

大同大學 九十二 學年度 轉學考試 試題

考試科目：微生物 系別：生物工程學系

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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。

I. Multiple choice: (two points each)

1. 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?

- a. X b. Y c. Z d. All
2. 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. A b. B c. C d. B and C
3. Transformation is the transfer of DNA from a donor to a recipient cell
a. By a bacteriophage.
b. As naked DNA in solution.
c. By cell-to-cell contact.
d. By sexual reproduction.
4. 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.
5. The DNA probe, 3' GGCTTA, will hybridize with RNA containing
a. 5'CCGAAT b. 5'CCGAU
c. 3'CCGAU d. 3'GGCAU
6. 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
7. 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.
8. Monoclonal antibodies against CD4 antigens might be used to treat AIDS because
a. The HIV has CD4 surface antigens.
b. Susceptible host cells would be killed.
c. Receptor sites would not be available for the virus.
d. The virus would attach to the antibodies.
9. Which of the following pairs is mismatched?
a. DNA polymerase - makes a molecule of DNA from a DNA template
b. RNA polymerase - makes a molecule of RNA from an RNA template
c. DNA ligase - joins segments of DNA
d. Transposase - insertion of DNA segments into DNA
10. The difference between simple diffusion and facilitated diffusion is that facilitated diffusion
a. can move materials from a higher to a lower concentration.
b. can move materials from a lower to a higher concentration.
c. requires ATP.
d. requires transporter proteins.
11. Which of the following pairs is mismatched?
a. Glycocalyx-adherence
b. Pili-reproduction
c. Membrane-DNA synthesis
d. Cell wall-protection
12. Archaea differ from eubacteria because archaea
a. lack peptidoglycan.
b. lack nuclei.
c. use organic compounds for food.
d. reproduce by binary fission.
13. The microscope is used to observe a specimen that emits light when illuminated with an ultra-violet light.
a. Compound light microscope
b. Phase-contrast microscope
c. Darkfield microscope
d. Fluorescence microscope
14. The following steps must be performed to make a bacterium produce human protein X:
1-translation; 2-restriction enzyme;
3-procaryotic transcription; 4-DNA ligase;
5-transformation; 6-eukaryotic transcription;
7-reverse transcription. Put the steps in the correct sequence.
a. 5,2,3,4,7,6,1. b. 1,2,3,5,4,7,6.
c. 6,7,2,3,4,5,1. d. 6,7,2,4,5,3,1.
15. According to the operon model, for the synthesis of an inducible enzyme to occur, the
a. substrate must bind to the repressor.
b. substrate must bind to the enzyme.
c. repressor must bind to the operator.
d. repressor must not be synthesized.
16. What is the fate of pyruvic acid in an organism that uses aerobic respiration?
a. It is reduced to lactic acid.
b. It is oxidized in the Krebs cycle.
c. It is reduced in the Krebs cycle.
d. It is oxidized in the electron transport chain

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17. The term facultative anaerobe refers to an organism that
- doesn't use oxygen but tolerates it.
 - prefers to grow without oxygen.
 - uses oxygen or grows without oxygen.
 - requires less oxygen than is present in air.
18. Three cells with generation times of 30 minutes are inoculated into a culture medium. How many cells are there after 5 hours?
- a. 3×2^{10} b. 1024 c. 243 d. 48
19. The antimicrobial activity of chlorine is due to which of the following?
- The formation of hydrochloric acid
 - The formation of hypochlorous acid
 - The formation of ozone
 - The formation of free O
20. Which of the following is in the correct order from the most general to the most specific?
- Kingdom-phylum-class-order-family-genus-species
 - Kingdom-class-order-family-phylum-genus-species
 - Species-genus-family-order-class-phylum-kingdom
 - Phylum-kingdom-class-order-genus-family-species
21. Which of the following pairs is mismatched?
- Dinoflagellates – paralytic shellfish poisoning
 - Brown algae – algin
 - Green algae – agar
 - Diatoms – petroleum
22. Which of the following pairs is mismatched?
- 1) Arthrospore — formed by fragmentation
 - 2) Sporangiospore — formed within hyphae
 - 3) Conidiospore — Formed in a chain
 - 4) Blastospore — formed from a bud
 - 5) Chlamydospore — formed in a sac
- a. 1 and 2 b. 2 and 3
c. 2 and 5 d. 3 and 4
23. Antibodies found in mucus, saliva and tears.
- a. IgG b. IgM c. IgA d. IgD
24. Put the following in the correct sequence to elicit an antibody response:(1) T_H cell recognizes B cell;(2) APC phagocytizes antigen;(3) antigen fragment goes to surface of APC;(4) T_H recognizes antigen digest and MHC;(5) B cell recognizes antigen.
- a. 1,2,3,4,5 b. 5,4,3,2,1
c. 2,3,4,1,5 d. 3,4,5,1,2
25. A viroid is
- A complete, infectious virus particle.
 - A naked, infectious piece of RNA.
 - A capsid without a nucleic acid.
 - A provirus

II. Questions

1. Compare and contrast the following terms: (four points each)
 - Photoautotroph and chemoautotroph
 - Active and passive immunity
 - Commensalisms, mutualism and parasitism
 - Disinfection and antisepsis
 - Missense and nonsense mutation
 - Positive and negative selection
 - Transcription and translation
 - Endotoxin and exotoxin
 - Axial filament and flagellum
 - Endospore and cyst
2. Describe and/or explain the following terms: (two points each)
 - Gram staining
 - The complement system
 - ELISA
 - PCR
 - Interferon