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4<sup>th</sup> SEMESTER  
MID SEMESTER EXAMINATION

Roll No.....  
[B.Tech]  
(March 2019)

PT-204 Polymer Processing

Time: 1 hour 30 min

Max Marks: 30

**Note: Answer all questions**

**Assume suitable missing data, if any**

$$\delta_{\text{Polyisoprene}} = 8.1(\text{Cal/cm}^3)^{1/2}, \delta_{\text{polybutadiene}} = 8.4(\text{Cal/cm}^3)^{1/2},$$

$$\delta_{\text{dibutyl phthalate}} = 9.4(\text{Cal/cm}^3)^{1/2}, \delta_{\text{paraffinic oils}} = 7.5(\text{Cal/cm}^3)^{1/2},$$

$$\delta_{\text{diisooctyladipate}} = 8.7(\text{Cal/cm}^3)^{1/2}$$

- Q.1 Justify the following statements with suitable examples. Marks
- a Coupling agents enhance the reinforcing property of filler. 3
  - b Effect pigments are combination of two materials. 3
- Q.2 a Discuss the mechanism of flame retardants which work at (a) solid phase (b) pyrolysis phase 3
- b What is ageing in polymers? Describe the different types of antiageing agents with suitable examples. 3
- Q.3 a Discuss various parameters which affect the solid-solid mixing. 3
- b Explain mechanism of mixing in internal batch mixer with the help of diagram. 3
- Q.4 a An Industry has developed new formulation with natural rubber (30%) and Butadiene rubber (70%). In their formulation they have added dibutyl phthalate. During export of their compound they paid penalty due to leaching out of phthalate. What was the purpose of dibutyl phthalate in elastomer formulation? Why it has leached 3

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out from the formulation?. Suggest suitable additive to replace the phthalate.

- b A recycling company purchased raffia grade polypropylene bags which were used to carry cement. They recycled these polypropylene bags, developed granules which they supplied to pipe manufacturing company. The pipe manufacturing complained that pipe made by granules have very low impact properties. Suggest suitable additive which can improve the impact property and why it is improving the impact property?

Q.5 a Differentiate between mechanism of mixing in two roll mill and internal bath mixer.

- b Differentiate between clarifying agents and nucleating agents