

Molecular And Applied Microbiology Exams 2003 3010BBS

Total Marks: 80

Time: 1 hour and 30 mins

INSTRUCTIONS

The paper is in two sections, SECTION A and SECTION B. Answer each of the sections in separate answer books.

SECTION A ANSWER THIS SECTION IN A SEPARATE BOOK

Question 1 Answer only ONE question from the following two questions: (Total 22 marks for this section)

(a) Outline the processes involved in obtaining a complete genome sequence for a microorganism including library construction, sequencing, gap filling etc.

OR

(b) Choose one published complete genome sequence and discuss how the genome sequence has aided in understanding the metabolism, physiology and specific genetic adaptations of this organism.

Question 2. Answer briefly any SEVEN of the following eight questions. Diagrams can be used if appropriate. Each question is worth 4 marks (total 28 marks for the section).

1. How does *Thermoplasma* strengthen its cell membrane to survive life in absence of a cell wall?
 2. How does the metabolism of *Thermococcales* differ from that of *Methanopyrus*?
 3. What are the major substrates for methanogenesis?
 4. How do hyperthermophiles keep important macromolecules like proteins and DNA from being destroyed by high heat?
 5. List at least two reasons why an upper temperature limit to life undoubtedly exists. What is the likely upper temperature limit for life?
 6. Where is the thermosome found and what is its apparent role?
 7. The Archaeal transcription apparatus most closely resembles the Eucaryotic transcription apparatus. State True or False and justify the statement.
 8. Draw a general secondary structure of ribosomal RNA and label some of its features.
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SECTION B. ANSWER THIS SECTION IN A SEPARATE BOOK

Question 3: Answer any FIVE of the following seven questions briefly. Answer in a separate examination booklet provided. Diagrams can be used if appropriate. Each question is worth 6 marks (total 30 marks for the section).

1. List 5 problems caused by microorganisms in industrial processes.
2. Specialty microbial tests are important in the pharmaceutical industry. Briefly describe under what circumstances any two of the following tests would be done: (i) sterility test, (ii) endotoxin test, (iii) Ames test, (iv) preservative efficacy test.
3. Briefly outline the industrial production of penicillin? How might the type of penicillin produced be varied?
4. Explain how microorganisms are used in bioremediation processes.
5. What are the characteristics of and mechanisms used by bioleaching microorganisms in the recovery of metals from minerals/ores?
6. Outline 2 industrial uses of lactic acid bacteria, giving examples of the organisms.
7. Explain how yeast is used in the production of (i) beer and (ii) bread.