

**Indian Institute of Technology  
Centre for Biomedical Engineering  
BIOMATERIALS (BM820)**

**Dt: 01.05.06**

**Time: 2hr**

**Total Marks : 50**

***Use separate answer books for Part A and Part B***

**Part A**

**Q1) Answer any three of the following.**

- a) Give preparation and biomedical applications of RTV and high temp. curable silicon rubber and its advantage over natural rubber.
- b) Give preparation and biomedical applications of polycarbonate and its advantage over polymethyl methacrylate.
- c) Give preparation of acrylic bone cement, its limitation, improvement and two biomedical applications.
- d) Polymeric hydrogels, preparation (two in each class) and biomedical applications.

**(9)**

**Q2) Recommend ideal material for the following biomedical applications:**

- |  |   |
|--|---|
| (a) Blood oxygenator                       | (b) Post sterilizable medical packagings                                      |
| (c) Blood tubings                          | (d) Helmet  |
| (e) Spectacle lenses                       | (f) Intraocular lenses  |
| (g) Disposable syringes                    | (h) Baby feeding bottle   |
| (i) Suture for stitching skin              | (j) Clippers for polio effected children                                      |
| (k) Polymer for encapsulation of pacemaker | (l) Micron filter for separation of bacteria from pharmaceutical preparations |

**(6)**

**Q3) Write short note on any three of the following:**

- (i) What is the role of free radical inhibitor and how will you remove them before the polymerization.
- (ii) Chemical attachment of drugs/enzymes onto polymers at room temperature
- (iii) Polyethylene glycol diacrylates preparation and their biomedical applications.
- (iv) Hard and soft contact lenses.

**(6)**

**Q4) Giving reasons state whether the following statements are true or false**

- (i) High molecular weight polyethylene is recommended for orthopedic applications
- (ii) PTFE is not processed by ordinary moulding techniques
- (iii) Chlorinated paraffin wax (CPW) can be recommended as plasticizer for PVC blood bags.
- (iv) Starch and cellulose are biodegradable polymers for human body.

**(4)**

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**PART B**

**Q1 State TRUE or FALSE:**

- a) Complements are the mediators of innate immunity.
- b) Inflammation is an adaptive immune response of the body.
- c) Neutrophils are the phagocytic cells.
- d) Antibody molecules are secreted by B-cells
- e) Lymphocyte is a kind of RBC.
- f) MHC class I molecules are expressed by all nucleated cells.
- g) Macrophages are antigen presenting cells.
- h) Antibody molecule has one heavy and one light chain.
- i) Ig M is the most abundant class of antibody.
- j) Ig E mediates inflammation.

**(10)**

**Q2 Write short note on any three of the following :**

- |                           |                              |
|---------------------------|------------------------------|
| a) Fibrinogen             | b) Antigen presenting cells  |
| c) Blood clotting system  | d) Complement system         |
| e) Cell mediated immunity | f) Blood compatible material |
| g) Antibody               |                              |

**(15)**