



## BRAINWARE UNIVERSITY

### Term End Examination 2020 - 21

Programme – Diploma in Mechanical Engineering

Course Name – Chemistry

Course Code - DME103

Semester / Year - Semester I

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) The nucleons are

- |                          |                           |
|--------------------------|---------------------------|
| a) Protons and electrons | b) Neutrons and electrons |
| c) Protons and neutrons  | d) None of these          |

(ii) The atomic number of sodium is 11 and its mass number is 23. It has

- |                                |                                 |
|--------------------------------|---------------------------------|
| a) 12 protons and 11 electrons | b) 11 protons and 12 neutrons   |
| c) 11 neutrons and 12 protons  | d) 12 electrons and 11 neutrons |

(iii) In an alpha scattering experiment, few alpha particles rebounded because

- |   |  |
|---|--|
| a) Most of the space in the atom is occupied          | b) Positive charge of the atoms is in very little space                          |
| c) The mass of the atom is concentrated in the centre | d) All the positive charge and mass of the atom are concentrated in small volume |

(iv) Quantum number values for 2p sub shell are

- |                   |                   |
|-------------------|-------------------|
| a) $n = 2, l = 1$ | b) $n = 1, l = 1$ |
| c) $n = 2, l = 0$ | d) $n = 1, l = 0$ |

(v) The maximum number of electrons that can be accommodated by p orbital is

- |      |       |
|------|-------|
| a) 6 | b) 10 |
|------|-------|

c) 2

d) 14

(vi) No two electrons in the same atom can have identical set of four quantum numbers. This statement is known as

a) Aufbau rule

b) Octet rule

c) Hund's rule

d) Pauli's Exclusion principle

(vii) The isotope atoms differ in

a) number of neutrons

b) atomic number

c) number of electrons

d) mass number

(viii) The state of hybridization of Carbon in the molecule acetylene ( $\text{H}-\text{C}\equiv\text{C}-\text{H}$ ) is

a) sp

b)  $\text{sp}^3\text{d}$

c)  $\text{sp}^2$

d)  $\text{sp}^3$

(ix) An electrolyte is a substance which

a) conducts electricity

b) decomposes on heating

c) is acidic in nature

d) when dissolved in water, dissociates into ions

(x) When one coulomb of electricity is passed through an electrolytic solution, the mass deposited on the electrode is equal to :

a) equivalent weight

b) molecular weight

c) electrochemical equivalent

d) One gram

(xi) When one Faraday of electric current is passed, the mass deposited is equal to :

a) One gram equivalent

b) One gram mole

c) electrochemical equivalent

d) Half gram equivalent

(xii) When electricity is passed through a solution of  $\text{AlCl}_3$ , 13.5 g of Al is deposited. The amount of charge passed is :

- a) 1.5 F
- b) 0.5 F
- c) 1.0 F
- d) 2.0 F

(xiii) The number of electrons involved when one faraday of electricity is passed through an electrolytic solution is:

- a) 96500
- b)  $8 \times 10^6$
- c)  $12 \times 10^{23}$
- d)  $6 \times 10^{23}$

(xiv) Carbon atom combines with other C atoms to form a long chain. This property is known as

- a) Isomerism
- b) Acetylene
- c) Catenation
- d) Homologous series

(xv) An example of aromatic compound is

- a) Benzene
- b) Naphthalene
- c) Both Benzene and Naphthalene
- d) None of these

(xvi) Butan-1-ol and Butan-2-ol are what type of isomers?

- a) functional group
- b) chain
- c) position
- d) stereoisomers

(xvii) Stereoisomers have different relative arrangement of atoms in

- a) 1D
- b) 2D
- c) 3D
- d) 4D

(xviii) Molten sodium chloride conducts electricity due to the presence of:

- a) free electron
- b) free ions
- c) free molecules
- d) free atoms of Na and Cl

(xix) The amount of electricity that can deposit 108 g of silver from silver nitrate solution is

- a) 1 ampere
- b) 1 coulomb
- c) 1 Faraday
- d) 2 ampere

(xx) Which reaction will take place at cathode when fused calcium chloride is electrolyzed?

- a)  $\text{Ca}^{2+} + 2e \rightarrow \text{Ca}$
- b)  $\text{Cl}^- \rightarrow \text{Cl} + e$
- c)  $\text{Ca}^{2+} - 2e \rightarrow \text{Ca}$
- d)  $\text{Cl}^- + e \rightarrow \text{Cl}$

(xxi) All cells do not contain:

- a) an anode
- b) a cathode
- c) ions
- d) a porous partition

(xxii) When lead accumulator is charged, it is :

- a) an electrolytic cell
- b) a galvanic cell
- c) a Daniell cell
- d) none of these

(xxiii) Strongest reducing agent is:

- a) K
- b) Mg
- c) Al
- d) I

(xxiv) Hydrogen gas will not reduce:

- a) heated cupric oxide
- b) heated ferric oxide
- c) heated stannic oxide
- d) heated aluminium oxide

(xxv) Which of the following is the best reducing agent?

- a)  $\text{F}^-$
- b)  $\text{Cl}^-$
- c)  $\text{Br}^-$
- d)  $\text{I}^-$

(xxvi) If a spoon of copper metal is placed in a solution of ferrous sulphate:

- a) Cu will precipitate out
- b) iron will precipitate
- c) Cu and Fe will precipitate
- d) no reaction will take place

(xxvii) Among Na, Hg, S, Pt, and graphite, which can be used as electrodes in electrolytic cells having aqueous solutions?

- a) Hg and Pt
- b) Hg, Pt and graphite
- c) Na and S
- d) Na , Hg and S

(xxviii) Which of the following metals is most readily corroded in moist air?

- a) Cu
- b) Fe
- c) Ag
- d) Ni

(xxix) Galvanization of iron denotes coating with:

- a) Cu
- b) Sn
- c) Zn
- d) Al

(xxx) Which of the following gains electrons more easily?

- a) Na<sup>+</sup>
- b) Zn<sup>2+</sup>
- c) Al<sup>3+</sup>
- d) H<sup>+</sup>

(xxxii) The standard electrode potential of hydrogen electrode at pH 10 is:

- a) 0.51 volt
- b) 0.0 volt
- c) - 0.591 volt
- d) 0.591 volt

(xxxiii) Which one is not correct for a reversible reaction?

- a) The reaction is never completed
- b) The reactants are present in the initial stage but after that the reactants and products are always present in the reaction mixture
- c) at equilibrium only products are present
- d) when the reaction is carried out in closed space ,it attains equilibrium state after suitable time

(xxxiii) The state of equilibrium refers to :

- a) state of rest
- b) dynamic state
- c) stationary state
- d) state of inertness

(xxxiv) The compounds in which two identical groups are on the opposite side of the double bond are known as

- a) Trans
- b) Meso
- c) Cis
- d) Threo

(xxxv) The product formed by reaction of methane with 4 moles of Chlorine is

- a)  $\text{CH}_3\text{Cl}$
- b)  $\text{CH}_2\text{Cl}_2$
- c)  $\text{CHCl}_3$
- d)  $\text{CCl}_4$

(xxxvi) Acetylene when heated at Cu tube at  $6300^\circ\text{C}$  produces

- a) Benzene
- b) Naphthalene
- c) Ethane
- d) Methane

(xxxvii) The product formed by ozonolysis of ethylene is

- a)  $\text{HCHO}$
- b)  $\text{CH}_3\text{CHO}$
- c)  $\text{CHO-CHO}$
- d)  $\text{CH}_4$

(xxxviii) Which is used in ripening of fruits

- a) Ethane
- b) Methane
- c) Ethylene
- d) Acetylene

(xxxix) Brass is an alloy of

- a) Cu and Zn
- b) Cu and Sn
- c) Zn and Sn
- d) Cu and Al

(xl) Name the metal extracted by self reduction process

- a) Cu
- b) Al
- c) Zn
- d) Fe

(xli) The impurities present in ore are known as

- a) Gangue
- b) Flux
- c) Slag
- d) Roasting

(xlii) The chief ore of Copper is

- a) Malachite
- b) Copper pyrites
- c) Azurite
- d) Copper glance

(xliii) Alumina can be extracted by

- a) Carbon reduction process
- b) Self-reduction process
- c) Roasting
- d) Bayers process

(xliv) The minimum quantity of carbon content is present in

- a) stainless steel
- b) cast iron
- c) wrought iron
- d) steel

(xlv) The Haber process is the name we give to the industrial production of

- a) Ammonia
- b) Salt
- c) Sodium Hydroxide
- d) Soap

(xlvi) What is the purpose of a catalyst in the Haber Process?

- a) To speed up the reaction
- b) To prevent ammonia from changing back to hydrogen and nitrogen
- c) To liquify the ammonia
- d) To heat up the products

(xlvii) Hardness of water is conventionally expressed in terms of equivalent amount of

- a)  $H_2CO_3$
- b)  $MgCO_3$

c)  $\text{CaCO}_3$

d)  $\text{Na}_2\text{CO}_3$

(xlviii) The chemical equivalent of  $\text{MgSO}_4$  salt is

a) 60

b) 47.5

c) 82

d) 68

(xlix) How many grams of  $\text{MgCO}_3$  dissolved per litre gives 84 ppm hardness?

a) 70.56 mg/L

b) 48.23 mg/L

c) 81.49mg/L

d) 66.12 mg/L

(l) Which of the following is not a result of the excess of impurity in boiler-feed?

a) Scale and sludge formation

b) Decomposition

c) Corrosion, priming and foaming

d) Caustic embrittlement

(li) The number of bonding pair of electron in  $\text{H}_2\text{O}$  is

a) 1

b) 3

c) 2

d) 4

(lii) The beam of electron can be produced using the

a) Cathod-ray tube

b) Anode-ray tube

c) Gamma-ray tube

d) Inert-ray tube

(liii) Number of isotopes of hydrogen are

a) 1

b) 2

c) 3

d) 4

(liv)  $\text{CH}_3\text{MgBr}$  on reaction with water produces

a)  $\text{CH}_3\text{-CH}_3$

b)  $\text{C}_3\text{H}_8$

c)  $\text{CH}_4$

d)  $\text{C}_6\text{H}_6$



(lv) The position of the double bond in alkene is denoted by

- a) Br<sub>2</sub> water
- b) Bayer's reagent
- c) Ozonolysis
- d) NH<sub>4</sub>OH/AgNO<sub>3</sub> solution

(lvi) Which one does not react with acetylene?

- a) NaOH
- b) NH<sub>4</sub>OH/AgNO<sub>3</sub>
- c) Na
- d) HCl

(lvii) The C-C bond length in benzene is

- a) Between C<sub>2</sub>H<sub>6</sub> and C<sub>2</sub>H<sub>4</sub>
- b) Like C<sub>2</sub>H<sub>4</sub>
- c) Between C<sub>2</sub>H<sub>6</sub> and C<sub>2</sub>H<sub>2</sub>
- d) Between C<sub>2</sub>H<sub>6</sub> and C<sub>2</sub>H<sub>2</sub>

(lviii) Which one is found widely in Earth crust?

- a) Al
- b) Ca
- c) Mg
- d) Na

(lix) In the Thermit process Al is used as

- a) Oxidizing agent
- b) Reducing agent
- c) Catalyst
- d) Flux

(lx) An alpha particle is

- a)
- b)



- c)
- d) None of these

