

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI  
SECOND SEMESTER 2022-2023  
PHA G535: BIOMATERIALS  
**Comprehensive Examination**

Maximum marks: 40

Weightage: 40%

Date: 08/05/2023

Duration: 180 min

Note:

- All parts of a question should be answered consecutively.
- Each answer should start from a fresh page.
- Assumptions made if any, should be stated clearly at the beginning of your answer.

No. of Pages	= 2
No. of Questions	= 09

**CLOSED BOOK**

**Maximum marks: 15**

Q1. Several tests need to be performed to assess the compatibility of a material. Explain how the following assays will be performed to evaluate the biocompatibility of newly developed polymer scaffold for cardiovascular application. [6 M]

- a. Guinea Pig Maximization Test (GPMT)
- b. Pyrogenicity
- c. In vitro genotoxicity

Q2. Using suitable examples, explain how biomaterials could be useful in tissue engineering and regenerative medicine? [3 M]

Q3. What are the challenges faced in the delivery of nucleic acids? Explain how biomaterials can overcome these challenges. [3 M]

Q4. What is complement system? [3 M]

**OPEN BOOK**

**Maximum marks: 25**

Q5. A polymeric implant was designed as a bone void filler. Explain the response of the body that is expected on its implantation. [6 M]

Q6. Several polymers have been developed as biomaterials. Select any two widely used biomaterials and compare their properties for their use as drug delivery device. [4 M]

Q7. You are provided with a newly developed polymer to be used as a biomaterial. Explain, how will you assess the thermal properties of the material? What impact does thermal properties have on product development and its performance. [3 M]

Q8. Write briefly on the following: [8 M]

- a. Factors that influence the properties of chitosan
- b. In GPC, how the molecular weight of unknown sample is determined.
- c. How does the M/G ratio in alginate impact its gel strength?
- d. Application/s of a temperature sensitive polymer.

Q9. Explain the factors that could impact the degradation of polymer. [4 M]

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