

[116]
A-120

Sc

No. of Printed pages: 2

SARDAR PATEL UNIVERSITY

M.Sc. 4th Semester (Surface Coating Technology) (CBCS) Examination

Monday, 04th April 2016

Time: 02:30 pm to 5:30 pm

Course No.: PS04CSCT01

Subject: Technology of Resins for Surface Coatings- II

Total Marks: 70

- N.B. (1) Marks allotted to the question are on its RHS
(2) Illustrate your answers wherever necessary with the help of neat sketches & chemical equations

- Q.1. 1 Reactive Polyamide resin is use as a curing agent for _____ resin (1)
(a) Epoxy (b) Alkyd (c) Polyester (d) None of these.
- Q.1. 2 _____ can acts as a catalyst in epoxy-polyamide cure system. (1)
(a) NaOH (b) DBTDL (c) DMP-30 (c) None of these
- Q.1. 3 _____ based liquid epoxy resins have much lower viscosities for same 'n' than their corresponding BPA resins. (1)
(a) BPF (b) Halogenated Epoxy resin (c) Epoxy Novalac resins (d) Phenoxy resins.
- Q.1. 4 The weight of resin containing 1 gm equivalent of Epoxide is referred to as _____. (1)
(a) Epoxy Equivalent Weight (b) Epoxy Value (c) Weight per phenoxy (d) Esterification Molar Mass
- Q.1. 5 The relative reaction rates of species with isocyanates are: (1)
 $1^\circ \text{amine} > 2^\circ \text{amine} > \text{_____} > \text{Water} > \text{Urea} > \text{Urethane} > \text{Carboxyl}$
(a) Allophanate (b) Hydroxyl (c) Biuret (d) Ethers.
- Q.1. 6 _____ (DABCO) is one of the most common amines used in PU Chemistry. (1)
(a) Triethyl amine (b) Triethylenediamine (c) Diethylene tetra amine (d) Triethylene tetra amine
- Q.1. 7 Additive OF is used to eliminate the _____ in 2K- polyurethane systems by chemical reaction. (1)
(a) Impurities (b) Solvent (c) Moisture (d) Gas
- Q.1. 8 *Desmodur* & *Desmophen* is the trade name of which company _____. (1)
(a) Rhodia (b) BASF (c) Bayer (d) Akzo Nobel Resins.
- Q.2 Attempt **any Seven** Questions (14)
- (a) 2k Acrylic PU is widely used as a topcoats for heavy duty, maintenance and marine coatings.
- (b) Explain the effect of NCO/OH ratio when it is < 1 and > 1 .
- (c) Parameters which influence curing reaction condition of Blocked Isocyanates.
- (d) For what reason diisocyanates are transformed into Oligomers?
- (e) Calculate Theoretical % NCO content for TDI, HDI and IPDI respectively.
- (f) Bisphenol F based liquid epoxy resin have much lower viscosities for the same value of 'n' than their corresponding Bisphenol A resins?
- (g) Write the structure of EDA, DETA, TETA, TEPA and PEHA
- (h) Factors affecting pot life in Epoxy-Polyamide system.
- (i) Write the role and types of Reactive Diluent currently find use in Epoxy resin.

- Q.3 a Describe the formation of an Epoxide moiety from Epichlorohydrin and Bisphenol A (6)
- Q.3 b Describe the formulation and manufacturing process of reactive polyamide resin. (6)

OR

- Q.3 a Explain the properties and application of Chlorinated rubber; give a brief account of plasticizing of chlorinated rubber for surface coating. (6)
- Q.3 b Discuss about Nitrocellulose polymers used for NC lacquers. (6)

- Q.4 a Describe the various curing agent used in epoxy coatings. (6)
- Q.4 b Write the schematic representation of the preparation of an Epoxy-Amine adduct (Aliphatic DETA) and also formulate an epoxy-amine adduct (Aliphatic-DETA Adduct) having 40% solids and Amine value=393 mg of KOH/gm by using Epoxy resin (EEW=475 mg of KOH/gm, Solid = 75%) (6)

OR

- Q.4 b Explain the three main chemical reaction, manufacture, properties and application of D4 type Epoxy ester resin in surface coatings. (6)
- Q.5 a Write a note on Polyurethane Dispersion (PUD's) (6)
- Q.5 b Write a note on Moisture Cured Urethane (MCU). (6)

OR

- Q.5 b Complete the following chemical reaction: (6)
- (a) $R-NCO + R^1-COOH \rightarrow$
- (b) $R-NCO + R^1-NH_2 \rightarrow$
- (c) $R-NCO + H_2O \rightarrow$
- (d) $R-NCO + R^1-OH \rightarrow$
- (e) $R-NCO + R-NH-COO-R^1 \rightarrow$
- (f) $R-NCO + R-NH-CO-NH-R^1 \rightarrow$

- Q.6 a Write a note on Types of isocyanates used in Polyurethane coating. (6)
- Q.6 b Explain the chemistry & manufacture of silicone resins. (6)

OR

- Q.6 b Write a note on Ethyl Silicate. (6)

X=X=X