DBK-003-2015022 Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

June - 2022

IC-502 : Polymer Chemistry & Analytical Techniques

Faculty Code : 003
Subject Code : 2015022

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) Question paper carries total 10 questions.
(2) All the questions have general option & carry 14 marks each.
(3) Answer any 5 questions out of total 10 questions.
(4) Draw labelled diagram wherever necessary and assume suitable data.

1 (a) Answer the following questions : **4**

(1) What is degree of polymerization?

(2) Define polymer with examples.

(3) What is repeating unit?

(4) Write only equation and application of number average molar mass or M_n.

(b) Answer in brief : **2**

Which polymer is monodispersed? Give only graph of rnonodispersed polymer.

(c) Answer in detail : **3**

Enlist factors affecting glass transition temperature in detail.

(d) Write a note on : **5**

Write detailed note on crystallinity of polymer.

2 (a) Answer the following questions : **4**

(1) In polymer structures n represents _____.

(2) What is molecular weight of ethene monomer.

(3) Define monomer with examples

(4) Write repeating unit of polypropylene.

(b) Answer in brief : **2**

Write only equation and application of Mass average molar mass or M_w.

(c) Answer in detail : **3**

Write classification of polymer on the basis of polymerization process.

(d) Write a note on : **5**

Explain glass transition temperature of polymer in detail.

3 (a) Answer the following questions : **4**

(1) Write reaction for generation of free radical from benzoyl peroxide.

(2) Enlist three steps of addition polymerization mechanism.

(3) Write only propagation step of addition polymerization mechanism for manufacturing of polyethylene.

(4) Write importance of heterolytic bond dissociation in ionic type addition polymerization technique.

(**b**) Answer in brief : **2**

Explain only initiation step of cationic radical mechanism for addition polymerization.

(c) Answer in detail : **3**

Explain compression molding process in brief with diagram.

(d) Write a note on : **5**

Explain free radical mechanism for addition polymerization.

4 (a) Answer the following questions : **4**

(1) Write importance of homolytic bond dissociation in free radical type addition polymerization technique.

(2) Write reaction for generation of free radical from chlorine molecule.

(3) How can we generate cation?

(4) How can we generate anion?

(b) Answer in brief : **2**

Explain the compounding of polymer in brief.

(c) Answer in detail : **3**

Write a brief note on the transfer molding process with a diagram.

(d) Write a note on : **5**

Write a brief note on Injection molding process with diagram.

5 (a) Answer the following questions : **4**

(1) Write structure of bakelite.

(2) Write structure of Novolac.

(3) Give example of chlorinated monomer.

(4) Give structure of ethylene glycol.

(b) Answer in brief : **2**

Write an introduction of polyurethane.

(c) Answer in detail : **3**

Write a note on polybutadiene.

(d) Write a note on : **5**

Write detailed note on manufacturing of ABS polymer.

6 (a) Answer the following questions : **4**

(1) Give full form of Buna-S.

(2) Give full form of Buna-N with structure.

(3) Enlist any one monomer containing amine functional group.

(4) Give example of any one polyester.

(b) Answer in brief : **2**

(1) What is difference between Novolac and Bakelite.

(c) Answer in detail : **3**

Explain in brief: Neoprene.

(d) Write a note on : **5**

Write detailed note on manufacturing of Urea-formaldehyde polymer.

7 (a) Answer the following questions : 4

(1) Enlist types of potentiometric titration.

(2) Draw only diagram of conductometric titration.

(3) Explain principle of potentiometric titration in brief.

(4) Discuss principle of conductometric titration in brief.

(b) Answer in brief : 2

Write source and operating instruction for colorimeter.

(c) Answer in detail : 3

Explain graphical representation of conductometric titration

(d) Write a note on : 5

Explain pH metric titration with diagram.

8 (a) Answer the following questions : 4

(1) Explain specific and equivalent conductance.

(2) Discuss applications of refractometer.

(3) Explain principle of colorimetric analysis with example.

(4) In Refractometer, RI stands for what?

(b) Answer in brief : 2

Describe procedure of potentiometric titration.

(c) Answer in detail : **3**

Discuss advantages and disadvantages of colorimetric analysis.

(d) Write a note on : **5**

Explain Conductometric titration with diagram.

9 (a) Answer the following questions ; **4**

(1) Enlist basis of sampling rules.

(2) What is small volume sampling?

(3) Discuss grab sampling used during collection of gas.

(4) Elaborate the word "Chromatography".

(b) Answer in brief : **2**

Discuss principle of UV spectroscopy.

(c) Answer in detail : **3**

Draw only diagram of IR spectroscopy.

(d) Write a note on : **5**

Explain flame ionization detector with diagram.

10 (a) Answer the following questions : **4**

(1) Explain retardation factor with formula.

(2) What is sampling of gas?

(3) Enlist classification of chromatographic method.

(4) Discuss partition ratio with formula.

(b) Answer in brief : **2**

Write advantages of thermal conductivity detector.

(c) Answer in detail : **3**

Discuss various applications of gas chromatography.

(d) Write a note on : **5**

Describe NMR spectroscopy with diagram.
