Registration No: | | | | | | | | | | |

Total Number of Pages: 01 **B.Tech.**
PCPE4201

3rd Semester Back Examination 2017-18
FUNDAMENTALS OF POLYMER SCIENCE
BRANCH: PLASTIC
Time: 3 Hours
Max Marks: 70
Q.CODE: B865

Answer 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 are dipole forces?
b) What are covalent bonds?
c) What are van der Waals forces?
d) State two thermal thermal transitions that take place in polymers.
e) State the importance of polarity on properties of polymers.
f) State the importance of hydrogen bonds on the properties of polymers.
g) What are conformation and configuration in polymers?
h) State the difference between crystallinity and crystallisability.
i) State what is average molecular weight?
j) What is linearity and non-linearity of polymer chains?

Q2 State the significance of molecular forces and chemical bonding in polymers. Describe what are primary and secondary bonds (in polymers) in detail? **(2+8)**

Q3 **a)** Explain why a knowledge of polymer-structure-property relationship is important for a polymer engineer/scientist **(5)**
b) Explain what you mean by molecular weight distribution. **(5)**

Q4 **a)** Write a short note on the history of macromolecular science. **(5)**
b) Explain additive and substitution reactions in polymers and show with the help of suitable reactions how these reactions lead to polymer degradation. **(5)**

Q5 **a)** Explain how knowledge of polymer molecular weight helps in predicting the processing characteristics and properties (of polymers). **(5)**
b) Write down the kinetics of stepwise polymerization. **(5)**

Q6 **a)** Explain with suitable schematic/diagram some possible structures of polymers having asymmetric carbon atoms **(5)**
b) Explain the relationship between regularity of molecular structure and crystallisability. **(5)**

Q7 Explain the factors affecting polymer crystallinity. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Write short note on differential scanning calorimetry.
b) Write short note on thermo gravimetric analysis.
c) Write down one hydrolysis and acidolysis reactions each for polymers and write down how these reactions lead to polymer degradation.
d) Write short note on molecular weight determination.