

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, AUGUST 2021

SECOND YEAR (BATCH 2019-22)

INDUSTRIAL CHEMISTRY (Honours)

Date : 11/08/2021

Time : 11.00 am – 1.00 pm

Paper : X [CC 10]

Full Marks : 50

Answer any five questions :

[5 × 10]

1. a) Why glass articles are annealed or heat treated just after shaping from molten glass.
b) Explain why GeO_2 is a good network former with the help of the Zachariasen's structural model.
c) Write the major ingredients of the commercial glasses.
d) Determine the final batch composition for the production of glass composition:
 $20\text{Na}_2\text{O}-5\text{Al}_2\text{O}_3-75\text{SiO}_2$. [2+3+2+3]
2. a) Which type of glass suitable for making eye-glasses (spectacles) and why?
b) Describe the structure of vitreous silica.
c) Why alkali addition increases the coefficient of expansion and density of soda lime silica glass.
d) Why boro-silicate glass have better thermal shock resistance and better chemical durability than soda-lime silica glass. [2+3+3+2]
3. a) Define the terms 'glass ceramics'.
b) Which is the best nucleating oxide for the ceramization of glass? and why?
c) Explain the different steps involved in the manufacturing process of the bottle glass. [2+2+6]
4. a) Draw and explain the T-T-T diagram of glassy melt. Define the critical cooling rate (CCR) from this diagram.
b) Why glass is called a 'Super cooled liquid'?
c) Draw the viscosity versus temperature plot of the commercial soda-lime-silica glass and define annealing point, strain point and working point. [4+2+4]
5. a) What is the maximum value of fineness of cement?
b) What effect does additional fineness of grinding have upon the strength of concrete and on the rate of development of strength?
c) What precautions do you take while performing the experiment?
d) What precautions will you take in transporting and storing the cement? [1+3+3+3]
6. a) What is clinker?
b) Mention the name of mineralogical phases of Portland cement clinker.
c) Illustrate the roles of CS_3 and CA_3 in formation of the cement.
d) Why little amount of gypsum is added in Portland cement? [2+2+3+3]

7. a) Discuss the chemistry of Hydration of cement in brief to form set cement viz, Calcium Silicate Hydrate CSH gel.

b) Write a short note on: setting and hardening of Portland cement.

[5+5]

_____ × _____