

## **Objective questions on MET-09**

Q1 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

Q2. The ability of a material to resist softening at high temperature is known as

- a) creep
- b) hot tempering
- c) hot hardness
- d) fatigue

Q3. Mild steel belongs to the following category

- a) low carbon steel
- b) medium carbon steel
- c) high carbon steel
- d) alloy steel

Q4. Slow plastic deformation of metal under a constant stress is known as

- a) creep
- b) fatigue
- c) endurance
- d) plastic deformation

Q5. White cast iron contains carbon in the form of

- a) free carbon
- b) graphite
- c) cementite
- d) white carbon

Q6. Maximum percentage of carbon in ferrite is

- a) 0.025%
- b) 0.06%
- c) 0.1%
- d) 0.25%

Q7. Maximum percentage of carbon in austenite is

- a) 0.025%
- b) 0.26%
- c) 0.8%
- d) 1.7%

Q8. 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

Q9. Railway rails are normally made of

- a) mild steel
- b) alloy steel
- c) high carbon
- d) tungsten steel

Q10. 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

Q11. Machining properties of steel are improved by adding

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

Q12.Eutectoid steel contains following percentage of carbon

- a) 0.02%
- b) 0.3%
- c) 0.63%
- d) 0.8%

Q13.Basic constituents of monel metal are

- a) Nickel, copper
- b) Nickel, molybdenum
- c) Zinc,tin,lead
- d) Nickel, lead and tin

Q14.German silver is an alloy of

- a) Silver and some impurities
- b) Refined silver
- c) Nickel, copper and zinc
- d) Zinc,tin,lead

Q15.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

Q16. Induction hardening is the process of

- a) Hardening surface of work piece to obtain hard and wear resistance surface
- b) Heating and cooling rapidly
- c) Increasing hardness throughout
- d) Inducing hardness by continuous process

Q17. Hardness of martensite is about

- a) RC 65
- b) RC 48
- c) RC 57
- d) RC 80

Q18. Materials after cold working are subjected to following process to relieve stresses

- a) Hot working
- b) Tempering
- c) Normalizing
- d) Annealing

Q19. What is false statement about annealing. Annealing is done to

- a) Relieve stresses
- b) Harden steel slightly
- c) Improve machining characteristic
- d) Soften material

Q20. Which is false statement about normalising. Normalising is done to

- a) Refine grain structure
- b) Reduce segregation in casting
- c) Improve mechanical properties
- d) Induce stresses

Q21. An explain of amorphous material is

- a) Zinc
- b) Lead
- c) Silver
- d) Glass

Q22. Which is false statement about tempering. Tempering is done to

- a) Improve machinability
- b) Improve ductility
- c) Improve toughness
- d) Release stresses

Q23. Which is false statement about case hardening? Case hardening is done by

- a) Electroplating
- b) Cyaniding
- c) Induction hardening
- d) Nitriding

Q24. Chromium in steel

- a) Improves wear resistance, cutting ability and toughness
- b) Refines grain size and produces fewer tendencies to carburization, improves corrosion and heat resistant properties.
- c) Improves cutting ability and reduces hardenability
- d) Gives ductility, toughness, tensile strength and anti corrosion properties

Q25. Melting point of iron is

- a) 1539°C
- b) 1601°C
- c) 1489°C
- d) 1712°C

Q26. 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

Q27. Iron alloyed with carbon upto 2% is called

- a) Cast iron
- b) Steel
- c) Mild steel
- d) high carbon steel

Q28. Iron alloyed with carbon in percentage greater than 2% is called

- a) cast iron
- b) steel
- c) mild steel
- d) high carbon steel

Q29. Pearlitic or eutectoid steels have carbon content

- a) equal to 0.83%
- b) less than 0.83%
- c) more than 0.83% and upto 2%
- d) more than 2%

Q30. Hypoeutectoid steels have carbon content

- a) equal to 0.83%
- b) less than 0.83%
- c) more than 0.83% and up to 2%
- d) more than 2%

Q31. Hypereutectoid steels have carbon content

- a) equal to 0.83%
- b) less than 0.83%
- c) more than 0.83 % and up to 2%
- d) more than 2%

Q32. Cementite phase has carbon content

- a) less than 0.83%
- b) more than 0.83% and less than 2%
- c) more than 2%
- d) more than 6.67%

Q33. Eutectoid steels have structure of

- a) pearlite alone
- b) phases of ferrite and pearlite
- c) phases of cementite and pearlite
- d) phases of ferrite and cementite

Q34. Hypoeutectoid steels have structure of

- a) pearlite alone
- b) phases of ferrite and pearlite
- c) phases of cementite and pearlite
- d) phases of ferrite and cementite

Q35. When steel with 0.8% carbon is cooled from temperature of 950°C the pearlite would occur at the following fixed temperature

- a) 910 °C
- b) 850 °C
- c) 770 °C
- d) 723 °C

Q36. Hypereutectoid steels have structure of

- a) pearlite alone
- b) phases of ferrite and pearlite
- c) phases of cementite and pearlite
- d) phases of ferrite and cementite

Q37. The temperature and carbon content at which eutectic reaction occurs in Fe-C equilibrium diagram are

- a) 723°C and 0.02%C
- b) 723°C and 0.80%C
- c) 910°C and 4.30%C
- d) 1130°C and 2.00%C

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- b) 723 °C and 0.80%C
- c) 1130 °C and 2.00%C
- d) 1130 °C and 4.30%C

Q39. Gibb's phase rule is given by the expression F is equal to

- a) C+P
- b) C-P
- c) C-P-2
- d) C-P-2

Q40. In full annealing process, the hypoeutectoid steel in

- a) Heated above A3 line and cooled very slowly in furnace as to refine old structure
- b) Heated above A1 line with a view to make steel ductile for cold working
- c) Heated below A1 line and cooled slowly with a view to remove internal stresses
- d) Heated above A3 line and cooled in air resulting in slight hardening



Q41.Which of the following is not a type of phase diagram;

- a) Eutectic system
- b) Monotectic systems
- c) Eutectoid systems
- d) All of the above

Q42.Heat treatment operation involving heating of steel above upper critical temperature and then cooling it in the furnace is known as

- a) Annealing
- b) Tempering
- c) austempering
- d) Normalizing

Q43.Heat treatment operation involving heating of steel above upper critical temperature and then cooling it in the air is known as

- a) Annealing
- b) Tempering
- c) austempering
- d) Normalizing

Q44.Tempering temperature of most of the materials is of the order of

- a) 100-150 °C
- b) 200-300 °C
- c) 350-400 °C
- d) 400-500 °C

Q45.Normalizing operation is carried out in

- a) Furnace
- b) Air
- c) Water
- d) Oil

Q46.The effect of alloying zinc to copper is

- a) To raise hardness
- b) To impart free-machining properties
- c) To improve hardness and strength
- d) To increase strength and ductility (if added up to 10-30%)

Q47.Which of the following is better suited for lighter duty bearings

- a) White metal
- b) Phosphor bronze
- c) Monel metal
- d) Neimonic alloys

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- c) Monel metal
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Q49.Pick up the wrong statement, Normalising result in

- a) Improving mechanical properties
- b) Refining coarse grain structure obtained during hot working
- c) Improving ductility
- d) Improving yield strength

Q50.Selection of a material for a particular use is based as following consideration

- a) Service requirement
- b) Fabrication characteristics
- c) Cost
- d) None of the above

Q51. Which of the following has maximum hardness?

- a) Austenite
- b) Pearlite
- c) Troostite
- d) Martensite

Q52. Which of the following is not the objective of normalizing

- a) Refine steel structure
- b) Remove strains caused by cold working of metal
- c) Remove internal stresses
- d) Improve tensile strength

Q53. Which of the following is a case hardening process

- a) Sheradising
- b) Tempering
- c) Sheradising
- d) Cyaniding

Q54. Which of the following is not the objective of nitriding

- a) Increase surface hardness
- b) Increase fatigue limit
- c) Increase wear resistance
- d) Refine grain size

Q55. Martensite is the supersaturated solution of carbon in

- a) Iron
- b) Steel
- c) Alpha-iron
- d) Beta-iron

Q56. Martensite is the structure obtained by

- a) Quenching austenite
- b) Quenching austenite and then heating in to the range of 200 to 375 °C
- c) Quenching austenite and then heating in to the range of 375 to 660 °C
- d) Quenching austenite and then heating in to the range of 600 to 700 °C

Q57. The percentage of chromium in 18-4-1 HSS is

- a) 18%
- b) 4%
- c) 1%
- d) 0.1%

Q58. The structure obtained by heating a steel above critical point and then quenching in water is

- a) Martensite
- b) Sorbite
- c) Acicular
- d) Bainite

Q59. Sorbite is the structure obtained by

- a) Quenching austenite
- b) Quenching austenite and then heating in to the range of 200 to 375 °C
- c) Quenching austenite and then heating in to the range of 375 to 660 °C
- d) Quenching austenite and then heating in to the range of 600 to 700 °C

Q60. Toughness of a material means

- a) Strength
- b) Mach inability
- c) Stress relieving
- d) Softening

Q61. The elastic stress strain behaviour of rubber is

- a) Linear
- b) Non-linear
- c) plastic
- d) No fixed relationship

Q62. 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

Q63. Which of the following constituents of steels is softest and least strong?

- (a) Austenite
- (b) pearlite
- (c) Ferrite
- (d) cementite

Q64. 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

Q65. Cast iron is characterised by minimum of following %age of carbon

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

Q66. 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

Q67. Railway rails are normally made of

- (a) Mild steel
- (b) Alloy steel
- (c) High carbon
- (d) Tungsten steel

Q68. The basic constituents of Hastelloy are

- (a) aluminum, copper etc.
- (b) nickel, molybdenum etc.
- (c) nickel, copper, etc.
- (d) all of the above

Q69. Carbon in iron is an example of

- (a) substitutional solution
- (b) interstitial solid solution
- (c) intermetallic compounds
- (d) all of the above

Q70. Which is false statement about case hardening. Case hardening is done by

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

Q71. The following element can't impart high strength at elevated temperature

- (a) manganese
- (b) magnesium
- (c) nickel
- (d) silicon

Q 72. Balls for ball bearings are made of

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

Q73. Preheating is essential in welding

- (a) cast iron
- (b) high speed steel
- (c) all non-ferrous materials
- (d) all of the above

Q74. 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

Q75. Which of the following alloys does not have copper as one of the constituents

- (a) delta metal
- (b) monel metal
- (c) constantan
- (d) nichrome

Q76. The correct composition of Babbitt 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

Q77. The transistor is made of

- (a) silver
- (b) gold
- (c) copper
- (d) germanium

Q78. The alloy used for making electrical resistances and heating elements is

- (a) nichrome
- (b) invar
- (c) magnin
- (d) elinva

Q79. Gibbs phase rule can be represented by (P=No. of phases, F= No. of Degrees of Freedom, C= No. of components of system)

- a)  $P+F=C+n$
- b)  $P+C=F+n$
- c)  $P+F+2=C+n$
- d) None of the above

Q80. Levers rule is used to determine;

- a) Amount of phases coexisting at particular temperature and alloy composition
- b) Amount of phases coexisting at different temperature and alloy composition
- c) Amount of phases coexisting at different temperature and particular alloy composition
- d) None of the above



Q81. Higher is the temperature of tempering:

- a) the softer will be the product
- b) the tougher will be the product
- c) the harder will be the product
- d) the stronger will be the product

Q82. The following constituents of steel is least strong and softest

- a) Ferrite
- b) Pearlite
- c) Austenite
- d) Martensite

Q83. Following stress relieving process is used after cold working of materials

- a) Tempering
- b) Cyaniding
- c) Annealing
- d) Normalizing

Q84. Which of the following statements are true for annealing of steels?

- a) Steels are heated to 500 to 700° C
- b) Cooling is done slowly and steadily
- c) Internal stresses are relieved
- d) all of these

Q85. The property of a material essential for spring materials is

- a) stiffness
- b) ductility
- c) resilience
- d) plasticity

Q86. The steel widely used for motor car crankshafts is

- a) nickel steel
- b) chrome steel
- c) nickel-chrome steel
- d) silicon steel

Q87. The hardening of machine tool guideways is usually done by;

- a) Induction hardening
- b) Flame hardening
- c) Salt bath furnaces
- d) Vacuum hardening

Q88. Austempering is the heat treatment process used to obtain greater;

- a) Hardness
- b) Toughness
- c) Softness
- d) Brittleness

Q89. The purpose of heat treatment is to

- a) relieve the stresses set up in the material after hot or cold working
- b) modify the structure of the material
- c) change grain size
- d) all of the above

Q90. Which of the following iron exist between 910° C and 1403° C?

- a)  $\alpha$ -iron
- b)  $\beta$ -iron
- c)  $\gamma$ -iron
- d)  $\delta$ -iron

Q91. Which of the following is an example of Polymeric Material?

- a) PTFE
- b) Nylon
- c) PVC
- d) All of the Above

Q92. Which of the following is an example of ceramic material?

- a) Silica
- b) Glass
- c) Cement
- d) All of the Above

Q93. Which of the following is the selection criteria of materials for given engineering requirement;

- a) Fabrication requirement
- b) Economic requirement
- c) Availability
- d) All of the Above

Q94. Duralumin is an alloy of which material;

- a) Aluminium
- b) Magnesium
- c) Copper
- d) None of the above

Q95. What are the properties that are required for a bearing material;

- a) Low coefficient of friction
- b) Anti seizing characteristics
- c) Resistance to corrosion
- d) All of the above

Q96. Which of the following is a micro constituent of iron carbon system?

- a) Pear light
- b) Bauxite
- c) Troostite
- d) All of the above

Q97. What is TTT diagram?

- a) Time temperature transformation Diagram
- b) Temperature tertiary transformation Diagram
- c) Tungsten transformation Diagram
- d) None of the above

Q98. Duralumin contains

- a) 3.5 to 4.5% copper, 0.4 to 0.7% magnesium, 0.4 to 0.7% manganese and rest aluminum
- b) 3.5 to 4.5% copper, 1.2 to 1.7% manganese, 1.8 to 2.3% nickel, 0.6% each of silicon, magnesium and iron, and rest aluminum
- c) 4 to 4.5% magnesium, 3 to 4% copper and rest aluminum
- d) 5 to 6% tin, 2 to 3% copper and rest aluminum

Q99. For the pipe fitting like elbow, tee, union etc., which of the following is preferred?

- a) Pig iron
- b) Malleable iron
- c) Spheroidal graphite cast iron
- d) High carbon steel

Q100. Babbit metal contains

- a) 50% tin and 50% antimony
- b) 66% tin, 30% copper and 4% antimony
- c) 88% tin, 4% copper and 8% antimony
- d) 92% tin, 6% copper and 2% antimony