



BRAINWARE UNIVERSITY

Term End Examination 2022

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

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) At cathode which process is occurs?

- | | |
|---------------------------------|------------------|
| a) oxidation | b) reduction |
| c) both oxidation and reduction | d) none of these |

(ii) Calculate the oxidation number of oxygen in H₂O₂.

- | | |
|-------|-------|
| a) -2 | b) +2 |
| c) -1 | d) +1 |

(iii)

The summation of mole fractions of all the components of a solution is always

- | | |
|------|------|
| a) 0 | b) 1 |
| c) 2 | d) 3 |

(iv) Which of the following statement about Bomb calorimeter is correct?

- | | |
|--|---|
| a) for the determination of calorific value of gaseous fuels | b) for the determination of calorific value of liquid fuels |
| c) . for the determination of calorific value of solid fuels | d) determination of calorific value for both the solid and liquid fuels |

(v) The *p* orbitals are

- | | |
|---------------------|--------------------|
| a) Spherical shaped | b) Dumbbell shaped |
| c) Square shaped | d) Can not be said |

(vi) Exhausted permutit does not contain

- | | |
|---------------------|---------------------|
| a) Na ⁺ | b) Mg ⁺² |
| c) Al ⁺³ | d) Si ⁺⁴ |

(vii) Alkalinity in water cannot be due to the presence of:

- | | |
|--|--|
| a) OH ⁻ only | b) OH ⁻ and CO ₃ ⁻² |
| c) OH ⁻ and HCO ₃ ⁻ | d) CO ₃ ⁻² and HCO ₃ ⁻ |

(viii) pH of neutral water is:

- a) 0
c) 14
(ix) Which of the following set of quantum numbers define one 4d electron?
a) $n=4, l=2, m_l=-3, m_s=+1/2$
c) $n=4, l=2, m_l=-1, m_s=-1/2$
(x) In H-spectra, the lowest energy transition in Lyman series belongs to
a) $n=1$ to $n=\infty$
c) $n=1$ to $n=2$
(xi) Shape of BF_3 molecule is
a) tetrahedral
c) linear
(xii) Which of the following is a wrong combination?
a) 6.022×10^{23} ions of sodium = 23g of sodium
c) 6.022×10^{23} atoms of C = 24g of carbon
b) 7
d) 10.7
b) $n=4, l=0, m_l=0, m_s=1$
d) $n=4, l=4, m_l=3, m_s=-1/2$
b) $n=2$ to $n=3$
d) $n=2$ to $n=\infty$
b) trigonal planar
d) trigonal pyramidal
b) 6.022×10^{23} molecules of oxygen = 32g of oxygen
d) 6.022×10^{23} atoms of H = 1g of hydrogen atoms
(xiii) Nylon-6 is made from
a) Butadiene
c) Adipic Acid
b) Chloroprene
d) Caprolactum
(xiv) What is the initial setting time of cement?
a) 1 hour
c) 15 minutes
b) 30 minutes
d) 30 hours
(xv) The process in which the concentrated ore is heated at a temperature below its temperature of fusion in absence of air is known as
a) Roasting
c) Smelting
b) Calcination
d) Carbon reduction

Group-B

(Short Answer Type Questions)

3 x 5 = 15

2. What is carbonization of coal? Which products are obtained during carbonization of coal sample? (3)
3. What is Portland cement? What are the components of Portland cement? [1+2] (3)
4. During the electrolysis of $CuSO_4$ solution using Cu electrode, gradually the wideness of anode decreases. Explain it. (3)

OR

Why is hardness measured with respect to $CaCO_3$? What is the unit of hardness? [2+1] (3)

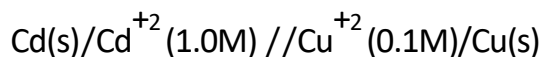
5. Draw the Lewis dot structure of [1.5+1.5] (3)

a) NaCl

b) $BeCl_2$

OR

Write down the cell reaction of the following cell and propose the E_{cell} of the following reaction. (3)



6. Write down the composition and uses of the following (3)

i) Water gas ii) Producer gas (1.5 +1.5)

OR

In NH_3 molecule though N is sp^3 hybridized but the shape of the molecule is not tetrahedral ----- Explain the statement. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. What do you mean by vulcanization of rubber? Explain the need of vulcanisation. [2+3] (5)

8. Why hard water can not be used in boiler? (5)

9. Describe the determination process of cloud and pour points of lubricant. (5)

10. Estimate different products obtain from fractional distillation of crude oil. (5)

11. (5)

Silver is electrodeposited on a metallic vessel of surface area 800 sq. cm by passing a current of 0.2 A for 3 hours. Calculate the thickness of silver deposited.

Given: Atomic mass of Ag is 107.92 amu, density of Ag is 10.5 g/ cm³.

OR

Why water has very high boiling point compare to H_2S ? Find out the hybridization of boron in BF_3 molecule and also explain about the shape of that molecule. (5)
[2+3]

12. How is hardness removed by permutit process? (5)

OR

To prepare 2 (M) NaOH solution how much amount of NaOH is required in 1000 ml of water? (5)
Write down the relation between molarity and normality for NaOH solution.
[3+2]
