



BRAINWARE UNIVERSITY
Term End Examination 2020 - 21
Programme – Diploma in Mechanical Engineering
Course Name – Engineering Materials
Course Code - DME302

Semester / Year - Semester III

Time allotted : 75 Minutes

Full Marks : 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 60=60

1. (Answer any Sixty)

(i) Tensile strength of steel can be safely increased by

- | | |
|-----------------------------|--------------------------------------|
| a) Adding carbon up to 2.8% | b) Adding carbon up to 6.3% |
| c) Adding carbon up to | d) Adding small quantities of copper |

(ii) Cemented carbide tools are not found to be suitable for cutting

- | | |
|--------------|--------------|
| a) Brass | b) Cast iron |
| c) Aluminium | d) Steel |

(iii) Brass (alloy of copper and zinc) is an example of

- | | |
|----------------------------------|--------------------------------|
| a) Substitutional solid solution | b) Interstitial solid solution |
| c) Intermetallic compounds | d) All of these |

(iv) 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 helps in raising the elastic limit and improve the resilience and ductility | d) Tungsten in steels improves magnetic properties and hardenability |

(v) 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

(vi) 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

(vii) On heating, one solid phase results in another solid phase and a liquid phase during _____ reaction.

a) Eutectoid

b) Peritectic

c) Eutectic

d) Peritectoid

(viii) Which phase will crystallize first just below the liquidus line?

a) ? phase

b) ? phase

c) (L+?) phase

d) (L+?) phase

(ix) What is % of C by weight in hypo-eutectoid steels?

a) 0.5%

b) 0.007

c) 0.8%

d) 0.012

(x) What is meant by specific surface?

a) surface area per unit volume

b) surface area per unit weight

c) surface weight per unit area

d) None of these

(xi) What are the metal requirements to have creep resistance property?

a) Low melting point

b) High oxidation resistance

c) Both Low melting point and High oxidation resistance

d) none of these

(xii) What is the effect of L/D ratio on compressive strength?

- a) compressive strength increases and then remains constant as L/D ratio increases b) compressive strength decreases and then increases as L/D ratio increases
- c) compressive strength decreases and then remains constant as L/D ratio increases d) none of these

(xiii) What causes transformation of deformed martensite into austenite phase?

- a) Heating b) Cooling
- c) both Heating and Cooling d) All of these

(xiv) What is meant by Nil Ductility Transition Temperature (NDT)?

- a) Metal gets transformed from brittle to ductile phase b) Metal gets transformed from ductile to brittle phase
- c) Metal gets transformed from malleable to ductile phase d) Metal gets transformed from elastic to ductile phase

(xv) Eddy current test is used to detect

- a) cracks b) hardness
- c) conductivity d) All of these

(xvi) During radiography test, which region absorbs less radiation and transmits more?

- a) Low and high density regions absorb and transmit same amount of radiation b) High density region
- c) Low density region d) none of these

(xvii) What is meant by ductility?

- a) Metals can be drawn into sheets b) Metals undergo elastic deformation under tensile loads
- c) Metals undergo plastic deformation under tensile loads d) All of these

(xviii) What is the effect of temperature on stiffness of a metal?

- a) Temperature has no effect on stiffness of a metal b) As temperature increases stiffness of metal decreases
c) As temperature increases stiffness of metal increases d) none of these

(xix) When are the slip lines observed?

- a) after neck deformation b) before plastic deformation
c) after mechanical working d) none of these

(xx) Which among the following is a paramagnetic material?

- a) Iron b) Cobalt
c) Nickel d) Aluminum

(xxi) Iron possesses BCC crystal structure up to (in degree centigrade)?

- a) 1539 b) 768
c) 910 d) 1410

(xxii) Iron possesses FCC crystal structure above (in degree centigrade)?

- a) 1539 b) 768
c) 910 d) 1410

(xxiii) For steel, which one of the following properties can be enhanced upon annealing?

- a) Hardness b) Toughness
c) Ductility d) Resilience

(xxiv) Upon annealing, eutectoid steel converts to which of the following?

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

(xxv) Alloy of Ni and Fe is termed as _____

- a) Brass
- b) Bronze
- c) Duralumin
- d) Invar

(xxvi) Major constituent of Muntz metal is _____

- a) Copper
- b) Nickel
- c) Iron
- d) Zinc

(xxvii) Which of the following alloying element can be used to deoxidize steels?

- a) Phosphorous
- b) Carbon
- c) Cerium
- d) Selenium

(xxviii) Which of the following has the highest hardness number?

- a) Martensite
- b) Tempered martensite
- c) Pearlite
- d) Fine pearlite

(xxix) Which of the following is false about ceramic structures?

- a) They are made up of two or more different elements
- b) More complex than metal structures
- c) They are electrically neutral
- d) Less complex than metal structures

(xxx) Which of the following property is affected by heat treatment?

- a) Hardness
- b) Strength
- c) Ductility
- d) All of these

(xxxii) Quenching

- a) Consists of heating the component to critical temperature
- b) Cooling rapidly
- c) Increases hardness
- d) All of these

(xxxiii) Flame hardening involves

- a) Heating the surface above the transformation range
- b) Quenching after heating
- c) Minimum case depth is 1mm
- d) All of these

(xxxiii) Which of the following polymer type is not classified on the basis of its application and properties?

- a) rubbers
- b) plastics
- c) fibres
- d) synthetic

(xxxiv) Which of the following kind of polymers are known for their high crystallinity?

- a) isotactic
- b) syndiotactic
- c) atactic
- d) none of the mentioned

(xxxv) Which of the following is not a property of thermoplastics?

- a) Recyclable
- b) Soft and weak
- c) Easy to mold
- d) Can be used at high temperatures

(xxxvi) Which of the following is an example of a thermoplastic?

- a) Urethane
- b) Melamine
- c) Acetal
- d) Epoxide

(xxxvii) Which of the following is not an example of a commodity thermoplastic?

- a) Polyethylene
- b) Polypropylene
- c) Polystyrene
- d) Phenolic

(xxxviii) _____ is an example of dichloro-ethylene.

- a) Plasticized PVC
- b) Un-plasticized PVC
- c) Chlorinated PVC
- d) Polyvinylidene chloride

(xxxix) Thermal resistance of polyimide is _____

- a) 100oC
- b) 250oC
- c) 540oC
- d) 760oC

(xl) Thermosetting plastics are formed by _____

- a) addition polymerization
- b) copolymerization
- c) condensation polymerization
- d) isomerism

(xli) Which of the following is a property of thermosetting plastics?

- a) Can be molded
- b) Soft
- c) Recyclable
- d) Can be used at high temperatures

(xlii) Phenolics are otherwise commonly known as _____

- a) Bakelite
- b) Polyformaldehyde
- c) Urea formaldehyde
- d) Melamine formaldehyde

(xliii) Cermet is a _____ composite.

- a) particle-reinforced
- b) fiber-reinforced
- c) structural
- d) laminar

(xliv) What is the dimensional accuracy in powder metallurgy?

- a) High
- b) Medium
- c) Low
- d) Sometimes high and sometimes low

(xlv) Wastage of material in powder metallurgy as scrap is _____

- a) large
- b) small
- c) depends on other factors
- d) medium

(xlvi) In powder metallurgy, range of particle size (in microns) is?

- a) 4 to 200
- b) 0.300 to 0.003

c) 100 to 2000

d) 5000 to 6000

(xlvii) Formation of metal powder to use in powder metallurgy by reducing some compound with CO or other molecules is known as?

a) Atomization

b) Reduction

c) Crushing

d) Electrolysis

(xlviii) Sintering is done to _____

a) increase final strength

b) decrease final strength

c) initially increase and then to decrease the strength

d) initially decrease and then to increase the strength

(xlix) Which of the following statements is true for green density?

a) Green density increases when particle strength increases

b) Green density decreases when compacting speed decreases

c) Green density increases when compaction pressure increases

d) Green density decreases when apparent density increases

(l) Which method is used to make powder of metals having low melting point?

a) Mechanical pulverisation

b) Electrolytic process

c) Chemical reduction

d) Atomization

(li) Which of the following tool is manufactured by powder metallurgy?

a) High speed steel

b) Sintered carbides

c) High carbon steel

d) Low carbon steel

(lii) Sintering increases

a) electrical conductivity, density and ductility

b) electrical conductivity, density and brittleness

c) porosity, electrical conductivity and brittleness

d) porosity, density and ductility

(liii) Which of the following have a greater impact on longitudinal strength of reinforced composites?

- a) Fiber orientation
- b) Fiber strength
- c) Fiber length
- d) Fiber diameter

(liv) The melting point of iron (in oC) is?

- a) 768
- b) 1535
- c) 1410
- d) 910

(lv) Iron-Carbon phase diagram is a _____

- a) Unary phase diagram
- b) Binary phase diagram
- c) Tertiary phase diagram
- d) Ternary phase diagram

(lvi) Which of the following material has the carbon varying from 2.1 to 4.3%?

- a) Dead steel
- b) Mild steel
- c) Medium carbon steel
- d) Cast iron

(lvii) The FCC structure of Fe-C solid solution is known as _____

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

(lviii) Which of the following iron carbon mixture, is the product of air cooling?

- a) coarse pearlite
- b) medium pearlite
- c) sorbite
- d) fine pearlite

(lix) Which of the following iron carbon mixture, is the product of water cooling?

- a) coarse pearlite
- b) medium pearlite
- c) martensite
- d) sorbite

(1x) Which of the following is the property of high carbon steel?

a) high toughness

b) reduced ductility

c) high strength

d) reduced strength