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

6S PCH : 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 diagram wherever necessary.

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

(i) Shift conversion is more commonly known as _____ shift conversion.

(ii) UV spectrum is called as _____.

(iii) _____ involves the interaction between electromagnetic radiation with matter.

(iv) Synthesis gas is mixture of _____. ½×4=2

(B) Choose correct alternative :

(i) The most useful region for infra-red spectroscopy is _____.

(a) 2.5 μ to 15 μ (b) 15 μ to 25 μ

(c) 0.8 μ to 2.5 μ (d) 1.5 μ to 2.5 μ

(ii) The _____ is the proper catalyst which is solely responsible for the particular catalytic activity.

(a) Promotor (b) Catalyst support

(c) Active mass (d) Texture

(iii) The unit of frequency is _____.

(a) Hertz (b) λ

(c) cm (d) nm

(iv) _____ type of transition occurs in sigma bonded molecule only.

(a) $\pi \rightarrow \pi^*$ (b) $\eta \rightarrow \sigma^*$

(c) $\sigma \rightarrow \sigma^*$ ½×4=2

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

(i) What is spectrophotometer ?

(ii) What is wavelength ?

(iii) What is the term "promotor" in catalyst ?

(iv) What do you mean by "biological oxygen demand" ? 1×4=4

2. (A) Describe the following with respect to their definition, formula and units :

(i) Energy 3

(ii) Wave number 3

(iii) Wave length 3

(iv) Frequency. 3

OR

3. (P) Discuss the different regions of electromagnetic spectrum. 6

(Q) Describe uses of ultra-violet spectroscopy in different fields. 6

4. (A) What are the application of N.M.R. spectroscopy ? 6

(B) On which principal mass spectroscopy is based ? 6

OR

5. (P) Discuss working of mass spectrometer in detail. 6

(Q) Which important features are highlighted in N.M.R. spectroscopy ? 6

6. (A) Which are important characteristic features of HPLC ? 6

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

OR

7. (P) Describe the applications of HPLC. 6

(Q) Describe instrumentation technique involved in gas chromatography. 6

8. (A) 'Activity of catalyst depends on its morphology'. Why ? Explain in detail. 6

(B) Which different catalysts are used in petroleum refining ? Describe with respect to their processes and catalyst used in those processes. 6

OR

9. (P) Describe the following in detail :

(i) Polymerization catalyst 4

(ii) Hydrocarbon oxidation catalyst 4

(iii) Hydrogenation catalyst. 4

10. (A) Biomass is a renewable resource for petrochemical; why ? Explain with examples. 8

(B) In future heavy feedstocks will be used in petrochemical industries. Why ? 4

OR

11. (P) Describe synthetic fuels. Why hydrogen acts as a fuel of tomorrow ? Describe advantages of hydrogen fuel. 8

(Q) Discuss the development of cracking technology in petrochemical industries. 4

12. (A) How we will calculate D.O. in laboratory ? Explain with respect to their formula and procedure. 8

(B) What is air pollution ? 4

OR

13. (P) What is water pollution ? Describe their impact on our earth. 6

(Q) What is COD ? Why petrochemical industries calculate COD of their effluent streams ? 6