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Total Number of Pages : 02

M.Sc.  
16MCYC402

4<sup>th</sup> Semester Regular Examination 2017-18

POLYMER CHEMISTRY

BRANCH : M.Sc.(AC)

Time : 3 Hours

Max Marks : 70

Q.CODE : C181

Question No.1 which is compulsory and any five from the rest  
The figures in the right hand margin indicate marks.

- Q1** Answer the following questions : (2 x 10)
- a) What do you mean by functionality of a monomer? What is the minimum functionality required by a CRU for the process of polymerization?
  - b) What are the different types of chain growth polymerization? Give any two examples.
  - c) In which type of polymers the Number average Molecular weight ( $M_n$ ) & Weight average Molecular weights ( $M_w$ ) will be nearly equal & why?
  - d) What are Biomaterials? Give examples.
  - e) What is the source for raw materials for the CRUs to be used in polymerizations?
  - f) Give an example of ring opening polymerization.
  - g) What is PDI? Explain.
  - h) What do you mean by 'Unzipping' of a polymer?
  - i) Give any one example of gas phase polymerization.
  - j) Give any two examples of polymers having medicinal applications.
- Q2**
- a) What is Insertion polymerization? Why is it named as so? (2)
  - b) Give the detailed mechanism of the above type of polymerization in which it produces stereo regular polymers. (8)
- Q3**
- a) What do you mean by 'Living Polymers'? Which type of polymerization mechanism renders the formation of these types of polymers? Explain. (5)
  - b) Explain the technique of bulk polymerization. (5)
- Q4**
- a) Explain the dependence of degree of polymerization & extent of conversion on (i) monomer concentration [M] (5)  
(ii) Initiator concentration [I], & Temperatures of polymerization?
  - b) What are plasticizers? Why they are being used in polymerization processes? (5)
- Q5**
- a) Give an account of any one method of polymer processing. (3)
  - b) Show that for a free radical polymerization the rate of formation of a polymer is directly proportional to the first power of the monomer concentration and also to the square root of the initiator concentration. (7)
- Q6**
- a) Draw the molecular weight distribution curve for a poly dispersed polymer sample showing all the four types of average molecular weights. (4)
  - b) Explain any one method for determining weight average molecular weight ( $M_w$ ) of a polymer. (6)

- Q7** a) How glass transition temperature ( $T_g$ ) and melting temperature ( $T_m$ ) or flow temperature ( $T_f$ ) are related? **(3)**
- b) How glass transition temperature ( $T_g$ ) can be determined experimentally by Differential Scanning Calorimetry (DSC)? **(7)**

- Q8** **Write short answer on any TWO :** **(5 x 2)**
- a) Ablation.
- b) Dilatometric method
- c) Ring Opening Polymerization.