R15

Time: 3 hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) What the difference between primary cell and secondary cell?   [2]
  b) What is water line corrosion? Explain with an example.   [3]
  c) What are plastics, elastomers, fibers? Give examples for each.   [2]
  d) Write about chemical vapors deposition in the preparation of nano materials.   [3]
  e) Give the units in which hardness of water is expressed. Give their inter relation.   [2]
  f) Write about ozonisation and its significance.   [3]
  g) Define and explain octane number.   [2]
  h) Give the significance of flue gas analysis.   [3]
  i) What are differences between melting point, triple point and eutectic point in phase diagram?   [2]
  j) Give an account on applications of adsorption.   [3]

PART-B
(50 Marks)

2.a) Give the expression for Nernst equation. Mention its applications.
  b) What are various types of dry corrosion? Explain with suitable examples.
  c) Write an account on cementation and galvanizing.   [3+4+3]

OR

3.a) Give the construction and working of glass electrode.
  b) What are paints .Give the constituents and functions of any four constituents.
  c) Explain the construction and working of H_2O_2 fuel cell. What are its advantages?
                                                                                 [3+3+4]

4.a) Give the characteristics of fibers. What are the applications of FRPS?
  b) Give the mechanism of thick film lubrication.
  c) Mention the preparation, properties and engineering applications of PVC and butyl rubber.   [3+3+4]

OR

5.a) Give the mechanism of conduction in poly acetylene.
  b) What are nanomaterials? Give their applications.
  c) How do refractories are classified Give examples.   [3+4+3]

6.a)   How do you determine hardness of water by EDTA complexometric method.
  b)   What are steps involved in the treatment of domestic water.   [5+5]
                                    OR
7.a)   Discuss about internal treatment methods of boiler feed water .
  b)   How disinfection of water in carried out by ozonisation and chlorination.   [5+5]

8.a)   How do you analyze coal by ultimate analysis. Give its significance.
  b)   Calculate the mass of air required for the complete combustion of 5.0 kg. of coal
        containing 80 % of carbon, 15% hydrogen and the rest oxygen.   [4+6]
                                    OR
9.a)   A sample of coal was found to contain the following percentage composition of
        C = 75%, H = 52% , O = 12%, N = 3.2% , ash = 4.5% calculate the minimum air required
        for complete combustion of 1kg of coal.

  b)   Explain Fischer – Tropsch's process with a neat diagram.
  c)   What are the advantages of gaseous fuels over liquid fuels?   [4+4+2]

 10.a) What are colloids? How are they classified?
  b)   Explain the salient features of physical adsorption and chemical adsorption.
  c)   Explain about hardening and normalization of steel.   [3+4+3]
                                    OR
11.a)   Discuss the application of phase rule to Ag – Pb system.
  b)   Differentiate physisorption and chemisorptions.   [5+5]

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