

大同大學 九十 學年度 轉學考試 試題

考試科目：微生物 系別：生物工程學系

級別：三年級 第 / 頁，共 4 頁

註：本次考試不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

* 請以答案紙另外作答。

1. Two culture media were inoculated with four different bacteria. After incubation, the following results were obtained:

Organism	Medium A	Medium B
<i>Escherichia coli</i>	Red colonies	No growth
<i>Staphylococcus aureus</i>	No growth	Growth
<i>Salmonella enteritidis</i>	Colorless colonies	No growth

Which medium is selective?

- medium A
 - medium B
 - both of them
 - neither of them
2. Assume you inoculated facultatively anaerobic cells onto two nutrient agar plates and incubated them aerobically and anaerobically, respectively. After incubation for 24 hours, you should have
- more colonies on the aerobic plate.
 - more colonies on the anaerobic plate.
 - the same number of colonies on both plate.
3. At which one of the following temperatures the mesophiles have the optimum growth?
- 50°C
 - 0°C
 - 37°C
 - 60°C
4. An organism that has peroxidase and superoxide dismutase but lacks catalase is most likely an
- aerobe
 - aerotolerant anaerobe
 - obligate anaerobe
5. The disk-diffusion method was used to evaluate three disinfectants. The results were as follows:

Disinfectant	Zone of inhibition
X	0 mm
Y	5 mm
Z	10 mm

Which disinfectant was the most effective against the organism?

- X
 - Y
 - Z
 - All
6. Suppose you inoculate three flasks of minimal salts broth with *E. coli*. Flask A contains glucose. Flask B contains glucose and lactose. Flask C contains lactose. After a few hours of incubation, you test the flasks for the presence of β -galactosidase. Which flasks do you predict will have this enzyme?
- A and B
 - B and C
 - A and C
 - All of above

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7. Plasmids differ from transposons because plasmids
 - a. become inserted into chromosomes
 - b. are self-replicated outside the chromosome
 - c. move from chromosome to chromosome
 - d. none of the above
8. The transfer of DNA from a donor to a recipient cell by a bacteriophage is called
 - a. conjugation
 - b. transcription
 - c. transduction
 - d. transformation
9. The transfer of DNA from a donor to a recipient as naked DNA in solution is called
 - a. conjugation
 - b. transcription
 - c. transduction
 - d. transformation
10. Which of the following mutagens is incorporated into DNA in place of a normal base?
 - a. frameshift mutagen
 - b. nucleoside analog
 - c. base-pair mutagen
 - d. ionizing radiation
11. Restriction enzymes were first discovered with the observation that
 - a. DNA is restricted to the nucleus
 - b. Phage DNA is destroyed in a host cell
 - c. Foreign DNA is kept out of a cell
 - d. Foreign DNA is restricted to the cytoplasm
12. The DNA probe, 3' GGCTTA, will hybridize with DNA containing
 - a. 5'CCGUUA
 - b. 5'CCGAAT
 - c. 3'CCGAAT
 - d. 3'GGCAAU
13. Which of the following is usually not the step necessary for the basic genetic engineering
 - a. transformation
 - b. restriction-enzyme digestion of gene
 - c. ligation
 - d. reverse transcription
14. You have a small gene that you want replicated by PCR. You add radioactively labeled nucleotides to the PCR thermalcycler. After three replication cycles, what percentage of the DNA single-stands are radioactively labeled?
 - a. 0%
 - b. 12.5%
 - c. 50%
 - d. 87.5%

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15. Some commonly used restriction enzymes are listed in the following table. The cutting site is indicated by ↓. Which of them produce sticky ends?

Enzyme	Recognition Sequence
<i>Bam</i> HI	$\begin{array}{c} \text{G} \downarrow \text{GATC} \text{C} \\ \text{CCTAG} \downarrow \text{G} \end{array}$
<i>Eco</i> RI	$\begin{array}{c} \text{G} \downarrow \text{AATT} \text{C} \\ \text{CTTAA} \downarrow \text{G} \end{array}$
<i>Hae</i> III	$\begin{array}{c} \text{GG} \downarrow \text{CC} \\ \text{CC} \downarrow \text{GG} \end{array}$

- a. *Bam*HI and *Eco*RI
 b. *Eco*RI and *Hae*III
 c. *Bam*HI and *Hae*III
 d. none
16. Place the following in the order in which they are found in a host cell: (1) capsid proteins; (2) infective phage particles; (3) phage nucleic acid.
 a. 1, 2, 3
 b. 3, 2, 1
 c. 2, 1, 3
 d. 3, 1, 2
17. An example of lysogeny in animals could be
 a. slow viral infections
 b. latent viral infections
 c. infections resulting in cell death
 d. none of the above
18. Which of the following is not one of Koch's postulates?
 a. The same pathogen must be present in every case of the disease
 b. The pathogen must be isolated and grown in pure culture from the diseased host.
 c. The pathogen from pure culture must cause the disease when inoculated into a healthy, susceptible laboratory animal.
 d. The disease must be transmitted from a diseased animal to a healthy, susceptible animal by some form of contact.
19. What is the LD_{50} for the bacterial toxin tested in the example below?
- | Dilution | No. of Animals
Died | No. of Animals
Survived |
|---------------------------------|------------------------|----------------------------|
| a. 6 $\mu\text{g}/\text{kg}$ | 0 | 6 |
| b. 12.5 $\mu\text{g}/\text{kg}$ | 3 | 3 |
| c. 25 $\mu\text{g}/\text{kg}$ | 4 | 2 |
| d. 50 $\mu\text{g}/\text{kg}$ | 6 | 0 |
20. Chloramphenicol binds to the 50S portion of a ribosome, which will interfere with
 a. transcription in prokaryotic cells
 b. translation in prokaryotic cells
 c. translation in eukaryotic cells
 d. none of above

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21. The following results were obtained from a broth dilution test for microbial susceptibility.

Antibiotic concentration	Growth	Growth in subculture
a. 200 µg	-	-
b. 100 µg	-	-
c. 50 µg	⊖	⊕
d. 25 µg	+	+

c Which of the above is the MIC of this antibiotic?

22. In the previous question, which of the above is the MBC of this antibiotic?

23. Coliforms are used as indicator organisms of sewage pollution because

- they are pathogens
- they ferment lactose
- they are abundant in human intestines
- they grow within 48 hours

24. Microorganisms themselves are industrial products. Which of the following pairs is mismatched?

- Penicillium* vs. treatment of disease
- S. cerevisiae* vs. fermentation
- Rhizobium* vs. nitrogen increases in the soil
- B. thuringiensis* vs. insecticide

25. Which of the following reactions is undesirable in wine-making?

- Sucrose → ethanol
- Ethanol → acetic acid
- Malic acid → lactic acid
- ✓ d. Glucose → pyruvic acid