B.Sc. (Part–III) Semester–VI Examination

PETROCHEMICAL SCIENCE

Time : Three Hours] [Maximum Marks : 80

Note :— (1) Question No. **1** is compulsory.

(2) Remaining **six** questions carry **12** marks each.

(3) Give chemical equation and draw diagram wherever necessary.

1. (A) Fill in the blanks with appropriate words :

(i) _____ catalyst constitute a different phase in the reaction medium.

(ii) The _____ is defined as the number of waves which can pass through a point in one second.

(iii) LNG is the important feed stock for _____ type of HC.

(iv) The _____ of the catalyst includes its constituents, physical form, the texture and structure. 2

(B) Choose the correct alternative :

(i) _____ solvent produces greatest migration and this gives better separation.

(a) Polar (b) Non-polar

(c) Anti-polar (d) None of the above

(ii) Natural gas is essentially _____ and represents the cleanest and richest form of commercially available energy.

(a) Propane (b) Butane

(c) Pantane (d) Methane

(iii) One of the disadvantages of _____ as a fuel is smoke evolution from burning which leads to environmental pollution.

(a) Fuel oil (b) Natural gas

(c) Coal (d) LPG

(iv) Hydrogen means clean energy that is :

Hydrogen → Energy + _____.

(a) Water (b) Hydrogen

(c) Oxygen (d) Nitrogen 2

(C) Answer in **one** sentence :

(i) What is Pollutant ?

(ii) Define Beer's law.

(iii) What is chromophore ?

(iv) Which catalyst is used in desulfurization process for production of syngas ? 4

2. (A) Define the following with their units and formula : 3
   (i) Wave number. 3
   (ii) Wavelength.
   (B) What is electromagnetic spectrum ? Discuss different regions of electromagnetic spectrum. 6

OR

3. (P) Which are special characteristics of electromagnetic radiation ? 6
   (Q) Describe principle and theory of UV-visible spectrophotometer. 6
4. (A) What are the important aspects used to study the NMR spectra ? 6
   (B) Which are the main principles of working involved in mass spectroscopy ? 6

OR

5. (P) Describe the experimental method used in NMR spectroscopy with respect to all their instrument parts. 6
   (Q) What is mass spectrum ? Explain in detail. 6
6. (A) Explain the theory of gas chromatography. 6
   (B) Which are the various applications of HPLC ? 6

OR

7. (P) Discuss the characteristic feature of HPLC. 6
   (Q) What is chromatography ? Draw a well labelled diagram showing classification of chromatographic method. 6
8. (A) Chemical industries consume bulk of the catalysts for various processes. Describe oxidation catalyst with example. 6
   (B) What is catalyst ? Compare homogeneous and heterogeneous catalysts with their importance. 6

OR

9. (P) Morphology of catalyst is more important, why ? Explain in detail. 6
   (Q) Reforming operation is important part of petroleum industries. Describe advances in these reforming catalyst composition. 6
10. (A) What is biomass ? Describe the importance of biomass as a resource for various chemicals. 6
    (B) Due to oil crisis; "coal is an alternative to petroleum oil". How ? Explain with examples. 6

OR

11. (P) Why integrated petrochemical complexes are established ? Explain in detail with advantages of these integrated complexes. 6
    (Q) What is synthetic fuel ? Why hydrogen is fuel of tomorrow ? Give the advantages of hydrogen fuel. 6
12. (A) What is air pollution ? Describe air pollution by chemical industries. 6
    (B) What is BOD (Biological Oxygen Demand) ? Explain this term in detail. 6

OR

13. (P) How COD of water is calculated ? Why ? Explain with respect to reagent required, formula and procedure. 6
    (Q) What is pH of water ? Explain this pH term in detail. 6