



COEP TECHNOLOGICAL UNIVERSITY (COEP Tech)

A Unitary Public University of Government of Maharashtra
(Formerly College of Engineering Pune (COEP))

END Semester Examination

Programme: B. Tech.

Course Code:
B.

Branch: C. 100

Duration: 1 year

Duration: 180 min

Semester: I

Course Name: Biology for Engineers

Documentation Academic Year: 2023-24

Max Marks: 60

6 1 2 3 0 9 0 5 0

Instructions:

1. All questions are compulsory & figures to the right indicate the full marks.
 2. Mobile phones and programmable calculators are strictly prohibited.
 3. Writing anything on question paper is not allowed except PRN No.
 4. Exchange/Sharing of stationery, calculator etc. not allowed.
 5. Support your answer/s with biological diagrams/ flow charts and logical explanation.

| | | Marks | CO |
|---|---|-------|----|
| Q1 A) Explain the bio-inspiration in .. | i. Velcro ii. Shape of a bullet train engine (Shinkansen) iii. Energy efficient wind turbine blades iv. Engineered swimsuits | 04 | 1 |
| B) Answer ANY TWO from the following .. | i. Elaborate on methods of biomining. ii. Discuss the advantages of nature inspired designs. iii. What are the problems we might have faced without a microscope? iv. Write the merits and limitations of self-healing bio concrete. | 04 | 1 |
| C) Attempt ANY ONE of the following .. | i. Explain any two biological algorithms. ii. Explain any two engineering applications in biology. | 04 | 1 |
| Q2 A) Write the types of .. | i. rRNA molecule ii. Proteins iii. Combination of biomolecules iv. Ribosomal subunits | 04 | 2 |
| B) Connect the following words in order and write the process .. | i. DNA, Endoplasmic reticulum, Ribosomes, Nuclear pore, mRNA ii. Saliva, Small & Large intestine, Esophagus, Stomach, Anus iii. Reduction, CO ₂ , Fixation, Regeneration, Carbohydrate iv. Phospho-di-ester bonds, Amino acids, Folding, Stabilization, | 04 | 2 |
| C) Attempt ANY TWO of the following.. | i. Explain the photochemical phase of photosynthesis. ii. Justify - ATP synthesis is highly efficient biological process. | 04 | 2 |
| A) Write the significance of .. | i. Caspary strip in Xylem ii. Signal transduction in plants iii. Passive immunity iv. Shutter in camera | 04 | 2 |



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- B) Answer ANY TWO questions from the following ..** 04 3
- i. Compare various types of memories of brain and computer.
 - ii. Elaborate on types of transport routes in short distance to xylem.
 - iii. Discuss the defense mechanism in non-vertebrates.
 - iv. Comment on the analogous system of thermoregulation.
- C) Attempt ANY ONE of the following ..** 04 3
- i. Discuss the process of current generation in electric fish.
 - ii. Compare and contrast the biological process of photosynthesis and solar energy harvesting
- Q4 A) Mention FOUR types of ..** 04 4
- i. Sources of cells for tissue engineering
 - ii. Prosthetic devices
 - iii. Biomaterials
 - iv. Bioprinting techniques
- B) Answer any TWO questions from the following....** 04 4
- i. What are the properties of ideal scaffold?
 - ii. Why are the biomaterials preferred over synthetic sources?
 - iii. What are the advantages of knowing mechanical properties of tissues?
 - iv. Can we represent summary of tissue engineering technique?
- C) Attempt ANY ONE of the following...** 04 4
- i. Explain SCPL and Freez Drying methods of scaffold synthesis along with their advantages and limitations.
 - ii. Discuss the evolutionary history of biomaterials with suitable examples.
- Q5 A) Write a line long application of AI in ..** 04 5
- i. Research
 - ii. Data collection & administration
 - iii. Medical Imaging
 - iv. Surgery
- B) Answer any TWO from the following:** 04 5
- i. Write about the applications of PCR.
 - ii. Differentiate between diagnostic & therapeutic biomedical devices.
 - iii. Elaborate on principle and working of any bioimaging technique.
 - iv. Discuss any four applications of biosensors .
- C) Attempt ANY ONE of the following...** 04 5
- i. Explain the process of DNA replication.
 - ii. Elaborate the process of biological computing and add a note on different spatial organizations of information processing.
