AR – 539

Third Semester B. Sc. (Part - II) Examination

3S : PETROCHEMICAL SCIENCE

P. Pages : 6

Time : Three Hours] [Max. Marks : 80

Note : (1) Question no. **1** is compulsory and carries **8** marks.
(2) Remaining **six** questions carry **12** marks each.
(3) Give chemical equations and draw diagram wherever necessary.
(4) Use of calculator is permitted.

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

(i) In visbreaking, as temperature increases the coke formation tendency is _____ .

(ii) Splitter is a type of _____ unit.

(iii) Kinetic severity function is commonly used in designing of _____ .

(iv) Isoprene is the monomer of _____ . 2

(B) Choose the correct alternative.

(i) Stabilizer is the type of

(a) Extraction unit

(b) Distillation unit

(c) Dehydration unit

(d) Furnace type

(ii) In catalytic cracking the common reactor used is

(a) Fixed bed

(b) Fluidized bed

(c) Moving bed

(d) Trickle bed

(iii) The feed in Houdry process for butadiene synthesis is

(a) Naphtha

(b) LPG

(c) Butane

(d) Natural gas

(iv) In platforming process the reactor used is

(a) Fixed bed type

(b) Fluidised bed type

(c) Moving bed type

(d) Trickle bed type 2

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

(i) Why steam cracking work at very high temperature ?

(ii) What is the size of catalyst used in platforming reactor bed ?

(iii) Why in product stream of naphtha steam cracking unit some time fuel oil is present ?

(iv) Which one is the major petroleum base route for butadiene synthesis in USA ? 4

2. Prove that, "At constant temperature and pressure as API gravity of feed increases, the residence time has to be increases for constant product pattern in thermal cracking." 12

OR

3. Compare the thermal process and catalytic process with respect to cracking in all aspect. 12

4. (a) Discuss the importance of Indian crude for coking process. 5

   (b) What are the various method of coking ? Which one is commonly adopted in India ? Why ? 7

OR

5. Discuss the effect of feed on product pattern of steam cracking process in brief. 12

6. What are the various type of catalyst used in FCCU ? Discuss in brief the activity of catalyst in FCCU. 12

OR

7. (p) Which factor's are responsible for deactivation of catalyst in FCCU ? Discuss in brief. 6

   (q) Define the term activity, selectivity and percent conversion with respect to catalytic cracking. 6

8. (a) What are the various type of catalytic cracking unit base upon product pattern ? 4

(b) Give complete classification of catalytic cracking process in brief. 8

OR

9. (p) What is the need of steam stripping in FCCU reactor ? 4

(q) Give the diagrammatic representation of FCCU reactor with working of each unit in brief. 8

10. What is selective extraction ? Discuss the utility of selective extraction for butadiene production in brief. 12

OR

11. Why dehydrogenation is commonly adopted for butadiene production in USA?

Hence discuss dehydrogenation technique in brief for butadience production with chemistry involved. 12

12. How ethyl benzene is separated from C_8 fraction ? Which design modification is needed for this ? Discuss production of ethyl benzene in brief. 12

OR

13. What is azeotropic distillation ? How is it useful for separation of toluene ? Discuss in brief. 12