Code No: 152AB

R18

Time: 2 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.a)   What do you understand by LCAO method? What are the conditions necessary for combination of atomic orbitals?

   b)   Explain n-type and p-type of semi conductions.   [7+8]

2.a)   Explain the crystal field theory for octahedral complexes of transition metals.

   b)   Explain the arrangement of following in the increasing order of their bond energy O_2^-, O_2, O_2^+.   [7+8]

3.a)   Describe the demineratisation of water by ion-exchange method?

   b)   Calculate the temporary, permanent and total hardness in ppm units for water which showed the following analysis, $MgSO_4$ =12 mg/litre; $Ca(HCO_3)$ =16.2 mg/litre, $CaCl_2$ = 11.1 mg/litre, $Mg (HCO_3)_2$ =14.6 mg/litre, NaCl = 5.85 mg/litre, KCl = 7.45 mg/litre. Given that atomic weights of Na, Mg and Ca are 23, 24 and 40 respectively.   [7+8]

4.a)   What is potable water? Discuss the steps involved in treatment of potable water.

   b)   0.5g of $CaCO_3$ was dissolved in dil, HCl and diluted to 1000ml. 50ml of this solution required 48ml of EDTA solution for titration. 50ml of hard water sample required 15ml of EDTA solution for titration. 50ml of same water sample in boiling, filtering ect, required 10ml of EDTA solution. Calculate the different kinds of hardness in ppm.
                                                                                   [7+8]

5.a)   Give a brief account on lithium-ion Battery.

   b)   Calculate the emf of the cell:
           $Zn_{(s)/Zn}^{+2}(0.2M) // Ag^+ (0.002M)/Ag_{(s)}$ at 25^0c
         Write cell reaction. The standard emf of the cell is 1.54V.   [7+8]

6.a)   Explain the mechanism of Electro chemical corrosion and explain the mechanism of rust formation in acidic and neutral medium.

   b)   Describe the cathodic protection of corrosion control.   [7+8]

7.a)   What are Elimination reactions? Explain with suitable examples.

   b)   In primary alkyl halide and tertiary alkyl halide, which one readily participates in SN[1] reaction mechanism? Why? Explain this with its stereochemistry.   [7+8]

8.a)   Discuss the principle and applications of UV spectroscopy.

   b)   Calculate the theoretical number of vibrational degree of freedom of
         i) CO_2 ii) Water   iii) SO_2 [7+8]

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