

**JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT**

**TEST -3 EXAMINATION- 2024**

**M.Tech-II Semester (BT)**

**COURSE CODE (CREDITS):** 14M11BT211 (03)

**MAX. MARKS:** 35

**COURSE NAME:** Industrial Biotechnology

**COURSE INSTRUCTOR:** Dr. Garlapati Vijay Kumar

**MAX. TIME:** 2 Hours

*Note: (a) All questions are compulsory.*

*(b) Marks are indicated against each question in square brackets.*

1. What is the necessity of extremozymes and emphasize the possible routes to get the extremozymes? Describe the existing practical applications of different extremozymes? (5 M)
2. Halophiles tolerate the high salt concentration. Explain the different possible surviving mechanisms of halophile for thriving in extreme salt concentration? How does the halophilic industrial biotechnology approach pave economic routes, given a detailed explanation by taking the case study of "PHA production" by halophilic microorganisms? (3+3=6 M)
3. Differentiate "2nd generation biofuels" with "3rd Generation Biofuels"? With a neat sketch, explain the conversion of lignocellulosics to bioethanol production? Explain the enzymatic hydrolysis through cellulolytic enzymes? (2+ 2+ 2 = 6M)
4. With a neat sketch, explain the "Rational Protein Design (RPD)", and "Directed evolution (DE)" approaches utilized towards development of Industrial biocatalysts? Explain the utilizing mutagenesis techniques under RPD, DE and Focused-DE" approaches? (3+3=6 M)
5. Discuss about the following ones related to the industrial applications of enzymes(2x3 = 6 M)
  - (a) Lipase specificities towards possible applications in the oil and fat industry
  - (b) Conventional Enzymatic Process Vs One-step process in case of "Tanneries"
6. Write about the following extremophiles and biomimicry concepts related industrial biotechnology (2 x 3 = 6 M)
  - (a) Halophilic-based ecotone production
  - (b) Biomimicry concepts of "Silk Fibers" and "Gecko Adhesives"

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