AT–404

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

6S : PETROCHEMICAL SCIENCE

Time : Three Hours] [Maximum Marks : 80

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

(2) Remaining six questions carry equal marks.

(3) Give chemical equations and diagrams wherever necessary.

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

(i) _____ catalysts are generally solid substances. ½

(ii) The _____ by itself is non-catalytic constituent but enhances the activity of the catalyst by its presence. ½

(iii) In all the chromatographic techniques difference in affinity involves the process of either adsorption or _____. ½

(iv) Increase in organic matter in water increase the _____ of water. ½

(B) Choose the correct alternative :

(i) UOP stand for _____

(a) Universal Oil Product (b) Universal Oil Production

(c) United Oil Production (d) Unique Oil Product ½

(ii) Metals such as Platinum, Palladium, Nickel are well known as _____ catalysts.

(a) Halogenation (b) Oxidation

(c) Hydrogenation (d) Dehydrogenation ½

(iii) Liquid solid chromatography is often termed as _____ chromatography.

(a) Absorption (b) Adsorption

(c) Gas (d) All of them ½

(iv) Polymerization catalysts are _____ during polymerization reaction. ½

(a) Consumed (b) Remains same

(c) Adsorb (d) None of these

(C) Answer the following question in **one** sentence :

(i) What are the advantages of bi and multimetallic catalysts over monometallic in reforming reaction ? 1

(ii) Why polymerization catalyst are called as initiators ? 1

(iii) Which are the renewable resources for petrochemicals ? 1

(iv) What is the composition of synthesis gas ? 1

2. (A) Define electromagnetic radiation. Explain different parameters of EMR. 6

(B) Describe in detail principle and theory of ultra violet spectrophotometer. 6

OR

3. (P) Describe the characteristics of electromagnetic radiation. 6

(Q) Define I-R spectroscopy. Explain various molecular vibrations in this technique. 6

4. (A) Describe theory and working of Mass Spectroscopy. 6

(B) Discuss the uses of NMR spectroscopy in detail. 6

OR

5. (P) Which important features are observed in mass spectroscopy ? 6

(Q) Describe working of NMR instrument in brief. 6

6. (A) Describe theory, principle and uses of HPLC in detail. 6

(B) What is chromatography ? Describe theory of gas chromatography. 6

OR

7. (P) What is HPLC ? Compare HPLC and GLC in detail. 6

(Q) Discuss chromatographic methods in detail. 6

8. (A) What is the difference between homogeneous and heterogeneous catalysts ? Discuss in detail. 6

(B) Which catalysts are used in petrochemical industries ? Describe with respect to process, products and catalyst. 6

OR

9. (P) What is the catalyst morphology ? Describe this in detail. 6

(Q) Focus on recent advances in industrial catalysts. 6

10. (A) What is the impact of energy crisis on petrochemical industry ? 6

(B) Discuss the concept of integrated petrochemicals complex. 6

OR

11. (P) What is the impact of heavy feedstocks on petrochemical industries ? 6

(Q) Describe synthetic fuels in detail. 6

12. (A) What is pollution ? Describe type of pollution in detail. 6

(B) Define the term pH. Explain in detail with example. 6

OR

13. (P) Describe the importance of dissolved oxygen in water with example. 6

(Q) Which tests are prescribed for polluted water ? Discuss any one of them. 6