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**BR—371—2016**

**FACULTY OF SCIENCE**

**M.Sc. (Second Year) (Third Semester) EXAMINATION**

**OCTOBER/NOVEMBER, 2016**

**(CBCS Pattern)**

**ORGANIC CHEMISTRY**

**Paper XVIII (CH 534/2B)**

**(Polymer Chemistry-I)**

**(Wednesday, 23-11-2016)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—Three Hours*

*Maximum Marks—75*

*N.B. :— (i) Attempt All questions.*

*(ii) Figures to the right indicate full marks.*

1. Solve any *three* of the following : 15

- (a) What is degree of polymerisation ? Explain with an example.
- (b) Define molecular weight concept of polymer.
- (c) Describe the process of thermofoaming for fabricating articles.
- (d) What is crystalline melting point ( $T_m$ ) ? How is it determined ?
- (e) Differentiate between addition and condensation polymerisation.

2. Attempt any *three* of the following : 15

- (a) Explain the mechanism of cationic polymerisation.
- (b) What is the practical use of knowledge of molecular weight of polymer ?

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- (c) Describe the hand-lay-up technique for producing reinforced plastic articles.
- (d) What is chain flexibility ? On which factors does it depend ?
- (e) Comment in detail on dry spinning process.
3. (a) What are free radicals ? Explain the mechanism of free radical polymerisation. 8

*Or*

How may X-ray diffraction data be used to estimate the sizes of polymer crystallites ?

- (b) What are elastomers ? Comment in detail on elastomers. 7

*Or*

Describe the process of determination of molecular weight of polymer by light scattering method.

4. (a) Mention different types of moulding processes and comment in detail on compression moulding. 8

*Or*

Discuss the structure of solution grown polyethylene single crystals.

- (b) Explain polymer tacticity in detail. 7

*Or*

Describe the merits and demerits of emulsion polymerisation.

5. (A) Select the *correct* alternative from the following : 5
- (i) In anionic polymerisation chain carriers are .....
- (a) Carbonium ions (b) Carbanions
- (c) Free radicals (d) None of these
- (ii) Polydispersity gives an idea of .....
- (a) Lowest molecular species
- (b) Highest molecular species
- (c) Lowest and highest molecular species
- (d) Average molecular weight species
- (iii) ..... are used for making garments and under garments.
- (a) Comfort fibres
- (b) Safety fibres
- (c) Industrial fibres
- (d) None of the above
- (iv) Whether the polymer is crystalline or amorphous is characterised by .....
- (a) X-ray diffraction
- (b) UV-spectroscopy
- (c) Mass spectroscopy
- (d) Thermo-gravimetric analysis

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(v) The properties of polymer such as density, modulus, hardness, permeability and heat capacity will be largely affected by its .....

(a) Diffusibility

(b) Solubility

(c) Crystallinity

(d) None of these

(B) Write short notes on any two :

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(a) Calendering

(b) Determination of molecular weight by ultracentrifugation method.

(c) Chain folding in polymers.