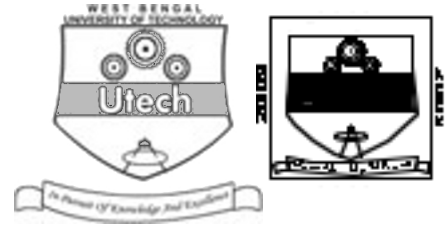


BIOMATERIALS (SEMESTER - 4)

CS/B.TECH (BME)/SEM-4/BME-401/09



1.
Signature of Invigilator

2.
Signature of the Officer-in-Charge

Reg. No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Roll No. of the Candidate

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**CS/B.TECH (BME)/SEM-4/BME-401/09
ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009
BIOMATERIALS (SEMESTER - 4)**

Time : 3 Hours]

[Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
b) For **Groups – B & C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

Question Number	Group – A					Group – B					Group – C					Total Marks	Examiner's Signature
Marks Obtained																	

.....
Head-Examiner / Co-Ordinator / Scrutineer

4424 (04/06)



<http://paperkit.net>
DO NOT WRITE ON THIS PAGE
www.wbut.ac.in



ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009

BIOMATERIALS

SEMESTER – 4



Time : 3 Hours]

] Full Marks : 70

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10
- i) Polylactic acid (PLA) is
- | | | |
|-----------------------|---------------------------|--------------------------|
| a) viable biomaterial | b) non-viable biomaterial | |
| c) inert biomaterial | d) bioactive biomaterial. | <input type="checkbox"/> |
- ii) Collagen is a
- | | | |
|-------------------|------------|--------------------------|
| a) carbohydrate | b) protein | |
| c) polysaccharide | d) fat. | <input type="checkbox"/> |
- iii) Crystalline structure means
- | | | |
|-------------------------------------|-----------------------------------|--------------------------|
| a) periodic alignment of unit cells | b) random alignment of unit cells | |
| c) ductile materials | d) brittle materials. | <input type="checkbox"/> |
- iv) Albuminised surface is used to improve
- | | | |
|-------------------------|--------------------------|--------------------------|
| a) tissue compatibility | b) mechanical properties | |
| c) blood compatibility | d) contour. | <input type="checkbox"/> |



v) Pyrogen is a

a) bacteria

b) bacterial endotoxin

c) virus

d) fungi.



vi) The bioactive dental material is

a) stainless steel

b) aluminium

c) titanium

d) gold.

vii) Bone is a/an

a) elastic material

b) viscous material

c) isoelastic material

d) hard material.

viii) The example of biodegradable polymer is

a) PVA

b) UHMWPE

c) HDPE

d) PHEMA.

ix) IOL is used in

a) ear

b) eye

c) nose

d) mouth.

x) What does exactly Epikeratoplasty do ?

a) Indent detached retina

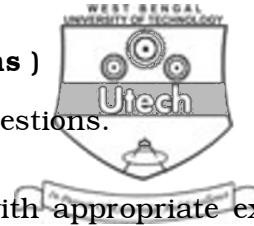
b) replace lens containing cataracts

c) correct vision

d) change corneal curvature and correct vision.

**GROUP – B****(Short Answer Type Questions)**Answer any *three* of the following questions.

3 × 5 = 15



2. Define the term 'biomaterials'. Classify biomaterials with appropriate examples. What are the basic criteria of biomaterials ? 5
3. Define the term 'biocompatibility'. Mention different methods for improving blood and tissue compatibility problems. 5
4. Classify polymers and define each group. 5
5. Classify bio-ceramics with appropriate examples. Give the advantage and disadvantage of ceramic materials. $2\frac{1}{2} + 2\frac{1}{2}$
6. Define composite. What are the important features of composite biomaterials ? Classify composite biomaterials. 1 + 2 + 2

GROUP – C**(Long Answer Type Questions)**Answer any *three* of the following questions.

3 × 15 = 45

7. Describe the effect of physiological fluid on the properties of biomaterials. Briefly explain the biological responses of biomaterials. 7 + 8
8. What are the different toxicity testing protocols for evaluation of a biomaterial ? Describe one *in vitro* and *in vivo* toxicity screening test for newer biomaterials. 6 + 9
9. Classify biomedical polymer with suitable examples. Briefly discuss the uses of biodegradable polymer in biomedical field. What are the importances of passive film layer for tissue adhesion ? Name at least three synthetic polymeric membranes and their application. 3 + 5 + 3 + 4



10. a) Name four mechanical testings.
- b) Describe the tensile testing of a metallic biomaterial.
- c) What are the data one can get from such a test regarding the mechanical properties of the material ?
- d) What is fracture toughness ? 4 + 5 + 4 + 2
11. a) Name/classify different crystal systems.
- b) Name different crystal defects.
- c) What are the primary use of metallic implant materials ? Mention the uses of 316 L SS, Co-Cr alloy, Ti and its alloys in orthopaedic and dental surgery.
- d) What are the possible biomedical uses of ceramics ?
- e) Why are ceramic materials more advantageous metallic implant ?
- $3 \frac{1}{2} + 1 \frac{1}{2} + (2 + 3) + 2 + 3$
12. Write short notes on any *three* of the following : 3 × 5
- a) Dental implants
- b) Problems of replacing human body parts
- c) Artificial heart valves
- d) PMMA-bone cement
- e) Wear testing of biomaterials.

END