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VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) I-Semester Supplementary Examinations, June/July-2019

Chemistry-I

(Common to all branches)

Time: 3 hours

Max. Marks: 60

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Differentiate between single electrode and standard electrode potential.
2. Can we use copper rod to stir HCl solution, given that E° of Cu^{2+}/Cu and H^+/H_2 are 0.34 and 0.00V respectively-Explain.
3. Discuss the principle of cathodic protection and explain one method.
4. Explain the type of corrosion when bolt and nut made from different metals are in contact with each other.
5. Differentiate between petrol and diesel knocking.
6. Compute the amount of air required for complete combustion of 1Kg fuel having the composition C = 86%, H_2 = 12% and rest is ash.
7. Define viscosity index (VI) and write its significance.
8. Classify refractories based on nature of material and mention one example for each.
9. Discuss the possible electronic transitions in UV-Visible region.
10. Draw the shapes of d-orbitals.

Part-B (5 × 8 = 40 Marks)

11. a) Describe the construction of a metal-metal insoluble electrode and show that its potential depends on anion of insoluble salt. [5]
 b) A cell is constructed using Fe and Sn electrodes by placing in their solutions of 0.02M and 0.04M respectively. Write the cell notation and calculate its emf at 25° C (E° of Fe and Sn are - 0.44V and - 0.18V respectively). [3]
12. a) Illustrate electrochemical corrosion when iron metal contacts with a brine solution. [4]
 b) Discuss the method to apply a metal coating on insulator with example. [4]
13. a) Demonstrate hydrodynamic and boundary film lubrication. [5]
 b) Explain refractoriness under load (RUL) and thermal spalling of a refractory material. [3]
14. a) Explain the fixed bed catalytic cracking method to convert heavy oil into gasoline. [5]
 b) Compute the LCV of a fuel containing C= 88%, H=5.5 %, S= 2%, N= 4% and remaining is Oxygen. [3]
15. a) Draw the splitting of d-orbitals in octahedral and tetrahedral geometry and discuss why CFSE is more in octahedral than in tetrahedral geometry. [3]
 b) Write the selection rules and discuss the working principle of IR spectrometer with block diagram and give two applications. [5]
16. a) Discuss the various factors affecting the rate of corrosion. [5]
 b) Derive the equation to relate between electrode potential and concentration of a solution. [3]
17. Answer any *two* of the following:
 - a) Define saponification number and write its significance for a good lubricant oil. [4]
 - b) Choose a method to convert vegetable oil into bio diesel and explain with reaction. [4]
 - c) Draw the molecular orbital diagram of oxygen molecule and calculate its bond order. [4]