



BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Dip. CSE/ Dip. EE/ Dip. ECE

Course Name - Chemistry

Course Code – DCHE010101

(Semester – 1)

Time allotted: 3 Hours

Full Marks: 70

[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)

10 x 1 = 10

1. *Choose the correct alternative from the following*
 - (i) Identify the subshell for principal quantum number, $n=1$ and orbital quantum number, $l=0$

a. s	b. p
c. d	d. f
 - (ii) $^{14}_6\text{C}$ and $^{14}_7\text{N}$ are

a. Isotopes	b. Isobars
c. Isotones	d. Isodiaphers
 - (iii) Basicity of H_2SO_4 is

a. 1	b. 3
c. 2	d. 4
 - (iv) The hardness that cannot be removed by boiling is called

a. Temporary hardness	b. Permanent hardness
c. Both a and b	d. Total hardness

- (v) Hydrophobic part of the soap is
- | | |
|---------------|--------------|
| a. Polar | b. Non-polar |
| c. Both a & b | d. Ionic |
- (vi) Brass is an alloy of
- | | |
|-----------------|-----------------|
| a. Cu & Zn | b. Cu & Sn |
| c. Cu & Zn & Sn | d. Cu & Sn & Sb |
- (vii) Which group is present in the organic ketone compounds:
- | | |
|-----------|------------|
| a. $>C=O$ | b. $-CHO$ |
| c. $-OH$ | d. $-COOH$ |
- (viii) The formula of ethane is :
- | | |
|-------------|-------------|
| e. C_2H_4 | f. C_2H_2 |
| g. CH_4 | h. C_2H_6 |
- (ix) Which one is a redox indicator?
- | | |
|------------------|--------------------|
| a. Methyl red | b. BDS |
| c. Methyl orange | d. Phenolphthalein |
- (x) The number of electrons involved when one faraday of electricity is passed through an electrolytic solution is
- | | |
|------------------------|---------------------------|
| a. 96500 | b. 8×10^6 |
| c. 12×10^{16} | d. 6.022×10^{23} |

Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

2. a) Explain exothermic and endothermic reaction with an example of each kind. 3
- b) Write K_c for the reaction given below: 2
- $$3H_2(g) + N_2(g) \rightleftharpoons 2NH_3(g)$$

3. (a) State Pauli's Exclusion principle with illustration. 3
 b) Draw ground state electronic configuration of ${}_{26}\text{Fe}$. 2
4. a) Calculate the number of atoms in 0.5 g of carbon (atomic weight of carbon=12, Avogadro number, $N = 6.022 \times 10^{23}$) 2
 b) Define acids and bases according to the Arrhenius theory. 3
5. a) Write a short note on hydrolysis of salts. 3
 b) Define coordinate bond with example. 2
6. (a) Write the effect of temperature and pressure on equilibrium of the reaction given below : 2

$$2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$$

 (b) Determine the relation between K_p and K_c for the reaction : 3

$$a\text{A}(\text{g}) + b\text{B}(\text{g}) \rightleftharpoons c\text{C}(\text{g}) + d\text{D}(\text{g})$$

Group – C

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

7. (a) Write down the principle of the removal of hardness of water by permutit process. 10
 (b) What is slag in case of metallurgy? Write down the differences between deionized water and distilled water? 2+3
8. (a) Write down the postulates of Bohr model of an atom. 6
 (b) What are the differences between primary standard and secondary standard solutions? What is a buffer solution? 3+2
 (c) State Le-Chatelier principle and explain its application in the industrial preparation of ammonia by Haber's Process. 4
9. (a) Explain basicity of acids and acidity of bases with suitable examples. What is pH of a solution? 3+2
 (b) State de Broglie's hypothesis. 2
 (c) Write down the Lewis dot structure of the following compounds:
 CH_4 , C_2H_2 , BF_3 , H_2O 4
 (d) Calculate equivalent weights of HCl and Na_2CO_3 . 4

10. (a) Write IUPAC name of the following compounds.
- i) $\text{CH}_3\text{-CH=CH-CH}_2\text{-CH}_3$
 - ii) $\text{CH}_3\text{-CH}_2\text{-C}\equiv\text{C-CH}_3$
 - iii) $\text{CH}_2(\text{Cl})\text{-CH}_2\text{-CH=CH}_2$
 - iv) $\text{HC}\equiv\text{C-CH}_2\text{-CH}(\text{CH}_3)\text{-CH}_3$
 - v) $\text{CH}_3\text{-CH}(\text{OH})\text{-CH}_2\text{CH}_3$ 5x2
- (b) Give the structural formula of the following compounds and identify the functional groups present (if any)
- i) 2,2,4-Trimethylpentane
 - ii) 2-Bromo-3-iodohexane 5
11. (a) What are electroplating and electro-refining of metals? 4
- (b) How much charge is required to reduce one mole of Al^{3+} to Al and one mole of Fe^{3+} to Fe^{2+} ? 5
- (c) Balance the following equations by ion-electron method :
- (i) $\text{MnO}_2 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{H}_2\text{O} + \text{Cl}_2$
 - (ii) $\text{MnO}_4^- + \text{Fe}^{2+} \rightarrow \text{Mn}^{2+} + \text{Fe}^{3+} + \text{H}_2\text{O}$ (acidic medium) 3+3