**A**   Reg. No. :

PART A - (10 x 1 = 10 Marks)

1. Arrange the covalent bond configurations $sp^3$-$sp^3$, $sp^2$-$sp^2$ and sp-sp in increasing order of strength.                   CO1- R

   (a) $sp^3$-$sp^3$ < sp-sp < $sp^2$-$sp^2$

   (b) $sp^2$-$sp^2$< $sp^3$-$sp^3$ < sp-sp

   (c) $sp^3$-$sp^3$< $sp^2$-$sp^2$ < sp-sp

   (d) sp-sp < $sp^2$-$sp^2$ < $sp^3$-$sp^3$

2. The bond order in oxygen is _____.                   CO1- R

   (a) 1                 (b) 2                 (c) 3                 (d) 4

3. Dry corrosion is a process of contact of two metals                   CO2- R

   (a) Indirectly        (b) Directly        (c) Oppositely        (d) Reversibly

4. Using the data given below find out the strongest reducing agent.                   CO2- R

   $E^-Cr_2O_7^{2-}/Cr^{3+}$ = 1.33V, $E^-Cr^{3+}/Cr$ = - 0.74V, $E^-Cl_2/Cl^-$ = 1.36V, $E^-MnO_4^-/Mn^{2+}$ = 1.51V.

   (a) $Cl^-$            (b) Cr              (c) $Cr^{3+}$          (d) $Mn^{2+}$

5. Primary batteries are examples of _____.                   CO3- R

   (a) Reversible cells   (b) Fuel cells     (c) Sensors           (d) Irreversible cells

6. In ion – selective electrodes the change in $p^H$ is sensed by                   CO3- R

   (a) pellet electrode                       (b) reference electrode

   (c) glass membrane                         (d) glass electrode

7. What is the range of visible region? CO4- R

   (a) 200-400 nm     (b) 400-1000 nm     (c) 400-850 nm     (d) 400-750 nm

8. Which of the following transitions is the highest energy transition? CO4- R

   (a) n to $\sigma^*$     (b) n to $\pi^*$     (c) $\sigma$ to $\sigma^*$     (d) $\pi$ to $\pi^*$

9. The number of boding sites in a monomer is referred to as its CO5- R

   (a) functionality     (b) tacticity     (c) Co-polymers     (d) degree of polymerisation

10. The fibre which is made from acrylonitrile as monomer CO5- R

    (a) Rayon     (b) Acrylic fibre     (c) Nylon     (d) PVC

<center>PART – B (5 x 2= 10 Marks)</center>

11. Distinguish between ionic compounds and covalent compounds. CO1- R

12. Identify the types of corrosion in the following and explain the mechanism (i) Iron knife with a wooden handle (ii) Welded stainless steel parts    CO2- R

13. Differentiate primary cells and secondary cells CO3- R

14. A solution of thickness 3 cm transmits 30% of indcident light. Calculate the concentration of the solution, given extinction Co efficient $\in$= 4,000 $dm^3 mol^{-1} cm^{-1}$    CO4- App

15. Give the synthesis and uses of Nylon 66 CO5- R

<center>PART – C (5 x 16= 80 Marks)</center>

16. (a) What do you mean by hybridization? Explain with diagram the formation of Oxygen ($O_2$) and Hydrogen ($H_2$) using molecular orbital theory.    CO1- U    (16)

<center>Or</center>

    (b) Explain the concept of bonding in a Homo and hetero diatomic molecule using MO Theory    CO1- U    (16)

17. (a) Describe in detail the measurement of single electrode potentially Poggendroff's method.    CO2- U    (16)

<center>Or</center>

    (b) How are metals protected against corrosion by modifying the metal and the environment? Discuss in detail.    CO2- U    (16)

18. (a) (i) Explain $H_2$-$O_2$ fuel cell. Give its merits and demerits    CO3- U    (8)

    (ii) What are chemically modified electrodes? Explain their types.    CO3- U    (8)

<center>Or</center>

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(b) Describe the construction and working of lead acid storage battery. CO3- U (16)
Compare the lead acid storage battery with that of the fuel cell.

19. (a) Summarize the working principles of thermo gravimetric analysis CO4- U (16)

Or

(b) (i) Explain with a schematic diagram the working of Differential CO4- U (8)
Scanning Calorimetry (DSC). List the merits of DSC.

(ii) Explain the thermo gravimetric analysis of any one chemical CO4- U (8)
compound with neat block diagram.

20. (a) (i) Discuss the methods available in chemical and electrochemical CO5- U (8)
doping of conducting polymer in detail

(ii) What is OLED? Explain its structure, advantages and CO5- U (8)
disadvantages of OLED.

Or

(b) What are liquid crystals? Discuss the applications of liquid crystals in CO5- U (16)
the field of electronics.

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