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Engineering Chemistry - I
(Old) (1020)

P. Pages : 2

Time : Two Hours   **Max. Marks :50**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Neat and labelled diagram must be drawn wherever necessary.
6. Use of non - programmable electronic calculator is allowed.
7. Figures to the right indicate full marks.

1. Solve **any two** from the following.
   a) Define co - valent bond and explain with suitable example. **5**
   b) Define hybridization. Explain SP^2 hybridization with help of neat labelled structure diagram. **5**
   c) Define the metallic bond. Explain the following properties.
      i) Malleability and ductility
      ii) Metallic luster. **5**

2. Solve **any two** from the following.
   e) i) Which salts causes temporary and permanent hardness to water ? **5**
      ii) How will you distinguish between hard and soft water ?
      iii) How will you distinguish between temporary and permanent hard water ?

   f) Explain ion exchange method for water softening with labelled diagram. **5**

   g) Calculate the amount of lime 84% pure and soda 92% pure required for the treatment of 20,000 liters of water, whose analysis as follows. **5**
   $C_a(HCO_3)_2 = 40.5$ PPM, $M_g(HCO_3)_2 = 36.2$ PPM
   $M_gSO_4 = 30$ PPM, $CaSO_4 = 34$ PPM, $CaCl_2 = 27.75$ PPM
   $NaCl = 10$ PPM.
   Molecular wts are $C_a(HCO_3)_2 = 162$, $M_g(HCO_3)_2 = 146$
   $M_gSO_4 = 120$, $CaSO_4 = 136$ $CaCl_2 = 111$, $NaCl = 58.5$.

3. Solve **any two** from the following.

h) Explain Boundary film mechanism of lubrication. **5**

i) Explain liquid lubricants in short. **5**

j) Define the following terms. **5**

i) Viscosity Index

ii) Saponification number

iii) Flash and fire point.

iv) Cloud and pour point

v) Neutralisation number.

4. Solve **any two** from the following.

k) Explain electrolysis in detail. **5**

l) State and explain I and II laws of electrolysis. **5**

m) An electric current is passed through solutions of silver nitrate, copper sulfate and are placed in series. If one gram of silver is deposited in the first cell, calculate the wt of copper deposited in the second cell.
Atomic wt of C_u=63.37, A_g = 108. **5**

5. Solve **any one** from the following.

x) i) Explain the ionic bond with help of electron sea model. **5**

ii) Define co - ordinate bond and explain with suitable example. **5**

y) i) Explain the measurement of conductance by conductometric titration of weak acid and weak base. **5**

ii) Derive an expression for Nerst equation. **5**

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