AR – 610

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

6 S : PETROCHEMICAL SCIENCE

P. Pages : 6

Time : Three Hours] [Max. Marks : 80

Note : (1) Question number **One** is compulsory.
(2) Remaining **Six** questions carry **12** marks.
(3) Give Chemical equations and diagram wherever necessary.

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

(i) The activity of catalyst depend not only on its chemical composition but to large extent on _____. $\frac{1}{2}$

(ii) Increase in organic matter in water increases the _____ of water. $\frac{1}{2}$

(iii) NMR stands for _____. $\frac{1}{2}$

(iv) _____ are the renewable sources of energy. $\frac{1}{2}$

(B) Choose correct alternative :—

(i) _____ is an alternative to oil for manufacturing of chemicals.

(a) Coal

(b) Naphtha

(c) Fuel oil

(d) Hydrogen $\frac{1}{2}$

(ii) "WHO" stand for _____

(a) World human organization.

(b) World health organization.

(c) World healthy organization.

(d) World highway organization. $\frac{1}{2}$

(iii) Which is a not green house gas _____.

(a) CO_2

(b) CH_4

(c) N_2

(d) H_2 $\frac{1}{2}$

(iv) The calorific value of hydrogen is _____ of all hydrocarbon fuel.

(a) Higher

(b) Lower

(c) Medium

(d) All of them. $\frac{1}{2}$

(C) Answer the following questions in **one** sentence :—

(i) What is the effect of Hydrogen bonding on UV absorption ? 1

(ii) What is the range of IR radiation ? 1

(iii) What is Pollutant ? 1

(iv) What is the role of methanator in synthesis of gas production ? 1

2. (A) Explain the following with its unit and formula :

(i) Wavelength ; 3

(ii) Frequency. 3

(B) Describe the following electronic transition :

(1) $\pi - \pi^*$. 3

(2) $\sigma - \sigma^*$. 3

OR

3. (P) Explain the principle and theory of Infrared instrument. 6

(Q) Define and explain the following :—

(i) Lambert's law. 3

(ii) Beer's law. 3

4. (A) Describe the important features of mass spectroscopy. 6

(B) Discuss in detail principle of N. M. R. instrument. 6

OR

5. (P) Explain N. M. R. instrumentation with neat diagram. 8

(Q) Describe "molecular ion" in mass spectrum. 4

6. (A) Describe the application of HPLC. 6

(B) Compare HPLC and GLC in detail. 6

OR

7. (P) Explain the technique of TLC with respect to following

(i) Stationary phase, (ii) Mobile phase,

(iii) Preparation. 6

(Q) What is gas chromatography ? Discuss principle of gas chromatography. 6

8. (A) Discuss the role of polymer in catalysis. 6

(B) What do you mean by heterogeneous catatalyst ? Explain it with suitable example. 6

OR

9. (P) Name the various catalyst used in Petro-chemical industry. Describe catalyst used in synthesis gas production in different units. 8

(Q) Discuss super active metal catalyst. 4

10. (A) Why importance of Olefins shift to paraffins ? Explain with example. 6

(B) From coal based technology which petro-chemical will be produced ? Explain it with suitable example. 6

OR

11. (P) What are the advantages of integrated petrochemical complexes ? 6

(Q) Why propylene has bright future in petro-chemical industry ? Explain with example. 6

12. (A) Explain various sources of water pollutants in refineries. Explain the characteristics of pollutants of each source. 12

OR

13. (P) With the help of flow diagram explain effluent water treatment in typical petroleum refinery. 12