RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. SIXTH SEMESTER TAKE-HOME TEST / ASSIGNMENT, JULY 2020

THIRD YEAR [BATCH 2017-20]

Date : 08/07/2020 **INDUSTRIAL CHEMISTRY (Honours)**

Time : 11 a.m. – 7 p.m. **Paper : VII** Full Marks : 50

UNIT-I & II

Answer **any two** questions from question nos. 1 to 4: [2×5]

1. a) Distinguish between conventional and non-conventional energy resources with examples.
   b) Describe various techniques used for harnessing solar energy.
   c) What are the characteristics of a good fuel? [2+2+1]

2. a) How can gross calorific value be calculated from the proximate analysis of coal?
   b) What is the purpose of pulverisation of coal?
   c) Enumerate the advantages of gaseous fuels over solid fuels.
   d) The proximate analysis of a coal sample gives 1.8% moisture, 15.8% ash, 26.8% volatile matter and rest fixed carbon on dry basis. Recalculate it's VM and fixed carbon on daf basis. [1+1+1+ 2]

3. a) Write a short note on manufacturing process of sulphuric acid preparation by contact process. [3]
   b) Discuss the physicochemical properties of Sulphuric Acid. [2]

4. a) Write a short note on manufacturing process of Nitric acid by Ostwald process. [3]
   b) Discuss the physicochemical properties of Nitric Acid. [2]

UNIT-III

Answer **any three** questions from question nos. 5 to 9: [3×5]

5. Choose the correct alternative (Answer **any five**) [1×5]
   a) Raw material for Ethylene production in Haldia petrochemicals is
      i) Ethane ii) Gas oil iii) Naphtha iv) residue from vacuum distillation unit
   b) Benzoyl chloride is not used as a catalyst in the manufacture of
      i) Polystyrene ii) Polyvinyl acetate iii) Polypropylene iv) poly vinyl chloride-co vinyl acetate
   c) What is produced by the interaction acetylene and hydrochloric acid?
      i) Vinyl Chloride ii) Acetaldehyde iii) Pthalic anhydride iv) ethanolamine
   d) Aryl benzene sulphonate (ABS) is a
      i) Monomer ii) Plasticizer iii) detergent iv) printing material
   e) Styrene is commercially produced by
      i) catalytic dehydrogenation of Ethyl benzene
      ii) dehydration of ethyl alcohol followed by hydrogenation

iii) reacting ethylene oxide with acetaldehyde

iv) fermentation of starch

f) Acetylene gas holder is made of

i) copper ii) cast iron iii) steel iv) monel metal

6. a) What are petrochemicals?

b) Draw a flow sheet showing petrochemical l feed stock sources.

c) What are the petrochemicals produced starting from Propylyne? And Show the products with the help of a flow diagram. [1+2+2]

7. How is Styrene manufactured from ethylene by (Dow Process).Give chemical reactions And process flow sheet. What is the toxicity limit of styrene? [4+1]

8. Answer **any two** questions :

How do you prepare following chemicals? Outline the steps involved? And give chemical reactions with two important industrial uses. [2.5 + 2.5]

a) Acrylonitrile from propylene

b) Ethylene glycol from ethylene

c) Isopropanol from propylene

d) Methanol from methane

9. Give a current scenario of Petrochemical industry in India and its future prospects. [5]

UNIT-IV

Answer **any one** question from question nos. 10 & 11 : [1×10]

10. a) Discuss the differences between co-precipitation and post-precipitation.
b) Distinguish between accuracy and precision.
c) How will you estimate the amount of Ca^{2+} and Mg^{2+} in a given solution with the help of EDTA titration?
d) Complete the following redox reaction and balance it by ion-electron method:
$Fe^{2+} + Cr_2O_7^{2-} + H^+ \rightarrow$
e) Name a redox indicator. [2+2+3+2+1]

11. a) What is oxine? Draw the structure of Al(III)-oxinate complex.

b) Define absolute error and relative error.

c) Distinguish between iodometry and iodimetry.

d) What is a metallochromic indicator? Give one example.

e) Explain the processes of masking and de-masking with suitable examples. [(1+1)+2+2+2+2]

UNIT-V

Answer **any three** questions: (**Word limit** for each question is **150 approx.**) [3×5]

12. "Different nutrient cycles play distinctive roles in maintaining integrity within various components of ecosystem" – justify. [5]

13. Elaborate how proper radioactive waste management ultimately turns beneficial to human society. [5]

14. "Depletion of polar ozone is an outcome of combined physical & chemical processes" – justify with reasons. [5]

15. Explain why few chemical parameters in water ultimately determine the sustenance of various life forms in it. [5]

16. Enumerate how biomagnification of mercury compounds is affecting human health, even becoming lethal sometimes. [5]

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