \ln 2$
- (B) $-R \ln 2$
- (C) $3 R \ln 2$
- (D) $-3R \ln 2$

Answer: Option A

726. Brazing filler metal used for joining steel plates

- (A) Melts below the melting points of base metals
- (B) Melts below 300°C
- (C) Is copper phosphorous alloy
- (D) Is copper

Answer: Option A

727. For grinding of softer materials, the grinding wheel should have _____ grain size.

- (A) Finer
- (B) Coarser
- (C) Medium
- (D) Any type of

Answer: Option B

728. The activity of pure hydrogen gas at 1000°C and 5 atm pressure

- (A) Is always less than 1
- (B) Is always greater than 1
- (C) Can be 5
- (D) Depends on the choice of the standard state

Answer: Option D

729. A furnace is made of a refractory brick wall of thickness 0.5 metre and thermal conductivity $0.7 \text{ W/m}\cdot\text{K}$. For the same temperature drop and heat loss, this refractory wall can be replaced by a layer of diatomaceous earth of thermal conductivity $0.14 \text{ W/m}\cdot\text{K}$ and thickness _____ metre.

- (A) 0.01
- (B) 0.1
- (C) 0.25
- (D) 0.5

Answer: Option B

730. Melting point & boiling points of liquid oxygen are respectively -218.8°C & -183°C , while the same for liquid nitrogen is -210°C & -195.8°C respectively. The difference in melting points of liquid oxygen & liquid nitrogen is not equal to 8.8

- (A) $^\circ\text{C}$
- (B) $^\circ\text{F}$
- (C) $^\circ\text{K}$
- (D) $^\circ\text{R}$

Answer: Option B

731. Production of one ton of paper in Indian paper industry consumes about _____ kWh of electricity.

- (A) 300
- (B) 800
- (C) 1400
- (D) 2000

Answer: Option C

732. _____ metal is used as a bearing liner material.

- (A) Pewter
- (B) White
- (C) Babbitt
- (D) Gun

Answer: Option C

733. The laminar boundary layer thickness in zero pressure gradient flow over a flat plate along the x-direction varies as $x^{0.5}$ while the thickness of turbulent boundary layer varies as (where, x = distance from the leading edge)

- (A) $x^{1.5}$
- (B) $x^{0.8}$
- (C) $x^{-1.5}$
- (D) $x^{-0.8}$

Answer: Option B

734. Regeneration of molecular sieve requires it to be heated to a temperature of about _____ $^\circ\text{C}$.

- (A) 80-120
- (B) 200-300
- (C) 600-800
- (D) 1000-1100

Answer: Option D

735. Exposure to _____ accelerates the degradation of plastics.

- (A) Ultraviolet radiation
- (B) High atmospheric temperature
- (C) High ambient temperature
- (D) Damp atmosphere

Answer: Option A

736. The 'laughing gas' is

- (A) Nitrous oxide
- (B) Nitric oxide
- (C) Nitrogen trioxide
- (D) Nitrogen pentoxide

Answer: Option A

737. Natural water contains approximately _____ percent of heavy water.

- (A) 0.015
- (B) 0.71
- (C) 1.2
- (D) 3.5

Answer: Option A

738. Heat transfer by _____ is almost absent in case of fluidised bed drying operation.

- (A) Radiation
- (B) Conduction
- (C) Convection
- (D) Both (B) & (C)

Answer: Option A

739. If a solid is compressed adiabatically in its elastic range, its _____ remains constant

- (A) Internal energy
- (B) Enthalpy
- (C) Entropy
- (D) Temperature

Answer: Option C

740. What is the range of tempering temperature (°C) for most of the materials?

- (A) 75-100
- (B) 200-300
- (C) 350-450
- (D) 500-600

Answer: Option B

741. At absolute zero temperature, for any reaction involving condensed phases

- (A) $\Delta G^\circ = 0$, $\Delta H^\circ = 0$
- (B) $\Delta H^\circ = 0$, $\Delta S^\circ = 0$
- (C) $\Delta S^\circ = 0$, $\Delta E^\circ = 0$
- (D) $\Delta S^\circ = 0$, $\Delta C_p^\circ = 0$

Answer: Option C

742. Boiler draught of 10 mm water column is equivalent to

- (A) 1 kgf/m²
- (B) 10 kgf/m²
- (C) 10 kgf/mm²
- (D) 1 kgf/mm²

Answer: Option B

743. Insulation of liquid surface can be achieved by _____ on top of its surface.

- (A) Floating hollow polypropylene spheres
- (B) Spraying alumina powder
- (C) Putting cement
- (D) None of these

Answer: Option A

744. Surface tension of a liquid

- (A) Is due to intermolecular forces of cohesion
- (B) Decreases with rise in temperature
- (C) Is responsible for the spherical shape of an isolated liquid drop
- (D) All (A), (B) & (C)

Answer: Option D

745. The activity co-efficient of the solute in a dilute solution

- (A) Decreases with the increase of concentration of the solute
- (B) Increases with the increase of concentration of the solute
- (C) Remains constant
- (D) Is unity at infinite dilution

Answer: Option C

746. Gas turbine normally employs a constant _____ cycle.

- (A) Pressure
 - (B) Temperature
 - (C) Volume
 - (D) None of these
- Answer: Option A

747. _____ property of a material is determined by the Herbert Pendulum device.

- (A) Hardness
 - (B) Tensile
 - (C) Toughness
 - (D) Compressive
- Answer: Option A

748. Depreciation of machines fails under the indirect expenses head. As per income tax regulations, it is calculated by the _____ method.

- (A) Diminishing balance
 - (B) Sinking fund
 - (C) Multiple straight line
 - (D) Sum of the years digit
- Answer: Option A

749. Pick out the wrong statement.

- (A) Molecules with symmetrical arrangements (e.g. CH_4 or CCl_4) are non-polar
 - (B) Generally, non-polar compounds are chemically inactive, conduct electricity poorly and do not ionise
 - (C) Most of the hydrocarbons are non-polar
 - (D) None of these
- Answer: Option D

750. An example of unsteady non uniform flow is the flow of liquid under pressure through a

- (A) Tapering pipe at constant flow rate
 - (B) Tapering pipe at either decreasing or increasing flow rate
 - (C) Long pipeline of constant diameter
 - (D) None of these
- Answer: Option B

751. Which of the following material handling equipments is not suitable for moving materials in varying paths?

- (A) Hand trolley
 - (B) Belt conveyor
 - (C) Crane
 - (D) Truck
- Answer: Option B

752. A material subjected _____ must have high resilience.

- (A) Shock loading
 - (B) Vibration
 - (C) Fatigue
 - (D) Tension
- Answer: Option A

753. Joule-Thomson co-efficient is the ratio of

- (A) Pressure change to temperature change occurring during adiabatic compression of a gas
 - (B) Pressure change to temperature change occurring during adiabatic throttling of a gas
 - (C) Temperature change to pressure change occurring during adiabatic compression of a gas
 - (D) Temperature change to pressure change occurring during adiabatic throttling of a gas
- Answer: Option D

754. Lead is added to 60:40 brass primarily to improve

- (A) Machinability
 - (B) Corrosion resistance
 - (C) Fluidity
 - (D) Strength
- Answer: Option A

755. Blasting of tri-nitro-toluene (TNT) is done by mixing it with ammonium

- (A) Nitrate
- (B) Sulphate
- (C) Carbonate
- (D) Chloride

Answer: Option A

756. A steam pipe is intended to be insulated with two layers of insulating materials of different thermal conductivities. For minimum heat transfer to take place

- (A) The better insulation material should be put just next to pipe (i.e., inside)
- (B) The better insulating material should be put outside
- (C) Either of the insulating material could be put on either side
- (D) Steam temperature is considered before deciding as to which insulating material is to be put inside (i.e., just next to the pipe)

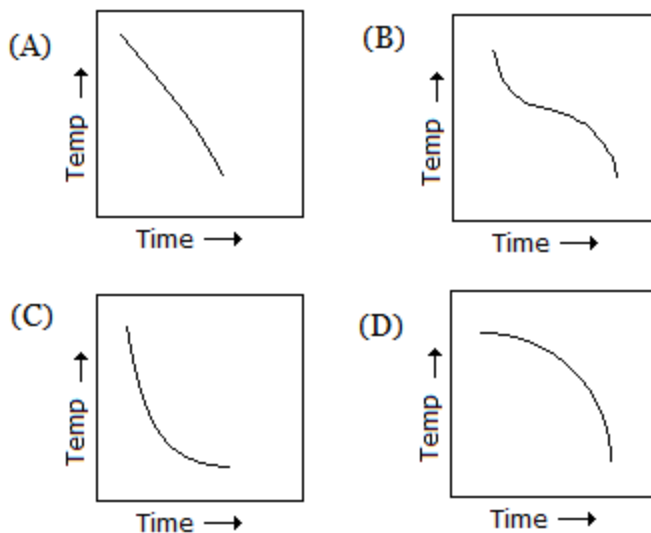
Answer: Option A

757. Glass reacts with

- (A) H_2SO_3
- (B) HF
- (C) HNO_3
- (D) $\text{K}_2\text{Cr}_2\text{O}_7$

Answer: Option B

758. Which of the following represents the correct time-temperature curve when a block of metal is heated above room temperature & then left to cool in the room following Newton's law of cooling in which the rate of temperature drop will go on decreasing with the passage of time.



Answer: Option C

759. Steels with high carbon equivalent have poor Weldability, because in these steels during welding

- (A) Carbon and other alloying elements get oxidised from the weld pool
- (B) Excessive ferrite forms in the heat affected zone leading to poor toughness of the weld
- (C) Martensite forms in the heat affected zone leading to poor toughness/ductility of the weld
- (D) Segregation of carbon and other element occurs in the weld pool leading to poor properties of the weld

Answer: Option C

760. Out of the following, maximum temperature drop for a given heat flow & for the same thickness will be in the case of

- (A) Steel
- (B) Glass wood
- (C) Copper
- (D) Fireclay bricks

Answer: Option B

761. What happens, when SO_2 is passed through a solution of H_2S in water?

- (A) Precipitation of sulphur takes place
- (B) H_2SO_3 is formed
- (C) Oleum is formed

(D) None of these
Answer: Option A

762. Which one can be directly solidified from gaseous state without entering into liquid state?

- (A) Helium
 - (B) Oxygen
 - (C) Carbon dioxide
 - (D) None of these
- Answer: Option C

763. Specific gravity of hot metal (pig iron) is _____ times that of the blast furnace slag.

- (A) 2
- (B) 3
- (C) 0.8
- (D) 6

Answer: Option B

764. Cold heading or upsetting is categorised as the _____ process.

- (A) Extrusion
- (B) Bending
- (C) Rolling
- (D) Forging

Answer: Option D

765. When dry bulb temperature & wet bulb temperature of moist air is the same, it means that the

- (A) Partial pressure of water vapour is less than the total pressure
- (B) Humidity is < 100% & dew point temperature of air has not reached
- (C) Dew point temperature of air has not reached & air is not saturated fully
- (D) Air is fully saturated

Answer: Option D

766. The fugacity of liquid water at 298 K is approximately $3171 P_a$. Considering the ideal heat of vaporisation as 43723 J/gm.mole , its fugacity at 300 K would be

- (A) $3171 P_a$
- (B) $3567 P_a$
- (C) $1.01 \times 10^5 P_a$
- (D) $5000 P_a$

Answer: Option B

767. Which of the following pairs is not correctly matched?

- (A) Uranium - 233 : Fertile material
- (B) Binding energy : Mass defect
- (C) Scattering: Absorption cross-section
- (D) Number of nucleons : Mass number

Answer: Option A

768. The most abundant metal present in the earth's crust is;

- (A) Iron
- (B) Copper
- (C) Titanium
- (D) Aluminium

Answer: Option D

769. Constituents of stellite are

- (A) Zinc, copper & nickel
- (B) Cobalt, chromium & tungsten
- (C) Zinc, aluminium & nickel
- (D) Nickel, cobalt & vanadium

Answer: Option B

770. A material being tested for endurance strength is subjected to the _____ load.

- (A) Impact
- (B) Completely reversed
- (C) Dynamic

(D) Static & dynamic
Answer: Option B

771. Which of the following contributes maximum as main source of sulphur in the blast furnace charge?

- (A) Sinter
- (B) Coke
- (C) Iron ore
- (D) Limestone

Answer: Option B

772. Notched bar test is used for testing the _____ of a material.

- (A) Impact strength
- (B) Endurance limit
- (C) Machinability
- (D) Corrosion resistance

Answer: Option A

773. L.D. (Linz-Donawitz) converter is used in the production of

- (A) Copper
- (B) Steel
- (C) Zinc
- (D) Aluminium

Answer: Option B

774. The unit of g_c is

- (A) $lb_m/lb_f \cdot ft/sec^2$
- (B) $lb_f/lb_m \cdot ft/sec^2$
- (C) ft/sec^2
- (D) $lb_m/lb_f \cdot sec^2/ft$

Answer: Option A

775. Thermal equivalent of electrical power in practical calculation is _____ kcal/kWh.

- (A) 746
- (B) 3000
- (C) 1000
- (D) 550

Answer: Option B

776. More than 95% of _____ is present in corundum.

- (A) SiO_2
- (B) Al_2O_3
- (C) $CaSiO_2$
- (D) MgO

Answer: Option B

777. One of the methods of purification of leach liquor is ion exchange, which involves

- (A) Exchange between two liquid phases
- (B) Exchange between a gaseous phase and a liquid phase
- (C) Exchange between a liquid phase and an organic resin phase
- (D) Exchange between a solid phase and a gas phase

Answer: Option C

778. Silicon percentage in acid resistant cast iron is about

- (A) 4
- (B) 8
- (C) 14
- (D) 20

Answer: Option A

779. The property of material, by which a given amount of energy is absorbed by it, without plastic deformation, is called

- (A) Resilience
- (B) Toughness
- (C) Ductility

(D) Impact strength
Answer: Option A

780. Calorific value of _____ are almost same.

- (A) Lignite & anthracite coal
 - (B) Lignite & coal gas
 - (C) Petrol & diesel
 - (D) Coal gas & natural gas
- Answer: Option C

781. The atmospheric temperature during melting of ice/snow (in the atmosphere)

- (A) Decreases
 - (B) Increases
 - (C) Remain same
 - (D) May increase or decrease; depends on the altitude where snow melts
- Answer: Option A

782. Identify the correct statement with reference to the extractive metallurgy of aluminium.

- (A) The electrolyte consists of molten Na_3AlF_6 with approximately 1 to 8% Al_2O_3
 - (B) Approximately 80% of the aluminium deposited on the cathode comes from cryolite
 - (C) Sodium is deposited along with aluminium, but is immediately vaporised
 - (D) Anode effect sets in when the cryolite concentration goes below 40%.
- Answer: Option A

783. _____ is not a case hardening process.

- (A) Carburising
 - (B) Nitriding
 - (C) Cyaniding
 - (D) Annealing
- Answer: Option A

784. The main charge in blast furnace is usually

- (A) Iron ore & coke
 - (B) Iron ore, coke & air
 - (C) Limestone, coke & iron ore
 - (D) Limestone, sand & iron ore
- Answer: Option C

785. Removal of non-condensable from steam or other vapour is termed as the _____ process.

- (A) Condensation
 - (B) Deaeration
 - (C) Scavenging
 - (D) Exhaust
- Answer: Option B

786. Maximum change in the hardness of martensite occurs in the carbon content range of _____ percent in steel.

- (A) 0.01 to 0.10
 - (B) 0.2 to 0.4
 - (C) 0.5 to 0.7
 - (D) 0.8 to 1.0
- Answer: Option B

787. _____ cannot increase the fatigue strength of a material.

- (A) Grain refining
 - (B) Grain coarsening
 - (C) Surface hardening
 - (D) Shot peening
- Answer: Option B

788. In a drilling process, the metal is removed by both shearing & extrusion. General purpose drills are made of

- (A) Stainless steel
- (B) Mild steel

- (C) High speed steel
 - (D) High carbon steel
- Answer: Option C

789. Speed of a submarine in deep sea & that of an aeroplane is measured by a/an

- (A) Pitot tube
- (B) Hot wire anemometer
- (C) Rotameter
- (D) Stroboscope

Answer: Option A

790. Production of a hollow product by inflation of a tube or parison is called the _____ process.

- (A) Blow moulding
- (B) Calendaring
- (C) Extrusion
- (D) Injection

Answer: Option A

791. Velocity of a gas in sound is not proportional to (where, T = Absolute temperature of the gas. P = Absolute pressure of the gas. γ = Ratio of specific heats (C_p/C_v) ρ = specific weight of the gas)

- (A) \sqrt{T}
- (B) $1/\sqrt{P}$
- (C) $\sqrt{\gamma}$
- (D) $1/\sqrt{\rho}$

Answer: Option B

792. Unbreakable crockeries are made from _____ polymers.

- (A) Polystyrene
- (B) Melamine
- (C) Polystyrene
- (D) Polyurethane

Answer: Option D

793. Coarse grained steels have

- (A) Low toughness
- (B) No tendency to distort
- (C) High density
- (D) Very high toughness

Answer: Option B

794. A form of stress corrosion failure termed as 'season cracking' is generally observed in

- (A) Thermosetting polymers
- (B) High carbon steels
- (C) Brasses
- (D) Borosilicate glasses

Answer: Option C

795. Hot & cold working of material causes its _____ deformation.

- (A) Visco-elastic
- (B) Isotropic
- (C) Elastic
- (D) Plastic

Answer: Option D

796. As per the Indian boiler regulation (IBR), the type of joint preferred for the circumferential joint is the _____ joint.

- (A) Butt
- (B) Lap
- (C) Welded
- (D) None of these

Answer: Option B

797. Thermit welding is categorised as the _____ welding.

- (A) Forge
- (B) Fusion
- (C) Resistance
- (D) Arc

Answer: Option B

798. Often earing defects are found during deep drawing operation, because the

- (A) Surface finish of the sheet is poor
- (B) Sheet material has been given substantial spring back
- (C) Starting sheet has planer anisotropy due to its texture
- (D) Starting sheet has normal anisotropy due to its texture

Answer: Option C

799. Work hardenable alloy steel used to make the bucket wheel excavators, blades of bulldozers and other earth moving equipments contain iron, carbon and

- (A) Manganese
- (B) Silicon
- (C) Nickel
- (D) Chromium

Answer: Option A

800. Plants produce carbohydrates from the CO₂ present in the atmosphere by

- (A) Polymerisation
- (B) Photochemical reaction
- (C) Oxidation
- (D) None of these

Answer: Option B

801. _____ is not used as the control rod material in a nuclear reactor.

- (A) Cobalt
- (B) Hafnium
- (C) Cadmium
- (D) Boron

Answer: Option A

802. The effect of friction on the flow of steam through a nozzle is to decrease the _____ of steam.

- (A) Wetness
- (B) Mass flow rate
- (C) Both 'a' & 'b'
- (D) Neither 'a' nor 'b'

Answer: Option C

803. Which of the following can be manufactured using powder metallurgy techniques?

- (A) Brake linings
- (B) Bearings
- (C) Carbide tool tips
- (D) All 'a', 'b' and 'c'

Answer: Option D

804. _____ is not a heat treatment process.

- (A) Cyaniding
- (B) Parkerizing
- (C) Austempering
- (D) Martempering

Answer: Option B

805. Pick out the wrong statement about nucleate boiling.

- (A) Bubble generation is by expansion of entrapped gas/vapour at small cavities in the surface
- (B) Surface temperature is greater than the saturation temperature of the liquid
- (C) Heat transfer from the surface of the liquid is less than that in film boiling
- (D) The temperature is less than that of film boiling

Answer: Option D

806. With increasing carbon percent in steel beyond 0.8%, its ultimate tensile strength (UTS) and _____ is not affected.

- (A) Impact strength
- (B) Percent elongation
- (C) Hardness
- (D) Both 'b' & 'c'

Answer: Option A

807. Screws are specified by their _____ diameters.

- (A) Minor
- (B) Major
- (C) Pitch
- (D) None of these

Answer: Option B

808. The bank of tubes located at the back of the domestic refrigerators are the _____ tubes.

- (A) Refrigerant cooling
- (B) Evaporator
- (C) Condenser
- (D) Throttling

Answer: Option C

809. Latent heat of dry steam at atmospheric pressure is 539 Kcal/kg; which _____ with increase in the pressure of steam.

- (A) Decreases
- (B) Increases
- (C) Remain same
- (D) May increase or decrease

Answer: Option A

810. Cupola produces _____ iron.

- (A) Pig
- (B) Cast
- (C) Wrought
- (D) Carbon free

Answer: Option B

811. Electrometallurgy is not involved in the extraction of _____ from its ore.

- (A) Aluminium
- (B) Tin
- (C) Lead
- (D) Both (B) & (C)

Answer: Option D

812. Pick out the wrong statement.

- (A) Ductile fracture of a stressed material, which exhibits a large plastic deformation is commonly caused by the formation and coalescence of voids in the necked region
- (B) Brittle fracture is caused by the propagation of pre-existing cracks in the material and involves minimum plastic deformation
- (C) Fatigue fracture of a material is always brittle in nature and takes place due to the existence of line imperfections
- (D) Brittle materials are generally tested in tension

Answer: Option B

813. In a furnace with heating element temperature at 1700°C, the dominant mechanism of heat transfer will be

- (A) Conduction
- (B) Radiation
- (C) Natural convection
- (D) Forced convection

Answer: Option B

814. A semi-conductor is damaged & behaves like a conductor, on passing a strong electric current through it, because it heats up the crystals & breaks the covalent bonds resulting in _____ electrons.

- (A) Lack of free
- (B) Excess of
- (C) Decrease in
- (D) None of these

Answer: Option B

815. Pick out the wrong statement about coating/electroplating of metals.

- (A) Phosphate coating is used as an excellent base for paints & enamels
- (B) Phosphate coating is less corrosion resistant than chromate coating
- (C) The base metal to be electroplated is normally made the cathode of the electrolytic cell and coating metal is made the anode
- (D) Calorising is the process of coating steel with chromium

Answer: Option D

816. Moh's scale of hardness, which consists of 10 standard minerals is used for the measurement of _____ hardness.

- (A) Scratch
- (B) Indentation
- (C) Dynamic
- (D) Rebound

Answer: Option A

817. Nusselt number/Biot number varies

- (A) Inversely with thermal conductivity
- (B) Directly with heat transfer co-efficient
- (C) Directly with thermal conductivity
- (D) Inversely with the dimension of the solid

Answer: Option A

818. Increase in temperature, in general results in the

- (A) Decrease in the viscosities of both liquids & gases
- (B) Increase in the viscosities of both liquids & gases
- (C) Increase in the viscosity of liquids and decrease in that of gases
- (D) Decrease in the viscosity of liquids and increase in that of gases

Answer: Option D

819. Hooke's law

- (A) Applies to elastic deformation
- (B) Applies beyond limit of proportionality in stress-strain curve
- (C) States that stress is inversely proportional to strain upto elastic limit
- (D) None of these

Answer: Option A

820. Which of the following fastening devices has its both ends threaded?

- (A) Bolt
- (B) Stud
- (C) Set screw
- (D) Split nut

Answer: Option B

821. In case of a centrifugal pump, the ratio h_1/h_2 is termed as the _____ efficiency (where, h_1 = actual measured head & h_2 = head imparted to the fluid by impeller).

- (A) Mechanical
- (B) Overall
- (C) Volumetric
- (D) Impeller

Answer: Option A

822. Dryness fraction of dry steam is

- (A) 0
- (B) ∞
- (C) 1

(D) 0.5
Answer: Option C

823. 'GASOHOL' widely used in Brazil as a motor fuel is a mixture of alcohol and

- (A) Petrol
 - (B) LPG
 - (C) Light hydrocarbon gases (e.g. butane or propane)
 - (D) None of these
- Answer: Option A

824. Pick out the wrong statement.

- (A) Geothermal energy is a non-conventional source of energy
 - (B) Mass is converted into energy in both nuclear fission & fusion reaction
 - (C) Inhalation of mercury vapour is not harmful for human beings
 - (D) Inhalation of arsenic causes cancer
- Answer: Option C

825. Batch process is preferred over continuous process, when the

- (A) Product yields and quality cannot be achieved in continuous process, because of long residence time
 - (B) Sales demand of product is not steady
 - (C) Same equipment cannot be used for several processes of the same nature
 - (D) All (A), (B) & (C)
- Answer: Option B

826. Specific _____ is a dimensionless quantity.

- (A) Heat
 - (B) Humidity
 - (C) Weight
 - (D) None of these
- Answer: Option D

827. Which of the following processes follows the hardening process for reducing the hardening strains & increasing the toughness of the steel part?

- (A) Anodising
 - (B) Tempering
 - (C) Carburising
 - (D) Annealing
- Answer: Option B

828. In the acid Bessemer process, the hot metal should have the following composition.

- (A) S < 0.05% and P < 0.05%
 - (B) S < 0.05% and P < 1.5%
 - (C) S < 0.05% and P > 1.5%
 - (D) S > 1.5% and P < 0.05%
- Answer: Option A

829. Electrochemical corrosion can occur, only if _____ is present in contact with metal.

- (A) Air
 - (B) Oxygen
 - (C) Liquid medium
 - (D) Gaseous medium
- Answer: Option C

830. A particle is settling in a liquid under Stokesian conditions. The free falling velocity of the particle is proportional to

- (A) $\sqrt{\text{Particle diameter}}$
 - (B) Particle diameter
 - (C) $(\text{Particle diameter})^2$
 - (D) $(\text{Particle diameter})^3$
- Answer: Option B

831. The ability of tool steel to resist softening at high temperatures is termed as _____ hardness.

- (A) Red

- (B) Extended
 - (C) Super
 - (D) Extreme
- Answer: Option C

832. Work study deals with the _____ study.

- (A) Time
 - (B) Motion
 - (C) Both (A) & (B)
 - (D) Neither (A) nor (B)
- Answer: Option C

833. The efficiency of a Carnot heat engine operating between absolute temperatures T_1 and T_2 (when, $T_1 > T_2$) is given by $(T_1 - T_2)/T_1$. The co-efficient of performance (CO.P.) of a Carnot heat pump operating between T_1 and T_2 is given by

- (A) $T_1/(T_1 - T_2)$
- (B) $T_2/(T_1 - T_2)$
- (C) T_1/T_2
- (D) T_2/T_1

Answer: Option B

834. Gross national product (GNP) means the total value of _____ in a country.

- (A) Goods produced
- (B) Gold reserve
- (C) Earning of the citizens
- (D) Taxes paid

Answer: Option A

835. Blow off cock is provided in steam boiler to

- (A) Guard the boiler in case of abnormal rise in steam pressure
- (B) Drain out water and sludge during its repair
- (C) Regulate the supply of water in boiler
- (D) Put out the fire in the furnace when the water level in the boiler falls to unsafe limit

Answer: Option B

836. Venturimeter is used to measure the flow rate of fluids in pipes, when the pipe is in _____ position.

- (A) Horizontal
- (B) Vertical
- (C) Inclined
- (D) Any

Answer: Option D

837. The most prominent single cause of corrosion in boiler-tubes, drums, economisers and steam superheaters in a thermal power plant boiler is the

- (A) Water alkalinity & leakage
- (B) Hydrazine addition during feed water treatment
- (C) Release of non-condensable gas from water in the boiler
- (D) Scale formation

Answer: Option C

838. Electrolytic reduction cell used for conversion of calcined Al_2O_3 to Al is a carbon lined furnace operating at 800-900 °C. The purpose of electric current supplied to the furnace is to

- (A) Achieve very high purity of aluminium (99.9%)
- (B) Keep the electrolyte in liquid condition by the generation of heat
- (C) Electrolytically dissociate alumina
- (D) Both (B) & (C)

Answer: Option D

839. _____ pipe is the most suitable for carrying sanitary drainage.

- (A) Stainless steel
- (B) Reinforced cement concrete
- (C) Cast iron
- (D) Asbestos cement

Answer: Option C

840. Holes for riveting purposes should be preferably made by

- (A) Cutting torch
- (B) Drilling
- (C) Punching
- (D) None of these

Answer: Option B

841. Sacrificial anode method is used in the protection of pipelines which are buried underground. Sacrificial anode

- (A) Occurs higher in the electro-chemical series of metals
- (B) Is exemplified by magnesium plate
- (C) Is much cheaper than the cathodic base material to be guarded against corrosion
- (D) All (A), (B) & (C)

Answer: Option D

842. Reynolds number of a fluid flowing in a circular pipe is 10,000. What will be the Reynolds number when the fluid velocity is decreased by 30% & the pipe diameter is increased by 30%?

- (A) 9,100
- (B) 13,000
- (C) 7,000
- (D) 2,550

Answer: Option A

843. Energy to be supplied to the radioactive nucleus for the emission of a neutron is _____ MeV.

- (A) 0.8
- (B) 7.8
- (C) 200
- (D) 10000

Answer: Option A

844. Triple point of water is

- (A) 0°F
- (B) 492°R
- (C) 0°K
- (D) -273°C

Answer: Option A

845. Euler number is defined as the ratio of inertia force to _____ force.

- (A) Pressure
- (B) Elastic
- (C) Gravity
- (D) Viscous

Answer: Option A

846. Ganister contains maximum percentage of

- (A) FeO
- (B) SiO₂
- (C) MgO
- (D) MnO₂

Answer: Option B

847. Pick out the wrong statement.

- (A) The X-rays cannot be deflected by electric field unlike cathode rays
- (B) The intensity of X-rays can be measured by ionisation current produced due to the ionisation of gas by X-rays
- (C) The quality of X-rays can be controlled by varying the anode-cathode voltage
- (D) Crystal structure of a material can be studied by an electron microscope

Answer: Option C

848. In a boundary layer developed along the flow, the pressure decreases in the downstream direction. The boundary layer thickness in this case will

- (A) Decrease gradually
- (B) Increase gradually

- (C) Increase rapidly
 - (D) Remain constant
- Answer: Option B

849. The co-ordination number in simple cubic structure is

- (A) 4
- (B) 6
- (C) 8
- (D) 12

Answer: Option B

850. Liquor poisoning generally occurs due to the presence of _____ in it.

- (A) Ethyl alcohol
- (B) Impurities
- (C) Methyl alcohol
- (D) Carbonic acid

Answer: Option C

851. In inventory control theory, the economic order quantity (EOQ) is the

- (A) Lot size corresponding to break even analysis
- (B) Average level of inventory
- (C) Optimum lot size
- (D) None of these

Answer: Option C

852. 'Flare tower' used in industry is meant for

- (A) Venting off (after burning) the excess inflammable/toxic gases at high pressure
- (B) Absorbing the pollutant gases from the furnace exhaust
- (C) Cooling of furnace exhaust gases
- (D) None of these

Answer: Option A

853. Solute atoms which cause yield point phenomenon in mild steel are/is

- (A) Aluminium
- (B) Boron
- (C) Carbon
- (D) Nitrogen

Answer: Option C

854. The ratio of thermal & electrical conductivity is same for all the metals at the same temperature; and at around room temperature, this ratio is proportional to (where, T = absolute temperature, °K)

- (A) T
- (B) $1/T$
- (C) T^2
- (D) $1/T^2$

Answer: Option A

855. Heat required to raise the temperature of a body by 1 °C is called its

- (A) Heat capacity
- (B) Specific heat capacity
- (C) Thermal conductivity
- (D) Water equivalent

Answer: Option A

856. Common salt is produced from sea water in India generally by the _____ method.

- (A) Freeze drying
- (B) Solar evaporation
- (C) Electrolytic
- (D) None of these

Answer: Option B

857. Air/fuel ratio on molar (volume) basis for combustion of methane with theoretical quantity of air with be

- (A) 9.5 : 1

- (B) 12.5 : 1
- (C) 15.5 : 1
- (D) 18.5 : 1

Answer: Option A

858. Which of the following terminology is used for the temperature at which new grains are formed in a metal?

- (A) Eutectic temperature
- (B) Lower critical temperature
- (C) Recrystallisation temperature
- (D) Upper critical temperature

Answer: Option C

859. Which of the following phenomenon/ phenomena is/are diffusion controlled?

- (A) Dislocation climb
- (B) Cross-slip
- (C) Twinning
- (D) Recrystallisation

Answer: Option D

860. Frother is added in the froth floatation cell used in ore beneficiation to stabilise the air bubbles (i.e., froth), which will hold the ore particles, but it does not affect the floatability of minerals. Which of the following is not used as a frother?

- (A) Cresylic acid
- (B) Xanthaies
- (C) Pine oil
- (D) All 'a' 'b' & 'c'

Answer: Option B

861. _____ the exhaust gas is an indication of the incomplete combustion of fuel.

- (A) Low temperature of
- (B) High temperature of
- (C) High % of CO in
- (D) High % of CO₂ in

Answer: Option C

862. The stress at which extension of the material takes place more rapidly as compared to the increase in load is termed as the _____ point of the material.

- (A) Elastic
- (B) Ultimate
- (C) Yielding
- (D) Breaking

Answer: Option C

863. In _____ process, there is an increase in entropy with no degradation of energy.

- (A) Isothermal expansion
- (B) Isochoric heat addition
- (C) Polytropic expansion
- (D) Isobaric heat addition

Answer: Option A

864. While the thermosetting polymers are amorphous in nature, the thermoplastic polymers are either amorphous or crystalline. The crystalline polymers are characterised by the

- (A) Low impact strength
- (B) High flexibility
- (C) Better finish and surface appearance
- (D) High plastic deformation

Answer: Option A

865. Air-petrol ratio in an automotive petrol engine is around

- (A) 14 : 1
- (B) 22 : 1
- (C) 25 : 1
- (D) 4 : 1

Answer: Option A

866. An approximately _____ process exemplifies the flow of a gas through a very long pipe of uniform cross-section.

- (A) Adiabatic
- (B) Isothermal
- (C) Isentropic
- (D) Isochoric

Answer: Option B

867. Pick out the wrong conversion of absolute & kinematic viscosities.

- (A) 1 stoke = 1 cm²/sec
- (B) 1 N.sec/m² = 10 paise
- (C) 1 stoke = 1 m²/sec
- (D) 1 m²/sec = 10⁴ stokes

Answer: Option C

868. _____ of test specimens is not involved in any hardness testing method.

- (A) Fracture
- (B) Indentation
- (C) Wear
- (D) Scratch

Answer: Option A

869. _____ is the process used for setting up compressive stresses in the surface of a metal to improve its fatigue strength.

- (A) Lancing
- (B) Shot peening
- (C) Slugging
- (D) Spinning

Answer: Option B

870. Which of the following are made out of the carbon steel having carbon content of 0.9 to 1%?

- (A) Small punches, broaches reamers and springs
- (B) Cutlery, screws, rivets and files
- (C) Mandrels, twist drills, small lathe tools and razors
- (D) Forgings like can shaft, structural steel plate, threading dies and drawing dies

Answer: Option A

871. Which of the following has the highest modulus of elasticity (about 7×10^6 kg/cm²)?

- (A) High speed steel
- (B) Stainless steel
- (C) Tungsten carbide
- (D) Superalloys

Answer: Option C

872. Nickel is a _____ material.

- (A) Ferromagnetic
- (B) Semi-conductor
- (C) Paramagnetic
- (D) Ferroelectric

Answer: Option A

873. Function of fusible plug in a boiler is to

- (A) Drain out water and sludge from the boiler during repair
- (B) Put off fire in the furnace when water level in the boiler falls to unsafe limit
- (C) Guard the boiler in case of abnormal rise in steam pressure
- (D) All (A), (B) & (C)

Answer: Option B

874. Optical activity is a/an _____ property.

- (A) Additive
- (B) Constitutive
- (C) Both (A) & (B)
- (D) Neither (A) nor (B)

Answer: Option C

875. The property of material, by which a given amount of energy is absorbed by it without plastic deformation, is called the

- (A) Resilience
- (B) Toughness
- (C) Ductility
- (D) Impact strength

Answer: Option A

876. High endurance limit of carburised machine parts is because of the fact that carburisation

- (A) Suppresses any stress concentration produced in the parts
- (B) Enhances the yield point of the material
- (C) Introduces a compressive layer on the surface
- (D) Produces a better surface finish

Answer: Option C

877. "Encyclopaedia of Chemical Technology" has been

- (A) Authored by Kirk Othmer
- (B) Edited by Perry and Chilton
- (C) Edited by Kirk Othmer
- (D) Authored by Perry and Chilton

Answer: Option C

878. A material being tested for endurance strength is subjected to the _____ load.

- (A) Impact
- (B) Completely reversed
- (C) Dynamic
- (D) Static & dynamic

Answer: Option B

879. A metal having a Poisson's ratio = 0.3 is elastically deformed under uniaxial tension. If the longitudinal strain = 0.8, then the magnitude of thickness strain is

- (A) -0.8
- (B) 0.8
- (C) +0.08
- (D) -0.24

Answer: Option D

880. Otto cycle used in spark ignition petrol engines is also known as the constant _____ cycle.

- (A) Volume
- (B) Pressure
- (C) Heat
- (D) None of these

Answer: Option A

881. _____ is not used as a material of construction in thermocouples.

- (A) Alumel
- (B) Rhodium
- (C) Constantan
- (D) Duralumin

Answer: Option D

882. For dynamic strain measurement, the Wheatstone bridge used is of _____ type.

- (A) Voltage sensitive null
- (B) Voltage sensitive deflected
- (C) Current sensitive deflected
- (D) None of these

Answer: Option B

883. The size of the tetrahedral void in the closest packing of atoms is _____ that of the octahedral void.

- (A) Equal to
- (B) Greater than