



KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

Answer any TEN Questions

(10 X 10 = 100 Marks)

1. Write a note on the formation of scales and sludges with the help of possible chemical equations. Discuss any three internal treatment methods to prevent scale formation.
2. Explain how zeolites and ion exchange resins can help in water softening with possible figures of the set ups. Once the zeolite and ion exchange beds are exhausted, is it possible to regenerate them? If yes, explain in detail.
3. a) 0.5 g of CaCO_3 was dissolved in HCl and the solution made up to 500 ml with distilled water. 50 ml of the solution required 48 ml of EDTA solution for titration. 50 ml of hard water sample required 15 ml EDTA and after boiling and filtering required 10 ml of EDTA solution. Calculate the temporary, permanent and total hardness of sample water in ppm. [5]
b) How does ozone help in the disinfection of water? Discuss the applications and benefits of this process. [5]
4. Discuss on the corrosion behavior of an iron bar in different environmental conditions such as (a) acidic medium and (b) attached to Zn rod (c) partially dipped in water.
5. Delineate proper procedures for protecting iron pipe from corrosion which carries oil from one country to another country and for imparting coating of Cu inside a hollow plastic pipe.
6. a) CVD can be used to give a coating of Ni on iron rod using Ni(CO)_4 . Explain the statement in details. [5]
b) How do different factors of environment influence the corrosion behaviour of metals? (Mention the influence of any five factors) [5]
7. How do you get an electrical energy with help of gaseous fuel and oxidant? Explain the process in details with proper diagram and reactions.
8. Discuss a method in details by which solar energy can be converted to electrical energy using Ruthenium dyes.
9. Describe the method of determination of gross and net calorific of gaseous fuel with necessary diagram, obtained from oil well.
10. a) A sample of solid fuel comprising 2.5% hydrogen when allowed to undergo combustion in bomb calorimeter, the following data were obtained. [5]
weight of solid fuel burnt = 0.475 gm
weight of water taken = 350 gm
water equivalent of bomb calorimeter = 1000 gm
rise in temperature = 1.24°C

cooling correction = 0.01°C

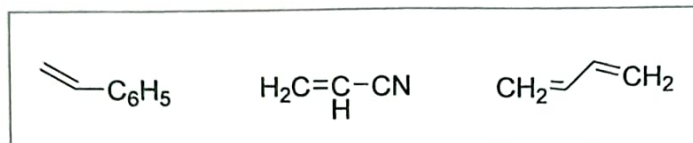
fuse wire correction = 5 cal

acid correction = 30 cal

Calculate Gross and Net Colorific Value of Coal.

- b) What is octane number? Which is the favourable constituent to be added to gasoline improve octane number? [5]

11. a) How would you use the below precursors to prepare a high utility polymer? Discuss its properties and any specific application of the polymer. [5]



- b) Describe the working principle of conducting polymers with a suitable example. [5]

12. a) Describe the process of blow moulding and its application. [5]

- b) Outline the difference between thermoplastics and thermosetting plastics. [5]

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