八十四學年度 輻射生物所 組碩士班研究生入學考試

科目 微生物學 科號3404 共 三 頁第 一 頁 *請在試卷【答案卷】內作答

第一部份：試在下列空格中填入適當的字（各字已給予第一字母），共二十分。

1. The D-alanine analogue D-cycloserine is a competitive inhibitor of two enzymes, alanine racemase and D-alanyl-D-alanine synthetase, both of which are important in p_____ synthesis.

2. Bacterial resistance to rifampins is usually due to an altered β-subunit of RNA p_____ with a decreased ability to bind rifampin.

3. Mutants, called a_____, have an additional nutritional requirement.

4. C_____is the process by which two recessive mutations can supply each other's deficiency to produce a wild type phenotype. It is another method of genetic analysis used to determine whether two mutants, apparently defective in the same way, are defective in the same gene.

5. When the effects of a primary mutation are eliminated by a second mutation, the latter is called a s_____ mutation.

6. Gene transfer between bacteria is accomplished by 3 different processes: transformaton, transduction, and c_____.

7. Transposition occurs in the absence of RecA function; therefore it is a type of i _____ recombination.

8. In Hfr strains the F factor DNA integrates into the c_____ of the host cell.

9. Various forms of a gene are known as a_____.

10. R_____ transcription is the process that leads to the synthesis of a DNA molecule from an RNA template.

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科目微生物學科號34-04共三頁第二頁 *請在試卷【答案卷】內作答

第二部份：試解釋下列各詞，共二十五分

1. posttransiational regulation
2. cloning
3. selective medium
4. mutator
5. biocide
6. bacteriocin
7. growth curve
8. plasmid curing
9. transposon mutagenesis
10. spontaneous mutation frequency

第三部份：對甲欄中所列之微生物，試由乙欄中選一能做最適當描述之詞，共十分。（答題時以諸如1-f, 2-a, ... 配對方式表達即可）

甲	乙
(1) *Saccharomyces cerevislae*	(a) antibiotics
(2) *Streptomyces* spp.	(b) bacterium-plant symbiosis
(3) *Rhizobium* spp.	(c) drink water quality
(4) *Deinococcus radiodurans*	(d) eukaryotic microbe
(5) *Bacillus subtilis*	(e) photosynthesis
(6) *Lactobacillus plantarum*	(f) sporulation
(7) *Aspergillus parasiticus*	(g) aflatoxins
(8) *Caulobacter crescentus*	(h) γ-ray resistance
(9) *Escherichia coli*	(i) food fermentation/acid production
(10) cyanobacteria	(j) cellular differentiation

第四部份：問答題，共四十五分。

1. 如何製備及運用monoclonal antibody？
2. 在許多生物學領域protein-protein interactions是很重要之課題。
   試以微生物細胞爲例論述之。
3. 下列一段文章節錄自最近發表的一篇微生物研究報告。這段文章提出微生物學發展上一些困難及轉機。試問這些困難及轉機是什麼？

Among the disciplines devoted to studying the different life forms on our planet, microbiology was the last to be established. Its boundaries are very much defined as a consequence. Subtract from the pool of organisms those that can be studied by the classic techniques of botany and zoology, and the rest is left for microbiologists. What usually remains are small organisms that can be visualized only by using special equipments, microscopes. In contrast to animals and plants, the morphology of microorganisms is general too simple to serve as a basis for a sound classification and to allow for reliable identification. Thus, until very recently, microbial identification required the isolation of pure cultures (or defined cocultures) followed by testing for multiple physiological and biochemical traits. A successful microbiologist was very much determined by the ability to cultivate microorganisms. Consequently, any approach to identify specific microbial populations without cultivation directly in their natural environments could be revolutionary, since it could change the character of microbiology and close the methodological gap which still exists in comparison with botany and zoology.

4. 以下兩句敘述所反映之事實在微生物學上有何意義及重要性？
(1) For oligotrophic to mesotrophic aquatic habitats, it has been frequently reported that direct microscopic counts exceed viable-cell counts by several orders of magnitude.
(2) It has been well documented that *Salmonella enteritidis*, *Vibrio cholerae*, and *V. vulnificus* may quickly enter a nonculturable state upon exposure to salt water, freashwater, or low temperatures.