

MSc Sem.-2 Examination

410

Polymer Science

May-2025

[Max. Marks : 70]

Time : 2-30 Hours]

General Instructions

1. All question is compulsory
2. Draw neat figure wherever necessary

Q-1(a) Describe preparation methods for polysilanes and write its structure, properties and applications. [7 Marks]

Q-1(b) Compare inorganic polymers with organic polymers [7 Marks]

OR

Q-1(a) Give a method for synthesis of polysiloxanes with proper example, and write its structure, properties and applications. [7 Marks]

Q-1(b) Write note on polymeric carbon: fullerene, and CNT. [7 Marks]

Q-2(a) What is silicates? Write structure of chain silicates and sheet silicates. [7 Marks]

Q-2(b) Write note on polymeric sulfur. [7 Marks]

OR

Q-2(a) Write structures, properties and application of polymeric sulfur nitrides (SN)_n. [7 Marks]

Q-2(b) Write structure, properties and applications of polymeric carbon: diamond, and graphite. [7 Marks]

Q-3(a) Write note on inorganic polymer: portland cement. [7 Marks]

Q-3(b) Discuss boron nitride polymer. [7 Marks]

OR

Q-3(a) Classify inorganic polymers. [7 Marks]

Q-3(b) Discuss boron carbide polymer. [7 Marks]

Q-4(a) Discusses structure, properties and applications of siloxane-carborane polymer. [7 Marks]

Q-4(b) Write structure, properties and applications of Phthalocyanine Polymers [7 Marks]

OR

Q-4(a) Write ring-opening polymerization of (NPCl₂)₃ [7 Marks]

Q-4(b) What is "organometallic polyphosphazene"? Give two examples with its structure. [7 Marks]

QUESTION –5 ANSWER ANY SEVEN QUESTIONS OUT OF TWELVE

[Max. marks: 7×2=14 MARKS]

(i) _____ is a familiar group of ceramic, and it is noncrystalline silicate containing other oxides, notably CaO, Na₂O, K₂O, and Al₂O₃. (Fill in the blank)

(ii) C₆₀ has

- (a) 14 pentagons and 18 hexagons rings
- (b) 12 pentagons and 20 hexagons rings
- (c) 10 pentagons and 20 hexagons rings
- (d) 12 pentagons and 18 hexagons rings

(P.T.O)

- (iii) Borazine is isostructural and isoelectronic with _____. (Fill in the Blank)
- (iv) Which of the polymer is known for its high thermal stability and flame retardancy?
- (v) _____ and _____ are examples of natural inorganic polymers.
- (vi) Inorganic polymer systems are based on elements such as silicon, germanium, tin, phosphorus, and sulfur. (True or False)
- (vii) Thermal stability of fluorocarbon polymer is increased by _____ content. (Fill in the blank).
- (viii) Which of the following is the general properties of silicate glass?
- (a) Transparency to light
 - (b) Hard
 - (c) Chemically inert
 - (d) All of the above
- (iv) Correct order of hardness is
- (a) Diamond > Boron carbide > Boron nitride
 - (b) Diamond < Boron carbide < Boron nitride
 - (c) Diamond > Boron nitride > Boron carbide
 - (d) None of the above
- (x) Which of the following polymeric carbon is the most electrically conducting?
- (a) CNT
 - (b) Fullerene
 - (c) Graphite
 - (d) All of the above
- (xi) Give name and structure of inorganic rubber.
- (xii) Phosphonate based polymers have become some of the most desired flame-retardant materials (True or false)
