

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. 3
(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