

# Engineering Materials

1. Ductility of a material can be defined as
- (a) ability to undergo large permanent deformations in compression
  - (b) ability to recover its original form
  - (c) ability to undergo large permanent deformations in tension
  - (d) all of the above
  - (e) none of the above.

Ans: c

2. Malleability of a material can be defined as
- (a) ability to undergo large permanent deformations in compression
  - (b) ability to recover its original form
  - (c) ability to undergo large permanent deformations in tension
  - (d) all of the above
  - (e) none of the above.

Ans: a

3. In compression, a prism of brittle material will break
- (a) by forming a bulge ( $\perp$ ) by shearing along oblique plane
  - (c) in direction perpendicular to application of load
  - (d) by crushing into thousands of pieces
  - (e) none of the above.

Ans: b

4. The ability of a material to resist softening at high temperature is known as
- (a) creep
  - (b) hot tempering
  - (c) hot hardness
  - (d) fatigue
  - (e) superhardening.

Ans: c

5. Mild steel belongs to the following category
- (a) low carbon steel
  - (b) medium carbon steel
  - (c) high carbon steel
  - (d) alloy steel
  - (e) special steel.

Ans: a

6. The ultimate tensile strength of low carbon steel by working at a high strain rate will
- (a) decrease
  - (b) increase
  - (c) remain constant
  - (d) first increase and then decrease
  - (e) first decrease and then increase.

Ans: b

7. Slow plastic deformation of metals under a constant stress is known as
- (a) creep
  - (b) fatigue
  - (c) endurance
  - (d) plastic deformation
  - (e) non-plastic deformation.

Ans: a

8. The ultimate tensile strength and yield strength of most of the metals, when temperature falls from 0 to 100°C will

- (a) increase
- (b) decrease
- (c) remain same
- (d) first increase and then decrease
- (e) show unpredictable behaviour.

Ans: a

9. The number of electrons in 1 cm<sup>3</sup> of metal would be of the order of

- (a) 10<sup>10</sup>
- (b) 10<sup>16</sup>
- (c) 10<sup>22</sup>
- (d) 10<sup>40</sup>
- (e) 10<sup>52</sup>

Ans: c

10. Stress relaxation is- the phenomenon

- (a) in which parts are not loaded
- (b) in which stress remains constant on increasing load
- (c) in which deformation tends to loosen the joint and produces a stress reduced
- (d) stress reduces on increasing load
- (e) none of the above.

Ans: c

11. The elastic stress strain behaviour of rubber is

- (a) linear
- (b) non-linear
- (c) plastic
- (d) no fixed relationship
- (e) unpredictable behaviour.

Ans: b

12. Isotropic materials are those which have the same

- (a) elastic properties in all directions
- (b) stresses induced in all directions
- (c) thermal properties in all directions
- (d) electric and magnetic properties in all directions
- (e) density throughout.

Ans: a

13. Recrystallization temperature is one

- (a) at which crystals first start forming from molten metal when it is cooled
- (b) at which new spherical crystals first begin to form from the old deformed one when a strained metal is heated
- (c) at which change of allotropic form takes place
- (d) at which crystals grow bigger in size
- (e) at which crystals are destroyed on heating.

Ans: b

14. Points of arrest for iron correspond to

- (a) stages at which allotropic forms change
- (b) stages at which further heating does not increase temperature for some time
- (c) stages at which properties do not change with increase in temperature
- (d) there is nothing like points of arrest

(e) none of the above.

Ans: a

15. Delta iron occurs at temperature of

- (a) room temperature
- (b) above melting point
- (c) between 1400°C and 1539°C
- (c) between 910°C and 1400°C
- (e) none of the above.

Ans: c

16. A material is known as allotropic or polymorphic if it

- (a) has a fixed structure under all conditions
- (b) exists in several crystal forms at different temperatures
- (c) responds to heat treatment
- (d) has its atoms distributed in a random pattern
- (e) none of the above.

Ans: b

17. Super conduction by metals is observed in the temperature range of

- (a) below 10°K
- (b) above 100°K
- (c) around 0°C
- (d) around 100°C
- (e) above 1000°C.

Ans: a

18. Which of the following constituents of steels is softest and least strong

- (a) austenite
- (b) pearlite
- (c) ferrite
- (d) cementite
- (e) bainite.

Ans: c

19. Which of the following represents the allotropic forms of iron

- (a) alpha iron, beta iron and gamma iron
- (b) alpha iron and beta iron
- (c) body centred cubic  $\alpha$ -iron and face centred cubic  $\alpha$ -iron
- (d) alpha iron, gamma iron and delta iron
- (e) none of the above.

Ans: d

20. The following types of materials are usually the most ductile

- (a) face-centred cubic lattice
- (b) body-centred cubic lattice
- (c) hexagonal close-packed lattice
- (d) all of the above
- (e) none of the above.

Ans: a

21. Pure iron is the structure of

- (a) ferrite
- (b) pearlite
- (c) austenite
- (d) ferrite and cementite
- (e) ferrite and pearlite.

Ans: a

22. The temperature at which ferromagnetic alpha iron transforms to paramagnetic alpha iron is

- (a) 770°C
- (b) 910°C
- (c) 1050°C
- (d) below recrystallisation temperature
- (e) above recrystallization temperature.

Ans: a

23. Gamma iron exists at following temperature

- (a) room temperature
- (b) near melting point
- (c) between 1400°C and 1539°C
- (d) between 910°C and 1400°C
- (e) none of the above.

Ans: d

24. Ferromagnetic alpha iron exists in temperature range of

- (a) below 723°C
- (b) 770 - 910°C
- (c) 910-1440°C
- (d) 1400-1539°C
- (e) above 1539°C.

Ans: a

25. Paramagnetic alpha iron changes to gamma iron at

- (a) 770°C
- (b) 910°C
- (c) 1440°C
- (d) 1539°C
- (e) none of the above.

Ans: b

26. A reversible change in the atomic structure of steel with corresponding change in the properties is known as

- (a) molecular change
- (b) physical change
- (c) allotropic change
- (d) solidus change
- (e) atomic change.

Ans: c

27. The molecules in a solid move

- (a) in a random manner
- (b) in a haphazard way
- (c) in circular motion
- (d) back and forth like tiny pendulums
- (e) do not move.

Ans: d

28. The crystal structure of gamma iron is

- (a) body centred cubic
- (b) face centred cubic
- (c) hexagonal close packed
- (d) cubic structure

(e) orthorhombic crystal.

Ans: b

29. The crystal of alpha iron is

- (a) body centred cubic
- (b) face centred cubic
- (c) hexagonal close packed
- (d) cubic structure
- (e) orthorhombic crystal.

Ans: a

30. The metallic structure of mild steel is

- (a) body centred cubic
- (b) face centred cubic
- (c) hexagonal close packed
- (d) cubic structure
- (e) orthorhombic crystal.

Ans: a

31. For the allotropic forms of iron, the points of arrest are

- (a) the points where no further change occurs
- (b) constant for all metals
- (c) the points where there is no further flow of metal
- (d) the points of discontinuity
- (e) the points where major changes take place.

Ans: d

32. The percentage of carbon in pig iron varies from

- (a) 0.1 to 1.2%
- (b) 1.5 to 2.5%
- (c) 2.5 to 4%
- (d) 4 to 4.5%
- (e) 4.5 to 6.3%.

Ans: d

33. The percentage of carbon in grey iron castings usually varies between

- (a) 0.5 to 1%
- (b) 1 - 2%
- (c) 2.5 to 4.5%
- (d) 5 - 7%
- (e) 7-9%.

Ans: c

34. Pig iron is the name given to

- (a) raw material for blast furnace
- (b) product of blast furnace made by reduction of iron ore
- (c) iron containing huge quantities of carbon
- (d) iron in molten form in the ladles
- (e) iron scrap.

Ans: b

35. The unique property of cast iron is its high

- (a) malleability
- (b) ductility
- (c) surface finish
- (d) damping characteristics
- (e) hardness.

Ans: d

36. Cast iron is characterised by minimum of following %age of carbon

- (a) 0.2%
- (b) 0.8%
- (c) 1.3%
- (d) 2%
- (e) 6.3%.

Ans: d

37. In grey cast iron, carbon is present in the form of

- (a) cementite
- (b) free carbon
- (c) flakes
- (d) spheroids
- (e) nodular aggregates of graphite.

Ans: c

38. In nodular iron, graphite is in the form of

- (a) cementite
- (b) free carbon
- (C) flakes
- (d) spheroids
- (e) nodular aggregates of graphite.

Ans: d

39. In malleable iron, carbon is present in the form of

- (a) cementite
- (b) free carbon
- (c) flakes
- (d) spheroids
- (e) nodular aggregates of graphite.

Ans: e

40. Wrought iron is

- (a) hard
- (b) high in strength
- (c) highly resistant to corrosion
- (d) heat treated to change its properties
- (e) least resistant to corrosion.

Ans: c

41. Sulphur in pig iron tends to make it

- (a) hard'
- (b) soft
- (c) ductile
- (d) tough
- (e) malleable.

Ans: a

42. Pick up wrong statement about wrought iron

- (a) It contains carbon of the order of 0 to 0.25%
- (b) It melts at 1535°C
- (c) It is very soft and ductile
- (d) It can be easily forge welded
- (e) It is made by adding suitable percent-age of carbon to molten iron and subjecting the product to repeated hammering and rolling.

Ans: e

43. Iron is

- (a) paramagnetic
- (b) ferromagnetic
- (c) ferroelectric
- (d) dielectric
- (e) none of the above.

Ans: b

44. A reversible change in the atomic structure of the steel with a corresponding change in the properties is known as

- (a) allotropic change
- (b) recrystallisation
- (c) heat treatment
- (d) precipitation
- (e) austempering.

Ans: a

45. Chilled cast iron has

- (a) no graphite
- (b) a very high percentage of graphite
- (c) a low percentage of graphite
- (d) graphite as its basic constituent of composition
- (e) none of the above is true.

Ans: a

46. Cast iron has

- (a) high tensile strength
- (b) its elastic limit close to the ultimate breaking strength
- (c) high ductility
- (d) all of the above
- (e) none of the above.

Ans: b

47. White cast iron contains carbon in the form of

- (a) free carbon
- (b) graphite
- (c) cementite
- (d) white carbon
- (e) ferrite.

Ans: c

48. In mottled cast iron, carbon is available in

- (a) free form
- (b) combined form
- (c) nodular form
- (d) flat form
- (e) partly in free and partly in combined state.

Ans: e

49. An important property of high silicon (12 - 18%) cast iron is the high

- (a) tenacity
- (b) brittleness
- (c) plasticity
- (d) corrosion resistance
- (e) hardness.

Ans: e

50. An important property of malleable cast iron in comparison to grey cast iron is the high

- (a) compressive strength
- (b) ductility
- (c) carbon content
- (d) hardness
- (e) surface finish.

Ans: b

51. Steel contains

- (a) 80% or more iron
- (b) 50% or more iron
- (c) alloying elements like chromium, tungsten nickel and copper
- (d) elements like phosphorus, sulphur and silicon in varying quantities
- (e) high quantities of sulphur.

Ans: b

52. Carbon steel is

- (a) made by adding carbon in steel
- (b) refined from cast iron
- (c) an alloy of iron and carbon with varying quantities of phosphorus and sulphur
- (d) extensively used for making cutting tools
- (e) extremely brittle.

Ans: c

53. Annealing of white cast iron results in production of

- (a) malleable iron
- (b) nodular iron
- (c) spheroidal iron
- (d) grey iron
- (e) none of the above.

Ans: a

54. 'Killed steels' are those steels

- (a) which are destroyed by burning
- (b) which after their destruction are recycled to produce fresh steel
- (c) which are deoxidised in the ladle with silicon and aluminium
- (d) in which carbon is completely burnt
- (e) which have poor properties due to improper manufacturing.

Ans: c

55. Hardness of steel depends on

- (a) amount of carbon it contains
- (b) the shape and distribution of the car-bides in iron
- (c) method of fabrication
- (d) contents of alloying elements
- (e) the quality of ore from which it is made.

Ans: b

56. Maximum percentage of carbon in ferrite is

- (a) 0.025%
- (b) 0.06%
- (c) 0.1%
- (d) 0.25%
- (e) 0.8%.

Ans: a

57. Maximum percentage of carbon in austenite is

- (a) 0.025%
- (b) 0.26%
- (c) 0.8%
- (d) 1.25%
- (e) 1.7%.

Ans: e

58. Corrosion resistance of steel is increased by addition of

- (a) chromium and nickel
- (b) sulphur, phosphorus, lead
- (c) vanadium, aluminium
- (d) tungsten, molybdenum, vanadium, chromium
- (e) zinc.

Ans: a

59. In which of the following cases, consideration of creep is important

- (a) flywheel of steam engine
- (b) cast iron pipes"
- (c) cycle chains
- (d) gas turbine blades
- (e) piston I.C. engine.

Ans: d

60. The most effective inhibitor of grain growth, when added in small quantities is

- (a) carbon
- (b) vanadium
- (c) manganese
- (d) cobalt
- (e) copper.

Ans: b

61. Depth of hardness of steel is increased by addition of

- (a) nickel
- (b) chromium
- (c) tungsten
- (d) vanadium
- (e) ell of the above.

Ans: b

62. Railway rails are normally made of

- (a) mild steel
- (b) alloy steel
- (c) high carbon
- (d) tungsten steel
- (e) cast iron steel.

Ans: c

63. Pick up the wrong statement

- (a) aluminium in steel results in excessive grain growth
- (b) manganese in steel induces hardness
- (c) nickel and chromium in steel help in raising the elastic limit and improve the resilience and ductility
- (d) tungsten in steels improves magnetic properties and hardenability
- (e) sulphur, phosphorous and lead im–prove machining properties of steel.

Ans: a

64. Pick up the wrong statement Nickel and chromium in steel help in

- (a) providing corrosion resistance
- (b) improving machining properties
- (c) providing high strength at elevated temperatures
- (d) raising the elastic limit
- (e) improving the resilience and ductility.

Ans: b

65. Machining properties of steel are improved by adding

- (a) sulphur, lead, phosphorous
- (b) silicon, aluminium, titanium
- (c) vanadium, aluminium
- (d) chromium, nickel
- (e) lubricants.

Ans: a

66. Eutectoid steel contains following percentage of carbon

- (a) 0.02%
- (b) 0.3%
- (c) 0.63%
- (d) 0.8%
- (e) 1.2%.

Ans: d

67. The basic constituents of Hastelloy are

- (a) aluminium, copper etc.
- (b) nickel, molybdenum etc.
- (c) nickel, copper, etc.
- (d) all of the above
- (e) none of the above.

Ans: b

68. Basic constituents of Monel metal are

- (a) nickel, copper
- (b) nickel, molybdenum
- (c) zinc, tin, lead
- (d) nickel, lead and tin
- (e) none of the above.

Ans: a

69. German silver is an alloy of

- (a) silver and some impurities
- (b) refined silver
- (c) nickel, copper and zinc
- (d) nickel and copper
- (e) silver and gold.

Ans: c

70. Surveying tapes are made of a material having low coefficient of expansion and enough strength. The alloy used is

- (a) silver metal
- (b) duralumin
- (c) Hastelloy
- (d) monel metal
- (e) invar.

Ans: e

71. A cold chisel is made of

- (a) mild steel
- (b) cast iron
- (c) H.S.S.
- (d) high carbon
- (e) german silver.

Ans: d

72. An engineer's hammer is made of

- (a) cast iron
- (b) forged steel
- (c) mild steel
- (d) high carbon steel
- (e) H.S.S.

Ans: d

73. Inconel is an alloy of

- (a) nickel, chromium and iron
- (b) nickel, copper
- (c) nickel, chromium
- (d) nickel, zinc
- (e) nickel, lead.

Ans: a

74. By severely deforming a metal in a particular direction it becomes

- (a) ductile
- (b) malleable
- (c) homogeneous
- (d) isotropic
- (e) anisotropic.

Ans: e

75. Solder is an alloy consisting of

- (a) tin, antimony, copper
- (b) tin and copper
- (c) tin and lead
- (d) lead and zinc
- (e) lead and copper.

Ans: b

76. Cyaniding is the process of

- (a) dipping steel in cyanide bath
- (b) reacting steel surface with cyanide salts
- (c) adding carbon and nitrogen by heat treatment of steel to increase its surface hardness
- (d) obtaining cyanide salts
- (e) making corrosion resistant steel.

Ans: c

77. Induction hardening is the process of

- (a) hardening surface of workpiece to obtain hard and wear resistant surface
- (b) heating and cooling rapidly
- (c) increasing hardness throughout
- (d) inducing hardness by continuous process
- (e) hardening core.

Ans: a

78. The loss of strength in compression with simultaneous gain in strength in tension due to overloading is known as

- (a) hysteresis
- (b) creep
- (c) visco elasticity
- (d) Boeschinger effect
- (e) inelasticity.

Ans: d

79. Process of austempering results in

- (a) formation of bainite structure
- (b) carburised structure
- (c) martensitic structure
- (d) lamellar layers of carbide distributed throughout the structure
- (e) relieving of stresses throughout a component.

Ans: a

80. The surface hardness of the following order is achieved by nitriding operation

- (a) 600 VPN
- (b) 1500 VPN
- (c) 1000 to 1100 VPN
- (d) 250 VPN
- (e) 2000 VPN.

Ans: c

81. Hardness of martensite is about

- (a) RC 65
- (b) RC 48
- (c) RC 57
- (d) RC 80
- (e) RC 32.

Ans: a

82. Weld decay is the phenomenon found with

- (a) cast iron
- (b) mild steel
- (c) non-ferrous materials
- (d) wrought iron
- (e) stainless steel.

Ans: e

83. Materials after cold working are subjected to following process to relieve stresses

- (a) hot working
- (b) tempering
- (c) normalising
- (d) annealing
- (e) special heat treatment.

Ans: d

84. Hardness of upper bainite (acicular structure) is about

- (a) RC 65
- (b) RC 48
- (c) RC 57
- (d) RC 80
- (e) RC 32.

Ans: b

85. Carbon in iron is an example of

- (a) substitutional solution
- (b) interstitial solid solution
- (c) intermetallic compounds
- (d) all of the above
- (e) none of the above.

Ans: b

86. Brass (alloy of copper and zinc) is an example of

- (a) substitutional solid solution
- (b) interstitial solid solution
- (c) intermetallic compounds
- (d) all of the above
- (e) none of the above.

Ans: a

87. Which is false statement about annealing.

Annealing is done to

- (a) relieve stresses
- (b) harden steel slightly
- (c) improve machining characteristic
- (d) soften material
- (e) permit further cold working.

Ans: b

88. Argentite is the principal ore or raw material for

- (a) aluminium
- (b) tin
- (c) zinc
- (e) lead
- (e) silver.

Ans: e

89. Hardness of lower bainite (tempered martensite) is about

- (a) RC 65
- (b) RC 48
- (c) RC 57
- (d) RC 80
- (e) RC 32.

Ans: c

90. Which is false statement about normalizing. Normalizing is done to

- (a) refine grain structure
- (b) reduce segregation in casting
- (c) improve mechanical properties
- (d) induce stresses-
- (e) relieve internal stresses.

Ans: d

91. Vanadium in high speed steels

- (a) promotes decarburisation
- (b) provides high hot hardness
- (c) forms very hard carbides and thus in-creases wear resistance
- (d) promotes retention of austenite
- (e) increases toughness.

Ans: c

92. Amorphous material is one

- (a) in which atoms align themselves in a geometric pattern upon solidification
- (b) in which there is no definite atomic structure and atoms exist in a random pattern just as in a liquid
- (c) which is not attacked by phosphorous
- (d) which emits fumes on melting
- (e) none of the above.

Ans: b

93. Dislocations in materials refer to the following type of defect

- (a) point defect
- (b) line defect
- (c) plane defect
- (d) volumetric defect
- (e) chemical defect.

Ans: b

94. An example of amorphous material is

- (a) zinc
- (b) lead
- (c) silver
- (d) glass
- (e) brass.

Ans: d

95. Which is false statement about tempering.

Tempering is done to

- (a) improve machinability
- (b) improve ductility
- (c) improve toughness
- (d) release stresses
- (e) reduce hardness and brittleness.

Ans: a

96. Which is false statement about case hardening. Case hardening is done by

- (a) electroplating
- (b) cyaniding
- (c) induction hardening
- (d) nitriding
- (e) flame hardening.

Ans: a

97. Which of the following is the binding material in cemented carbides

- (a) cobalt
- (b) nickel
- (c) vanadium
- (d) iron
- (e) carbon.

Ans: a

98. Chromium in steel

- (a) improves wear resistance, cutting ability and toughness
- (b) refines grain size and produces less tendency to carburisation, improves corrosion and heat resistant properties
- (c) improves cutting ability and reduces hardenability

- (d) gives ductility, toughness, tensile strength and anticorrosion properties
- (e) makes steel hard.

Ans: a

99. Manganese in steel increases its

- (a) tensile strength
- (b) hardness
- (c) ductility
- (d) fluidity
- (e) malleability.

Ans: a

100. Cemented carbide tools are not found to be suitable for cutting

- (a) brass
- (b) cast iron
- (c) aluminium
- (d) steel
- (e) non-ferrous alloys.

Ans: d

101. Sulphur in steel

- (a) acts as deoxidiser
- (b) reduces the grain size
- (c) decreases tensile strength and hardness
- (d) lowers the toughness and transverse ductility
- (e) increases hardness.

Ans: d

102. Tungsten in steel

- (a) improves wear resistance, cutting ability and toughness
- (b) refines grain size and produces less tendency to carburisation, improves corrosion and heat resistant properties
- (c) improves cutting ability and reduces hardenability
- (d) gives ductility, toughness, tensile strength and anticorrosion properties
- (e) raises its melting point.

Ans: b

103. Tungsten in high speed steel provides

- (a) hot hardness
- (b) toughness
- (c) wear resistance
- (d) sharp cutting edge
- (e) cold hardness.

Ans: a

104. Which of the following is not the correct method of increasing fatigue limit

- (a) shot peening
- (b) nitriding of surface
- (c) cold working
- (d) surface decarburisation
- (e) under-stressing.

Ans: d

105. Connecting rod is usually made of

- (a) aluminium
- (b) low carbon steel
- (c) medium carbon steel

- (d) high carbon steel
- (e) cast iron.

Ans: c

106. Which of the following pipes is least corrosion resistant

- (a) brass
- (b) mild steel
- (c) cast iron
- (d) wrought iron
- (e) copper.

Ans: d

107. Tensile strength of steel can be safely in-creased by

- (a) adding carbon up to 2.8%
- (b) adding carbon up to 6.3%
- (c) adding carbon up to 0.83%
- (d) adding small quantities of copper
- (e) adding copper and carbon.

Ans: c

108. High carbon steel carries carbon %age c

- (a) 0.1 to 0.3%
- (b) 0.3 to 0.6%
- (c) 0.6 to 0.8%
- (d) 0.8 to 1.5%
- (e) 1.5 to 2.5%.

Ans: d

109. Cobalt in steel

- (a) improves wear resistance, cuttinability and toughness
- (b) refines grain size and produces les tendency to carburisation, improve corrosion and heat resistant proper ties
- (c) improves cutting ability and reduce hardenability
- (d) gives ductility, toughness, tensile strength and anti corrosion property:
- (e) none of the above.

Ans: c

110. The percentage of carbon in low carbon steel is

- (a) 0.05%
- (b) 0.15%
- (c) 0.3%
- (d) 0.5%
- (e) 0.7%.

Ans: b

111. The hardness of steel increases if it contains

- (a) austenite
- (b) martensite
- (c) pearlite
- (d) cementite
- (e) all of the above.

Ans: b

112. Grey cast iron

- (a) contains 1.7 to 3.5% carbon in free state and is obtained by the slow cooling of molten cast iron
- (b) is also known as chilled cast iron am is obtained by cooling rapidly. It i: almost

unmachinable

- (c) is produced by annealing process. It is soft, tough and easily machined metal
- (d) is produced by small additions of magnesium (or cerium) in the ladle. Graphite is in nodular or spheroidal form and is well dispersed throughout the material
- (e) none of the above is true.

Ans: a

113. Nodular iron has

- (a) high machinability
- (b) low melting point
- (c) high tensile strength
- (d) good fluidity
- (e) all of the above.

Ans: e

114. Nickel in steel

- (a) improves wear resistance, cutting ability and toughness
- (b) refines grain size and produces less tendency to carburisation, improves corrosion and heat resistant properties
- (c) improves cutting ability and reduces hardenability
- (d) gives ductility, toughness, tensile strength and anticorrosion properties
- (e) none of the above.

Ans: d

115. Which of the following elements does not impart hardness to steel

- (a) copper
- (b) chromium
- (c) nickel
- (d) silicon
- (e) none of the above.

Ans: a

116. The presence of sulphur in pig iron makes

- (a) it easily machinable
- (b) it brittle
- (c) it hard
- (d) the casting unsound
- (e) increases the fluidity.

Ans: d

117. Melting point of iron is

- (a) 1539°C
- (b) 1601°C
- (c) 1489°C
- (d) 1712°C
- (e) 1131°C.

Ans: a

118. Compressive strength of grey cast iron in tonnes/cm<sup>2</sup> is of the order of

- (a) 3- 5
- (b) 5-7
- (c) 7-10
- (d) 10-15
- (e) 15-22.

Ans: b

119. Blast furnace produces following by reduction of iron ore

- (a) cast iron
- (b) pig iron
- (c) wrought iron
- (d) malleable iron
- (e) white iron.

Ans: b

120. Cupola produces following material

- a) cast iron
- (b) pig iron
- (C) wrought iron
- (d) malleable iron
- (e) white iron.

Ans: a

121. The machinability of steel is increased by

- (a) silicon and sulphur
- (b) phosphorous, lead and sulphur
- (c) sulphur, graphite and aluminium
- (d) phosphorous and aluminium
- (e) none of the above.

Ans: b

122. The following element can't impart high strength at elevated temperature

- (a) manganese
- (b) magnesium
- (c) nickel
- (d) silicon
- (e) none of the above.

Ans: b

123. Which of the following element results in presence of free graphite in C.I.

- (a) carbon
- (b) sulphur
- (c) silicon
- (d) manganese
- (e) phosphorous.

Ans: c

124. White cast iron

- (a) contains 1.7 to 3.5% carbon in free state and is obtained by the slow cooling of molten cast iron
- (b) is also known as chilled cast iron and is obtained by cooling rapidly. It is almost unmachinable
- (c) is produced by annealing process. It is soft, tough and easily machined metal
- (d) is produced by small additions of magnesium (or creium) in the ladle. Graphite is in nodular or spheroidal form and is well dispersed throughout the material
- (e) none of the above.

Ans: b

125. Cold rolled steel sheets contain carbon of the following order

- (a) 0.1%
- (b) 0.2%
- (c) 0.4%
- (d) 0.6%
- (e) 0.8%.

Ans: a

126. Pipes for bicycle frames are made of

- (a) cold rolled steel
- (b) hot rolled steel
- (c) forged steel
- (d) cast steel
- (e) carbon-chrome steel.

Ans: a

127. Large forgings, crank shafts, axles normally contain carbon up to

- (a) 0.05 to 0.20%
- (b) 0.20 to 0.45%
- (c) 0.45 to 0.55%
- (d) 0.55 to 1.0%
- (e) 1.0 to 1.2%.

Ans: c

128. Heavy duty leaf and coil spring\* contain carbon of the following order

- (a) 0.2%
- (b) 0.5%
- (c) 0.8%
- (d) 1.0%
- (e) 1.5%.

Ans: d

129. Taps, dies and drills contain carbon

- (a) below 0.5%
- (b) below 1%
- (c) above 1%
- (d) above 2.2%
- (e) nil.

Ans: c

130. Drop forging dies contain carbon of the order of

- (a) 0.1 to 0.2%
- (b) 0.25 to 0.5%
- (c) 0.6 to 0.7%
- (d) 0.7 to 0.9%
- (e) 1.0 to 1.2%.

Ans: c

131. Which is the false statement about wrought iron. It has

- (a) high resistance to rusting and corrosion
- (b) high ductility
- (c) ability of hold protective coating
- (d) easily weldable characteristics
- (e) uniform strength in all directions.

Ans: e

132. The tensile strength of wrought iron is maximum

- (a) along the lines of slag distribution
- (b) perpendicular to lines of slag distribution
- (c) uniform in all directions
- (d) unpredictable
- (e) none of the above.

Ans: a

133. Balls for ball bearings are made of

- (a) cast iron
- (b) mild steel
- (c) stainless steel
- (d) carbon-chrome steel
- (e) high carbon steel.

Ans: d

134. Malleable cast iron

- (a) contains 1.7 to 3.5% carbon in free state and is obtained by the slow cooling of molten cast iron
- (b) is also known as chilled cast iron and is obtained by cooling rapidly. It is almost unmachinable
- (c) is produced by annealing process. It is soft, tough, and easily machined metal
- (d) is produced by small additions of magnesium (or cerium) in the ladle. Graphite is in the nodular or spheroidal form and is well dispersed throughout the material
- (e) none of the above.

Ans: c

135. Preheating is essential in welding

- (a) cast iron
- (b) high speed steel
- (c) all non-ferrous materials
- (d) all of the above
- (e) none of the above.

Ans: a

136. The hardness of steel primarily depends on

- (a) %age of carbon
- (b) %age of alloying elements
- (c) heat treatment employed
- (d) method of manufacture
- (e) shape of carbides and their distribution in iron.

Ans: e

137. Steel made from phosphatic iron is

- (a) brittle
- (b) hard
- (c) ductile
- (d) tough
- (e) malleable.

Ans: a

138. Ductile cast iron

- (a) contains 1.7 to 3.5% carbon in free state and is obtained by the slow cooling of molten cast iron
- (b) is also known as chilled cast iron and is obtained by cooling rapidly. It is almost unmachinable
- (c) is produced by annealing process. It is soft, tough and easily machined metal
- (d) is produced by small additions of magnesium (or creium) in the ladle. Graphite is in nodular or spheroidal form and is well dispersed throughout the material
- (e) none of the above.

Ans: d

139. Brass contains

- (a) 70% copper and 30% zinc
- (b) 90% copper and 10% tin

- (c) 85-92% copper and rest tin with little lead and nickel
  - (d) 70-75% copper and rest tin
  - (e) 70% copper and 30% tin.
- Ans: a

140. The crystal structure of brass is
- (a) F.C.C.
  - (b) B.C.C.
  - (c) H.C.P.
  - (d) Orthorhombic crystalline structure
  - (e) none of the above.
- Ans: a

141. The composition of silver solder is
- (a) silver, copper, zinc
  - (b) silver, tin, nickel
  - (c) silver, lead, zinc
  - (d) silver, copper, aluminium
  - (e) silver, lead, tin.
- Ans: a

142. Which one of the following metals would work-harden more quickly than the others?
- (a) copper
  - (b) brass
  - (c) lead
  - (d) silver
  - (e) aluminium.
- Ans: b

143. A specimen of aluminium metal when observed under microscope shows
- (a) B.C.C. crystalline structure
  - (b) F.C.C. crystal structure
  - (c) H.C.P. structure
  - (d) a complex cubic structure
  - (e) orthorhombic crystalline structure.
- Ans: b

144. The usual composition of a soldering alloy is
- (a) tin, lead and small percentage of antimony
  - (b) tin and lead
  - (c) tin, lead and silver
  - (d) tin and copper
  - (e) tin, copper and lead.
- Ans: a

145. Admiralty brass used for steam condenser tubes contains copper and zinc in the following ratio
- (a) 50 : 50
  - (b) 30 : 70
  - (c) 70 : 30
  - (d) 40 : 60
  - (e) 60 : 40.
- Ans: b

146. Corrosion resistance of steel is increased by adding
- (a) chromium and nickel

- (b) nickel and molybdenum
- (c) aluminium and zinc
- (d) tungsten and sulfur
- (e) none of the above.

Ans: a

147. Corundum contains more than 95%

- (a) steel
- (b) A1203
- (c) SiO<sub>2</sub>
- (d) MgO
- (e) german silver.

Ans: b

148. Alnico, an alloy used extensively for permanent magnets contains iron, nickel, aluminium and cobalt in the following ratio

- (a) 50 : 20 : 20 : 10
- (b) 40 : 30 : 20 : 10
- (c) 50 : 20 : 10 : 20
- (d) 30 : 20 : 30 : 20
- (e) 50 : 10 : 20 : 20.

Ans: a

149. If a refractory contains high content of silicon, it means refractory is

- (a) acidic
- (b) basic
- (c) neutral
- (d) brittle
- (e) none of the above.

Ans: c

150. Bell metal contains

- (a) 70% copper and 30% zinc
- (b) 90% copper and 10% tin
- (c) 85-92% copper and rest tin with little lead and nickel
- (d) 70-75% copper and rest tin
- (e) 70-75% copper and rest zinc and tin.

Ans: d

151. Which of the following is used for bearing liner

- (a) gun metal
- (b) bronze
- (c) bell metal
- (d) babbitt metal
- (e) brass.

Ans: d

152. The correct sequence for descending order of machinability is

- (a) grey cast iron, low carbon steel, wrought iron
- (b) low carbon steel, grey cast iron, wrought iron
- (c) wrought iron, low carbon steel, grey cast iron
- (d) wrought iron, grey cast iron, low carbon steel
- (e) grey cast iron, wrought iron, low carbon steel.

Ans: a

153. Structural steel contains following principal alloying elements

- (a) nickel, chromium and manganese

- (b) tungsten, molybdenum and phosphorous
- (c) lead, tin, aluminium
- (d) zinc, sulphur, and chromium
- (e) none of the above.

Ans: a

154. Aluminium bronze contains aluminium and copper in the ratio of

- (a) 50 : 50
- (b) 40 : 60
- (c) 60 : 40
- (d) 10 : 90
- (e) 90 : 10.

Ans: d

155. Bronze contains

- (a) 70% copper and 30% zinc
- (b) 90% copper and 10% tin
- (c) 85-92% copper and rest tin with little lead and nickel
- (d) 70-75% copper and rest tin
- (e) 90% copper and 10% zinc.

Ans: b

156. Muntz metal contains copper and zinc in the ratio of

- (a) 50 : 50
- (b) 40 : 60
- (c) 60 : 40
- (d) 20 : 80
- (e) 80 : 20.

Ans: c

157. Gun metal contains

- (a) 70% copper and 30% zinc
- (b) 90% copper and 10% tin
- (c) 85-92% copper and rest tin with little lead and nickel
- (d) 70-78% copper and rest tin
- (e) 85-92% copper and rest zinc.

Ans: c

158. Perminvar alloy having constant permeability is an alloy of

- (a) nickel, copper and iron
- (b) nickel, copper and zinc
- (c) copper, nickel and antimony
- (d) iron, zinc and bismuth
- (e) antimony, copper and zinc.

Ans: a

159. The alloy used for making electrical resistances and heating elements is

- (a) nichrome
- (b) invar
- (c) magnin
- (d) elinvar
- (e) peiminvar.

Ans: a

160. Monel metal contains

- (a) 63 to 67% nickel and 30% copper
- (b) 88% copper and 10% tin and rest zinc

- (c) alloy of tin, lead and cadmium
  - (d) malleable iron and zinc
  - (e) none of the above.
- Ans: a

163. Permalloy is a
- (a) kind of stainless steel
  - (b) none ferrous alloy
  - (c) polymer
  - (d) cutting tool material
  - (e) nickel and iron alloy having high permeability.
- Ans: e

164. Phosphor bronze contains
- (a) 0.5% of phosphorous
  - (b) 1% phosphorous
  - (c) 2.5% phosphorous
  - (d) 5% phosphorous
  - (e) none of the above.
- Ans: e

165. Free cutting steels
- (a) are used where ease in machining is the criterion
  - (b) contain carbon in free form
  - (c) require least cutting force
  - (d) do not exist
  - (e) can be cut freely even under adverse conditions.
- Ans: a

166. Delta metal is an alloy of
- (a) copper, zinc and iron
  - (b) iron, nickel and copper
  - (c) iron, lead and tin
  - (d) iron, aluminium and magnesium
  - (e) copper, zinc and antimony.
- Ans: a

167. Admiralty gun metal contains
- (a) 63 to 67% nickel and 30% copper
  - (b) 88% copper, 10% tin and rest zinc
  - (c) alloy of tin, lead and cadmium
  - (d) iron scrap and zinc
  - (e) none of the above.
- Ans: b

168. Which of the following alloys does not contain tin
- (a) white metal
  - (b) solder admiralty
  - (c) fusible metal
  - (d) phosphor bronze
  - (e) gun metal.
- Ans: a

169. Which is false statement about properties of aluminium
- (a) modulus of elasticity is fairly low
  - (b) wear resistance is very good
  - (c) fatigue strength is not high

- (d) creep strength limits its use to fairly low temperatures
- (e) corrosion resistance is good.

Ans: b

170. Addition of copper to aluminium results in

- (a) improvement of casting characteristics
- (b) improvement of corrosion resistance
- (c) one of the best known age and precipitation-hardening systems
- (d) improving machinability
- (e) none of the above.

Ans: c

171. Addition of manganese to aluminium results in

- (a) improvement of casting characteristics
- (b) improvement of corrosion resistance
- (c) one of the best known age and precipitation-hardening systems
- (d) improving machinability
- (e) none of the above.

Ans: b

172. Elinvar, an alloy used in precision instruments, hair springs for watches, etc. contains the following element as principal alloying element

- (a) iron
- (b) copper
- (c) aluminium
- (d) zinc
- (e) nickel.

Ans: e

173. Which of the following alloys does not have copper as one of the constituents

- (a) delta metal
- (b) monel metal
- (c) constantan
- (d) nichrome
- (e) silicon bronze.

Ans: d

174. Addition of lead and bismuth to aluminium results in

- (a) improvement of casting characteristics
- (b) improvement of corrosion resistance
- (c) one of the best known age and precipitation-hardening systems
- (d) improving machinability
- (e) none of the above.

Ans: d

175. Addition of silicon to aluminium results in

- (a) improvement of casting characteristics
- (b) improvement of corrosion resistance
- (c) one of the best known age and precipitation-hardening systems
- (d) improving machinability
- (e) none of the above.

Ans: a

176. Constantan an alloy used in thermocouples is an alloy of

- (a) copper and tin
- (b) copper and zinc
- (c) copper and iron

- (d) copper and nickel
  - (e) copper and chromium.
- Ans: d

177. White metal contains
- (a) 63 to 67% nickel and 30% copper
  - (b) 88% copper and 10% tin and rest zinc
  - (c) alloy of tin, lead and cadmium
  - (d) silver and chromium
  - (e) malleable cast iron and silver.
- Ans: c

178. German silver contains
- (a) 1% silver
  - (b) 2.5% silver
  - (c) 5% silver
  - (d) 10% silver
  - (e) 100% silver.
- Ans: c

179. Which of the following has highest specific strength of all structural materials
- (a) magnesium alloys
  - (b) titanium alloys
  - (c) chromium alloys
  - (d) magnetic steel alloys
  - (e) none of the above.
- Ans: b

180. Dow metal contains
- (a) 94% aluminium, 4% copper and 0.5% Mn, Mg, Si and Fe
  - (b) 92.5% aluminium and, 4% copper, 2% nickel and 1.5% Mg
  - (c) 90% aluminium and 90% copper
  - (d) 90% magnesium and 9% aluminium with some copper
  - (e) 90% magnesium and 10% tin.
- Ans: d

181. Foundry crucible is made of
- (a) mild steel
  - (b) german silver
  - (c) lead
  - (d) cast iron
  - (e) graphite.
- Ans: e

182. Age-hardening is related with
- (a) stainless steel
  - (b) gun metal
  - (c) german silver
  - (d) duralumin
  - (e) cast iron.
- Ans: d

183. Aluminium bronze contains
- (a) 94% aluminium, 4% copper and 0.5% Mn, Mg, Si and Fe
  - (b) 92.5% aluminium, 4% copper, 2% nickel, and 1.5% Mg
  - (c) 10% aluminium and 90% copper
  - (d) 90% magnesium and 9% aluminium with some copper

(e) 10% aluminium and 90% tin.

Ans: c

184. Babbit metal is a

- (a) lead base alloy
- (b) tin base alloy
- (c) copper base alloy
- (d) all of the above
- (e) (a) and (c) above.

Ans: e

185. The correct composition of Babbit metal is

- (a) 87.75% Sn, 4% Cu, 8% Sb, 0.25% Bi
- (b) 90% Sn, 2% Cu, 4% Sb, 2% Bi, 2% Mg
- (c) 87% Sn, 4% Cu, 8% Sb, 1% Al
- (d) 82% Sn, 4% Cu, 8% Sb, 3% Al, 3% Mg
- (e) none of the above.

Ans: a

186. DuraJomin contains

- (a) 94% aluminium, 4% copper and 0.5% Mn, Mg, Si and Fe
- (b) 92.5% aluminium, 40% copper, 2% nickel, and 1.5% Mg
- (c) 10% aluminium and 90% copper
- (d) 90% magnesium and 9% aluminium with some copper
- (e) 94% aluminium and 6% tin.

Ans: a

187. Neutral solution is one which has pH value

- (a) greater than 7
- (b) less than 7
- (c) equal to 7
- (d) pH value has nothing to do with neutral solution
- (e) none of the above.

Ans: c

188. Acidic solution is one which has pH value

- (a) greater than 7
- (b) less than 7
- (c) equal to 7
- (d) pH value has nothing to do with neutral solution
- (e) none of the above.

Ans: b

189. Basic solution is one which has pH value

- (a) greater than 7
- (b) equal to 7
- (c) less than 7
- (d) pH value has nothing to do with basic solution
- (e) none of the above.

Ans: a

190. Following elements have face-centred cubic structure

- (a) gamma iron (910° to 1400°C), Cu, Ag, Au, Al, Ni, Pb, Pt
- (b) Mg, Zn, Ti, Zr, Br, Cd
- (c) a iron (below 910°C and between 1400 to 1539°C), W
- (d) all of the above
- (e) none of the above.

Ans: a

191. Recrystallisation temperature can be lowered by

- (a) purification of metal
- (b) grain refinement
- (c) working at lower temperature
- (d) all of the above
- (e) none of the above.

Ans: d

192. Pearlite is a combination of

- (a) ferrite and cementite
- (b) cementite and gamma iron
- (c) ferrite and austenite
- (d) ferrite and iron graphite
- (e) pearlite and ferrite.

Ans: a

193. Austenite is a combination of

- (a) ferrite and cementite
- (b) cementite and gamma iron
- (c) ferrite and austenite
- (d) ferrite and iron graphite
- (e) pearlite and ferrite.

Ans: b

194. The transistor is made of

- (a) silver
- (b) gold
- (c) copper
- (d) germanium
- (e) german silver.

Ans: d

195. Lead is poured into the joint between two pipes. These pipes may be made of

- (a) cast iron
- (b) vitrified clay
- (c) asbestos cement
- (d) concrete
- (e) mild steel.

Ans: a