9. (P) Which is free radical polymerization catalyst ? Name those catalysts with their structural formula. 6

(Q) Discuss the role of catalyst morphology and its activity in any industrial process. 6

10. (A) Why integrated petrochemical complexes are advantageous ? 6

(B) Explain biomass as a renewable resource for petrochemical. 6

OR

11. (P) Discuss coal as an alternative to oil. 6

(Q) Why propylene has importance in future petrochemical industries ? 6

12. (A) What are greenhouse gases ? 4

(B) What is pH ? Describe with pH scale. 4

(C) What is C.O.D. ? Explain in detail. 4

OR

13. Define the following terms with examples :

(i) Air pollution 6

(ii) Water pollution. 6

AQ–748A

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

6S : PETROCHEMICAL SCIENCE

Time—Three Hours] [Maximum Marks—80

Note :—(1) Attempt **SEVEN** questions in all. Question No. 1 is compulsory carrying 8 marks.

(2) Remaining questions (Q. Nos. 7 to 13) carry **12** marks each.

(3) Give chemical equations and draw diagrams wherever necessary.

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

(i) Frequency α 1/ _____.

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

(iii) Activity of catalyst depends not only on its chemical composition but it is depended on its _____.

(iv) _____ is clean energy, but generation of these is not clean and safe process. 2

(B) Choose correct alternative :

(i) Infrared spectrum is an important record which gives sufficient information about the _____ of compound.

(a) Structure (b) Texture

(c) Morphology (d) Physical form

(ii) Liquid natural gas is _____.

(a) Natural fuels (b) Synthetic fuels

(c) Biofuels (d) All the above

(iii) In mass spectroscopy molecular ion peak is not generally visible in case of _____ ___.

(a) Alcohol (b) Aromatic

(c) Aldehyde (d) Acid

(iv) _____ this type of electronic transition occurs in the unsaturated centers of the molecule.

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

(c) $\sigma \rightarrow \sigma^*$ (d) $\pi \rightarrow \pi^*$ 2

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

(i) What is the range of I-R radiation ?

(ii) Which spectroscopy method is used in determining molecular mass of compound with elemental composition ?

(iii) What is the unit of wavelength ?

(iv) What is the main aim of refinery ? 4

2. (A) Explain the following absorption law in detail :

(i) Lambert's law 6

(ii) Beer's law. 6

OR

3. (P) Describe application of Infra Red Spectroscopy. 6

(Q) What is Electromagnetic Radiation ? Explain with their characteristics. 6

4. (A) Which is important features of mass spectroscopy ? 6

(B) Explain application of NMR spectroscopy. 6

OR

5. (P) Describe principle of mass spectrometer. 6

(Q) Explain theory of NMR. 6

6. (A) Describe theory and working of HPLC. 6

(B) Explain various applications of HPLC. 6

OR

7. (P) What is gas chromatography ? Explain theory of G.C. 6

(Q) What do you mean by T.L.C. ? Explain application of TLC. 6

8. Explain the following with suitable examples :

(i) Hydrogenation Catalyst 6

(ii) Reforming Catalyst. 6

OR