



**BRAINWARE UNIVERSITY**

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**Term End Examination 2023-2024**

**Programme – Dip.CSE-2022/Dip.EE-2022/Dip.CE-2022/Diploma in Robotics &  
Automation-2023/Dip.CE-2023/Dip.CSE-2023/Dip.EE-2023/Dip.ME-2023**

**Course Name – Applied Chemistry**

**Course Code - BS101**

**( Semester I )**

**Full Marks : 60**

**Time : 2:30 Hours**

[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 15=15

1. Choose the correct alternative from the following :
- (i) Calculate the oxidation number of chlorine in  $\text{HClO}_4$ .
- |       |       |
|-------|-------|
| a) +3 | b) +5 |
| c) +7 | d) +8 |
- (ii) Which of the following compound is not likely to form an ionic bond?
- |                  |        |
|------------------|--------|
| a) NaCl          | b) MgO |
| c) $\text{CO}_2$ | d) KI  |
- (iii) Hardness of water is measured in terms of
- |                    |                    |
|--------------------|--------------------|
| a) $\text{CaCO}_3$ | b) $\text{CaCl}_2$ |
| c) NaCl            | d) KCl             |
- (iv) Select the incorrect statement from the following option.
- |  |  |
|--|--|
| a) Permanent hardness is due to dissolved chlorides and sulphates of calcium and magnesium | b) Permanent hardness can be removed by mere boiling of water  |
| c) Permanent hardness is also known as non-alkaline hardness                               | d) The difference between the total hardness and the alkaline hardness gives the non-alkaline hardness |
- (v) What type of titration is done during hardness of water measurement?
- |                             |                            |
|-----------------------------|----------------------------|
| a) Complexometric titration | b) Precipitation titration |
| c) Conductometric titration | d) Complexion titration    |
- (vi) 'No two electrons with same spin can not reside inside an orbital' ----- the statement was given by scientist
- |           |               |
|-----------|---------------|
| a) Pauli  | b) Hund       |
| c) Aufbau | d) Heisenberg |
- (vii) The yield of coal tar in HTC and LTC is
- |                              |                              |
|------------------------------|------------------------------|
| a) $\text{HTC} = \text{LTC}$ | b) $\text{HTC} > \text{LTC}$ |
|------------------------------|------------------------------|

- c)  $HTC < LTC$   
 (viii)  $H_2O$  has higher boiling point than  $H_2S$  due to  
 a) Higher electronegativity of oxygen  
 c) In  $H_2O$  there is existence of H-bonding  
 (ix) What is the name of monomer of addition-polymer?  
 a) Unsaturated Compounds  
 c) Bifunctional Saturated Compound  
 (x) What will be correct electronic configuration of  $Cr^+$ ?  
 a)  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$   
 c)  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$   
 (xi) In electrolysis of dilute  $H_2SO_4$  using platinum electrodes  
 a)  $H_2$  evolved in cathode  
 c)  $Cl_2$  obtained at cathode  
 (xii) Which of the following are redox titrations?  
 a) Iodometric titration  
 c) Complexometric titration  
 (xiii) Quantum number values for  $2p$  sub shell are  
 a)  $n = 2, l = 1$   
 c)  $n = 2, l = 0$   
 (xiv) Which of the following is used as an industrial fuel?  
 a) Coal gas  
 c) Carbon dioxide gas  
 (xv) Knocking in an internal combustion engine is mainly due to  
 a) use of tetra ethyl lead  
 c) formation of peroxides
- d) none of these  
 b)  $H_2S$  has higher molecular weight than  $H_2O$   
 d) In  $H_2S$  there is existence of H-bonding  
 b) Saturated Compounds  
 d) Trifunctional Saturated Compound  
 b)  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^4 4s^1$   
 d)  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^1$   
 b)  $NH_2$  evolved at cathode  
 d)  $O_2$  obtained at cathode  
 b) Acid-base titration  
 d) All of the above  
 b)  $n = 1, l = 1$   
 d)  $n = 1, l = 0$   
 b) Nitrogen gas  
 d) All of the above  
 b) isomerization of hydrocarbons in petrol  
 d) complete combustion of hydrocarbons in petrol.

### Group-B

(Short Answer Type Questions)

3 x 5 = 15

2. Give examples of salts which are responsible for permanent and temporary hardness. (3)  
 3. Why is hardness measured with respect to  $CaCO_3$ ? What is the unit of hardness? [2 + 1] (3)  
 4. In  $NH_3$  molecule though N is  $sp^3$  hybridized but the shape of the molecule is not tetrahedral (3)  
 ----- Explain the statement.  
 5. What is Portland cement? What are the components of Portland cement? [1+2] (3)  
 6. Classify the different type of lubricant with examples. (3)

OR

- Is good motor (petrol) engine fuel as good as diesel engine fuel? Justify your answer. (3)

**Group-C**  
(Long Answer Type Questions)

5 x 6=30

7. What do you mean by vulcanization of rubber? Why is vulcanization necessary? (5)
8. What do you mean by thermosetting and thermoplastic polymer? Give examples. Write the differences between them. (5)
9. How is hardness estimated by EDTA? (5)
10. Deduce the Nernst equation for calomel electrode. (5)
11. Write down two demerits of Rutherford's theory. State three postulates of Bohr's model. (5)  
[2+3]
12. Distinguish between Proximate analysis and ultimate analysis of coal. (5)
- OR**
- Estimate different products obtain from fractional distillation of crude oil. (5)

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