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

Total Number of Pages : 02 **M.Tech**

P1PNBC05

1st Semester Regular Examination 2019-20

POLYMERIC NANOMATERIALS PROCESSING TECHNIQUES & THEIR APPLICATIONS

BRANCH : POLYMER NANOTECH.

Max Marks : 100

Time : 3 Hours

Q.CODE : HR801

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) Differentiate between top-down and bottom up method for preparation of nanoparticles.

b) What is the type of dispersion of nanoparticles in polymer matrices?

c) What are the factors affecting for homogenous nucleation?

d) What do you mean by plasma promoted nucleation?

e) What are the disadvantages of CVD synthesis method?

f) How precursors affecting synthesis of polymer during Sol-gel method?

g) Explain the synthesis technique of any two polymers by VLS method.

h) Write short note on Solvent Casting technique.

i) Write any three allotropes of Carbon.

j) Explain application of polymer nanocomposites as fire retardant.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) What is the structure and properties of organically modified clay platelets? Explain preparation by insitu intercalative polymerization and exfoliation adsorption.

b) What is the binding mechanism of nanoparticle? How it affects during preparation of nanocomposite?

c) Explain advantages and limitations of CVD synthesis method.

d) Differentiate between melt blending and solution polymerization method for preparation of nanocomposite.

e) Explain in detail the “Sol Gel Processing” technique. State its advantages over other Wet Synthesis Processes.

f) State advantages and limitations of “Liquid Solid Reaction”.

g) What do you mean by pyrolysis? Explain about flame assisted ultrasonic pyrolysis.

h) What do you mean by top down and bottom up method for preparation of nanoparticles. Explain any two method of preparation by top down method.

i) State advantages and limitations of “Liquid Solid Reaction”.

j) Explain waterborne fire retardant Nanocomposites with case study.

k) What is polymer Nanocomposite? Explain the structural, gas barrier and flame retardant properties of nanocomposite.

l) Explain use of elastomeric nanocomposites for propulsion system .

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Describe the synthesis of Si-Nanowire by VLS technique. Explain fabrication of surface coating by LBL deposition technique. Specify advantages. **(16)**

Q4 Explain any two methods for fabrication of nanocomposite with neat sketch. **(16)**

Q5 What do you mean by nucleation? What are the types of nucleation and explain its mechanism of growth. **(16)**

Q6 In what conditions “Gas Phase Synthesis” is preferred for Nanomaterials synthesis? Explain CVC method for preparation of Tungsten Carbide nanoparticle with suitable examples. **(16)**