

# 17651

**11920**

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answers with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) **Attempt any THREE of the following:** **12**
- (i) List any four indian refineries with their location and capacity.
  - (ii) Explain importance of vacuum distillation in petroleum refining.
  - (iii) Define octane number and cetane number.
  - (iv) List any four chemicals obtained from C<sub>4</sub> hydrocarbons. Give the uses of each (any one industrial application).
- b) **Attempt any ONE of the following:** **6**
- (i) Describe any one method of hazardous waste treatment.
  - (ii) Explain the manufacture of methanol with reaction and flowsheet.

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- 2. Attempt any FOUR of the following:** **16**
- a) What is OPEC? Give its objectives (any two).
  - b) Distillation is considered as a major unit operation in petroleum refining. Give reason.
  - c) Differentiate between thermal cracking and catalytic cracking (any four points).
  - d) List out any four methods of emission control followed in a petroleum refinery.
  - e) Draw the flowsheet for the manufacture of ethylene oxide.
- 3. Attempt any FOUR of the following:** **16**
- a) Give the composition of petroleum crude.
  - b) Explain desalting of crude oil with diagram.
  - c) Give the reaction involved in the manufacture of :
    - (i) Styrene
    - (ii) Butadiene.
  - d) Explain delayed coking process with diagram.
  - e) Give two uses each of :
    - (i) Ethanol
    - (ii) Formaldehyde.

- 4. a) Attempt any THREE of the following: 12**
- (i) Give the difference between petroleum refinery and Petrochemical industry (any four points).
  - (ii) Give the advantages and disadvantages of crude oil over other energy sources.
  - (iii) Draw the flowsheet for the manufacture of butyl acetate.
  - (iv) Give the reactions involved in reforming process.
- b) Attempt any ONE of the following: 6**
- (i) Name the different fractions (any six). obtained by the refining of crude petroleum with their boiling point range and any one use.
  - (ii) What is BTX. Explain the Udex process for the recovery of BTX with flow diagram.
- 5. Attempt any TWO of the following: 16**
- a) Explain with reaction and flowsheet the manufacturing process of MTBE.
  - b) Explain any one biological process for waste water treatment.
  - c) What is Alkylate? Explain the sulphuric acid alkylation process with a neat flowsheet.
- 6. Attempt any TWO of the following: 16**
- a) Explain atmospheric distillation and vacuum distillation carried out in petroleum refinery.
  - b) With a neat flowsheet, explain the process for the manufacture of propylene oxide. Give the reaction also.
  - c) Explain hydrocracking process with flowsheet.
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