

Polymer Technology - PTL 709

Minor I Semester I - 2017-2018

Total marks: 25

Time: 1 hr

Answer all the questions.

1. Correct the following statements, if needed. Justify for your answers. [5X2=10]

T  
F  
T  
F  
F

why?

- I. Order of brittle points: Polymethylmethacrylate < Polyoctylmethacrylate < Polyhexadecyl methacrylate
- II. Paraffin oil is more efficient in plasticising Polystyrene than ethyl benzene.
- III. Phenyl salicylate acts as UV absorber.
- IV. Organophosphites act as chain-breaking antioxidant.
- V. Air permeability will be higher for the product made with high aspect ratio filler.

T  
F  
T  
F  
F

$\frac{P}{R} = 1 + \frac{Hdd}{2}$

Hold 2

(a) A compounder wants to find out right plasticizer for PMMA. What will he do?  
[Hint: please refer the chart for molar attraction constants. Density of PMMA is 1.18 gm/cc]

(b) How will he calculate the solubility parameter of a plasticizer with known boiling point?

[2+2=4]

$\frac{D H_v - R T}{V}$

Table V. Molar Attraction Constants (28)

Group	G	Group	G
-CH <sub>3</sub>	214	-O-	70
-CH <sub>2</sub> -	133	CO	275
-CH<	28	COO	310
>C<	93	CN	410
CH <sub>2</sub> =	190	Cl	270
-CH=	111	Br	340
>C=	19	I	425
CH≡C-	285	CF <sub>3</sub>	150
-C≡C-	222	S	225
-C <sub>6</sub> H <sub>5</sub> -	735	SH	315
-C <sub>6</sub> H <sub>4</sub> -	658	ONO <sub>2</sub>	440
		Si	-38

(b) Design a polymer structure which itself can act as flame retardant. [2]

(c) A tremendous improvement of aging property of Polyethylene has been observed when a few percentage of 2-naphthalene thiol has been added along with tetra-substituted diphenoquinones. Explain with a mechanism and graph. [2+1=3]

$Q = 1/R$

3. (a) A compounder wants to replace phthalate based plasticizer due to its high toxicity quotient. Define toxicity quotient. What are the parameters he will look for the replacement? Suggest an alternative structure. [1+2+1=4]

(b) Give an example of a multi-functional additive. Define its functions. [1+1=2]

$Q = E \times \frac{10000}{T}$  wt

E?  
T?

Anti oxidant

