B.Sc. (Part—I) Semester—II 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 :

(i) Indian Petrochemical industry is born around year _____ .

(ii) The complication of gas purification and cost of purification usually increase with _____ of the feed stocks.

(iii) Hydrocarbon gases are mostly separated by _____ absorption.

(iv) _____ is a general name for a mixture of Hydrogen and Carbon Monoxide. 2

(B) Choose correct alternatives :

(i) Unsaturated hydrocarbons increase carbon formation, hence, hydrogen recycling is recommended when high _____ stocks are handled.

(a) Paraffin (b) Olefin

(c) Natural gas (d) None of these

(ii) The hypersorber can separate _____ from feed gas.

(a) Propane (b) Propylene

(c) Ethylene (d) Butane

(iii) Which process regulates the pollutions by removing the sulfur from tail gases ?

(a) Selexol (b) Modop

(c) Sheel (d) Girbotol

(iv) What will happen when feed stock contains water vapours ?

(a) Corrosion (b) Formation of crystal

(c) Maligh catalyst (d) All the above 2

(C) Answer in **one** sentence :

(i) What is the boiling point of methane at 760 mm Hg pressure ?

(ii) Which is a conventional absorbent used to remove the moisture from gasoline ?

(iii) Which are the gaseous feed stocks to petrochemical ?

(iv) G.S.F.C. stands for ? 4

2. (A) Describe development of petrochemical industries in India. 6

(B) What is HBJ-gas grid ? Discuss in detail. 6

OR

3. (P) What is petrochemical ? Describe history of petrochemical industry in detail. 6

(Q) Which are the largest and the most ambitious petrochemical complexes in India ? Describe in detail. 6

4. (A) Why purification of petroleum gas is carried out ? Which techniques are used for removal of impurities present in petroleum gases ? Discuss any one. 6

(B) Describe Beavon-Otter process for removal of sulfur compound from petroleum gases with block diagram and process parameters involved. 6

OR

5. (P) Water vapour impurities are present in all petroleum gases. How will you remove these impurites from those gases ? Describe in detail. 6

(Q) Which feed stocks are used for petrochemical industries ? Discuss with some examples. 6

6. (A) Describe the role of relative volatility in separation of C_4 Cuts by using absorption-desorption processes. 6

(B) Draw and describe process of azeotropic distillation for separation of toluene. 6

OR

7. (P) Describe Udex extraction process for separation of aromatic HC from reformates in brief. 12

8. (A) Describe steam reforming process for production of synthesis gas. 6

(B) Describe the reactivity of hydrocarbon for a given steam to hydrocarbon ratio in detail. 6

OR

9. (P) Describe the role of steam and hydrocarbon ratio in steam reforming operation for production of synthesis gas 6

(Q) What is steam reforming ? Why this process is adopted for production of synthesis gas ? Describe in detail. 6

10. (A) Which raw materials are used for production of synthesis gas ? Which are the different processes for production of synthesis gas ? Explain water gas process for production of synthesis gas. 6

(B) What are the types of reformer used in production of synthesis gas by using raw material natural gas and naptha ? Write the composition of material used for reformer construction. 6

OR

11. (P) Draw block diagram for Co-production and describe each unit present in block diagram. 6

(Q) Describe Lurgi coal gasification process in detail for production of CO and H_2. 6

12. (A) Describe in brief low pressure process developed by ICI with respect to process parameter adopted for syn gas synthesis. 8

(B) Describe the Vinyl acetate monomer production from synthesis gas. 4

OR

13. (P) What is oxo synthesis ? Describe production of propionaldehyde with respect to their process flow and process parameter. 8

(Q) What are the various uses of methanol ? Also write the physical properties of methanal. 4