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[A-36]

No of Printed Pages: 2

SARDAR PATEL UNIVERSITY  
M. Sc. -Chemistry (Fourth Semester) EXAMINATION  
Industrial Polymer chemistry (IPC)

PS04CIPC02: Manufacture, Properties and Applications of Thermoplastics

23<sup>th</sup> April, 2015, Thursday

Time: 10.30 am to 1.30 pm

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

Total max: 70

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

- i. Cross-linking of a crystalline thermoplastic polymer reducing the levels of \_\_\_\_\_  
(a) flexibility (b) crystallization (c) molecular weight (d) aging.
- ii. The latest manufacturing process of PP uses a \_\_\_\_\_ catalyst.  
(a) first generation (b) second generation (c) high yield (d) High yield stereo specific or high selectivity.
- iii. Which of the following resembles cellulose plastics?  
(a) Cellulose nitrate (b) cellulose acetate (c) ethyl cellulose (d) all of these
- iv. Additives are incorporated into polymer to \_\_\_\_\_ and improve their basic mechanical, physical or chemical properties.  
(a) hardened (b) alter (c) degrade (d) flexible.
- v. The starting raw material for manufacturing tetrafluoroethylene monomer is:  
(a) Calcite (b) Opalite (c) Fluoromite (d) Fluorspar
- vi. Over dehydrogenation of ethyl benzene forms \_\_\_\_\_.  
(a) Phenyl acetylene (b) diphenyl acetylene (c) methyl acetylene (d) divinyl benzene.
- vii. Around 1936, rigid sheets of PMMA with the trade name " \_\_\_\_\_ " were introduced into the market by the U.S.  
(a) plastiglas (b) flexiglas (c) Plexiglas (d) acryglas.
- viii. 
$$\text{NC}-(\text{CH}_2)_4-\text{CN} \xrightarrow[130^\circ\text{C, 4000 psi}]{\text{Excess NH}_3 \text{ \& Co cat.}} \underline{\hspace{2cm} ? \hspace{2cm}}$$
  
(a)  $\text{H}_2\text{N}-(\text{CH}_2)_4-\text{NH}_2$  (b)  $\text{H}_2\text{N}-(\text{CH}_2)_6-\text{NH}_2$  (c)  $\text{H}_2\text{N}-(\text{CH}_2)_2-\text{NH}_2$   
(d)  $\text{H}_2\text{N}-(\text{CH}_2)_8-\text{NH}_2$

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

- i. What is plastic and why it is extensively used?
- ii. Draw only block-diagram of the Unipol process for producing PE granules.
- iii. Mention the ingredients of TGC (third generation catalyst) for manufacturing PP.
- iv. Write various reactions for preparation of styrene monomer.
- v. Which polymer is used in electrostatic dry photocopying machines? Why?
- vi. Explain briefly about Auto-acceleration/gel/Tromsdorff effect.

- vii How the process of curing may lead to a three dimensional structure in linear unsaturated polyester?
- viii What is telomerization process?
- ix Write various reactions involved in preparation of tetrafluoroethylene.

**QUE.3** (12)

**A** Write a manufacturing process of LDPE by the Slurry process and mention its advantages.

**B** List out various low pressure processes for manufacturing High Density polyethylene and describe the Ziegler process.

**OR**

**B** Discuss industrial process of manufacturing impact PP by BASF and UNIPOL processes.

**QUE.4** (12)

**A** Explain mass polymerization of styrene monomer.

**B** Write various reactions for preparing vinyl acetate monomer and write about its polymerization mechanism with applications.

**OR**

**B** Write a note on poly (vinyl butyral) and poly (vinyl carbazole)

**QUE.5** (12)

**A** Write a note on different monomer used for the preparation of different nylons.

**B** Describe the manufacturing process of cellulose nitrate.

**OR**

**B** Write suspension polymerization of methylmethacrlate monomer and mentions properties and uses of acrylates.

**QUE.6** (12)

**A** Elaborate properties of PCTFE, PVF and PTFE.

**B** What is the role of additives in plastics?

**OR**

**B** (i) Mention various plastic identification code (PIC) with examples.

(ii) Discuss briefly about the recycling process.

