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## SARDAR PATEL UNIVERSITY

## M. Sc. -Chemistry (Fourth Semester) EXAMINATION

Industrial Polymer chemistry (IPC)

PS04CIPC02: Manufacture, Properties and Applications of Thermoplastics

Saturday, 7<sup>th</sup> April, 2016, Thursday

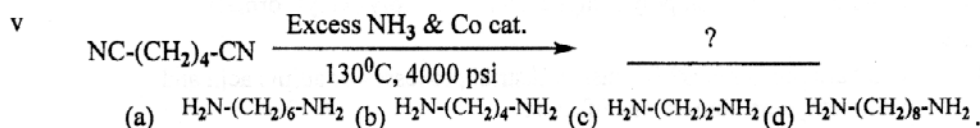
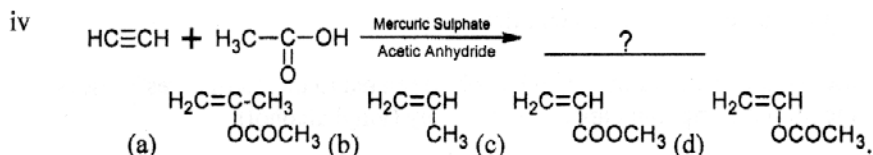
Time: 2.30 pm to 5.30 pm

Note: Figure to the right in brackets indicates the full marks

Total marks: 70

QUE.1 Answer the following questions by selecting the most appropriate option. (8)

- i. Thermoplastics in general having \_\_\_\_\_ molar mass.  
(a) 20,000-500,000 (b) 30,000-600,000 (c) 40,000-700,000 (d) 10,000-400,000.
- ii. LDPE (low density polyethylene) has \_\_\_\_\_ structure.  
(a) linear & crystalline (b) branched & amorphous (c) linear & amorphous (d) branched & crystalline.
- iii. Cinnamene, phenethylene, diarex HF77 are the trade names of \_\_\_\_\_.  
(a) methylmethacrylate (b) polystyrene (c) styrene (d) polycarbonate



- vi Auto-acceleration is that the \_\_\_\_\_ reaction slows down during bulk polymerization of MMA.  
(a) chain propagation (b) chain termination (c) chain degradation (d) oxidative.
- vii Which addition polymer is least thermoplastic in nature?  
(a) PVC (b) PVF (c) PTFE (d) PCTFE.
- viii \_\_\_\_\_ are used to protect a polymer against the effects of temp. and oxygen during processing.  
(a) Fillers, (b) Plasticizers (c) Lubricants, (d) Stabilizers

QUE.2 Answer the following questions in short. (Any seven). (14)

- i Why plastics are used widely for various types of applications?
- ii Write at least two reaction mechanism for manufacturing of Ethylene monomer.

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- iii Briefly write the three forms of polypropylene optical isomers.
- iv Draw only schematic flow diagram for manufacturing of Polystyrene by Bulk polymerization technique.
- v How the safety glass prepared with the help of poly (vinylbutyral)?
- vi How the Sebacic acid is obtained from the castor oil?
- vii What are cellulose plastics? Name the important cellulosic polymers.
- viii What is telomerization process?
- ix Mention at least four Plastic Identification codes (PIC) with respect to its polymers/plastics.

**QUE.3** (12)

- A Describe the Spheripol process of manufacturing PP as it is practiced commercially.
- B List out cross-linking processes for manufacturing cross-linked polyethylene and describe any two of them.

**OR**

- B Describe briefly the manufacturing of polypropylene by Hercules Slurry process along with its limitations.

**QUE.4** (12)

- A How is styrene polymerized by the suspension polymerization method? Describe an industrial process with a suitable flow diagram.
- B How are the properties of poly(vinyl alcohol) related to their structures? Discuss. Also mention the important application of poly (vinyl alcohol).

**OR**

- B Write a short note on poly (vinyl acetals) and poly (vinyl formal).

**QUE.5** (12)

- A What are polyamides? Discuss industrial processes of adipic acid and hexamethylenediamine manufacture.
- B Elaborate commercial production of Terylene.

**OR**

- B What is viscose rayon? Discuss the manufacturing process of viscose rayon.

**QUE.6** (12)

- A Name some fluorine containing polymers and give their molecular structures. What are the specific characteristics related to their molecular structure?
- B Write a short note on Polymer Additives.

**OR**

- B Why recycling of plastics is important? How the "manual sorting" is carried out from waste plastic materials? Mention the uses of recycled plastics.

