RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER EXAMINATION, MAY 2019

THIRD YEAR [BATCH 2016-19]

Date : 10/05/2019 **INDUSTRIAL CHEMISTRY (Honours)**

Time : 11 am – 1 pm **Paper :** VII (IV, V) Full Marks : 50

[Use a separate Answer Book for each Unit]

UNIT-IV

Answer **any four** questions: [4×5]

1. Why net calorific value of a fuel is lesser than its gross calorific value?
   How calorific value of coal can be determined experimentally? (1+4)

2. Write the purpose of proximate analysis of coal. How the proximate analysis of coal is carried out in the laboratory? (1+4)

3. a) The proximate analysis of Jhoria coal is given as
      Moisture – 1.8%, Ash – 15.2%, V.M – 27.6% and rest fixed Carbon.
      Determine its V.M. in % by weight on dry ash fires basis.
   b) A producer gas has the following composition by volume:
      CO – 30%, H_2 – 12%, CO_2 – 4.0%, CH_4 – 2.0% and N_2 – 52%
      What will be the composition of dry flue gas if 25% excess air is used for can combustion? (1+4)

4. What are the advantages of pulverisation of coal? Differentiate between low temperature and high temperature carbonization of coal. Mention the desirable characteristics of metallurgical coke used in metal extraction. (1+2+2)

5. Mention the valuable hydrocarbon fractions with their boiling point ranges obtained during primary and vacuum distillation of crude petroleum in refinery. Write the IS specification for gasoline. (3+2)

6. State relative advantages of catalytic cracking over the thermal cracking of high boiling hydrocarbon fractions.
   Describe with a sketch the fluidised bed catalytic cracking process of fuel oil indicating (a) process conditions, (b) choice of catalysed. (1+4)

UNIT-V

Answer **any six** questions: [6×5]

7. Discuss the role of metal indicator in EDTA titration? Give one example of such indicator along with its structure. Explain with example that complexometric titration depend on specific pH? (1+2+2)

8. Distinguish between iodometry and iodimetry. Name an indicator as used for such type of titration. Explain why iodine titration cannot be carried out in a very basic medisess. (2+1+2)

9. How do you estimate of argentometrically? What is meant by gravimetric Factor (GF)? (3+2)

10. How will you determine the percentage of manganese dioxide in a pyrolusite ore? (5)

11. What do you mean by systematic error and random error? Analysis of an iron ore sample gave the following iron context values (in %) : 7.08,7.21, 7.09,7.13 and 7.15. Calculate the standard deviation value. (3+2)

12. Differentiate between accuracy and precision. Show distribution of random error with a curve along with its features. (3+2)

13. What are masking and demasking agents? Give examples. Discuss co-precipitation and post precipitation? With example. (2+3)

14. Discuss the principle and estimation of Fe^{+3} / Al^{+3} in a mixture by Edta titration. (5)

15. Mention the differences between primary and secondary standard solution. How will you prepare 250 cc $\left(\frac{N}{20}\right)$ solution of oxalic acid? Give one example of Redox indicator.

    25 cc of Fe^{+3} solution is titrated with $\left(\frac{N}{20}\right)K_2Cr_2O_7$ solution using BDS as indicator and the titre value is 24.2 cc. Calculate the amount of Fe^{+3} in gms/lit. Atomic weight of Fe is 55.85. (1+1+1+2)

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