

銘傳大學 97 學年度轉學生招生考試

生物科技學系

普通生物學試題

(7 月 24 日第三節)

(第 1 頁共 4 頁)(限用答案本作答)

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一、選擇題：每題 1.5 分，共 45 分。若連續五題或五題以上答案相同，皆不給分。題號標示不清不給分。

1. Organic chemistry is currently defined as
 - A) the study of compounds that can be made only by living cells.
 - B) the study of carbon compounds.
 - C) the study of vital forces.
 - D) the study of natural (as opposed to synthetic) compounds.
 - E) the study of hydrocarbons.
2. Which of the following are pyrimidines found in the nucleic acid DNA?
 - A) adenine and guanine
 - B) thymine and cytosine
 - C) thymine and adenine
 - D) uracil and guanine
 - E) guanine and cytosine
3. Which of the following is **not** electrically charged amino acid within a cell?
 - A) Cysteine
 - B) lysine
 - C) histidine
 - D) aspartic acid
 - E) arginine
4. Which of the following structure-function pairs is mismatched?
 - A) Gogi; protein trafficking
 - B) chloroplast; synthesis triose sugars
 - C) microtubules; organelle movements
 - D) microfilaments; cytoplasmic streaming
 - E) mitochondrion; glycolysis
5. Which of the following functional processes result(s) from the presence of proteins in or on the plasma membrane?
 - A) enzymatic activity
 - B) cell-cell recognition
 - C) intercellular joining
 - D) cell-cell communication
 - E) all of the above
6. Which of the following accompanies the conversion of pyruvate to acetyl CoA before the citric acid cycle?
 - A) formation of CO_2 and ATP
 - B) formation of CO_2 and NADH
 - C) formation of CO_2 and coenzyme A
 - D) completion of one turn of the citric acid cycle
 - E) regeneration of NAD^+
7. In C_4 and CAM plants carbon dioxide is fixed in the _____ of mesophyll cells.
 - A) stoma
 - B) cytoplasm
 - C) thylakoids
 - D) stroma
 - E) grana
8. C_4 plants differ from C_3 and CAM plants in that C_4 plants _____.
 - A) open their stomata only at night
 - B) are better adapted to wet conditions
 - C) transfer fixed carbon dioxide to cells in which the Calvin cycle occurs
 - D) use malic acid to transfer carbon dioxide to the Calvin cycle
 - E) use PEP carboxylase to fix carbon dioxide
9. Thyroid hormones bind to _____ receptors
 - A) tyrosine-kinase
 - B) plasma membrane ion-channel
 - C) steroid
 - D) intracellular
 - E) G-protein-linked

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10. Spindle fibers attach to kinetochores during _____.
A) metaphase B) prometaphase
C) interphase D) anaphase E) telophase
11. Synapsis occurs during _____.
A) prophase I B) telophase I and cytokinesis
C) prophase II
D) metaphase II E) anaphase II
12. A cross between an individual with orange eyes and green skin and an individual with black eyes and white skin is an example of a _____ cross.
A) test B) difficult C) dihybrid
D) trihybrid E) monohybrid
13. A phenotypic ratio of 9:3:3:1 in the offspring of a cross indicates that _____.
A) one parent is homozygous dominant and one parent is homozygous recessive
B) one parent is heterozygous and one parent is homozygous recessive
C) one parent is homozygous dominant and one parent is heterozygous
D) both parents are heterozygous for both genes
E) both parents are homozygous dominant
14. The recombination frequency between gene A and gene B is 8.4%, the recombination frequency between gene A and gene C is 6.8%, and the recombination frequency between gene B and gene C is 15.2%. Which of these is the correct arrangement of these genes?
A) ABC B) ACB C) BCA D) CAB E) CBA
15. Synthesis of a new DNA strand usually begins with
A) an RNA primer. B) DNA ligase.
C) a DNA primer. D) a thymine dimer.
E) an Okazaki fragment.
16. Plants are more readily manipulated by genetic engineering than are animals because
A) plant genes do not contain introns.
B) more vectors are available transferring recombinant DNA into plant cells.
C) a somatic plant cell can often give rise to a complete plant.
D) genes can be inserted into plant cells by microinjection.
E) plant cells have larger nuclei.
17. In *C. elegans* the gene that initiates the cascade that results in apoptosis is the _____ gene.
A) *Bicoid* B) *homeobox* C) *ced-9*
D) *myoD* E) *fasciated*
18. In tomatoes, the *fasciated* gene determines the _____.
A) number of organs a flower will have
B) death of a cell
C) anterior-posterior axis
D) organ that develops from a particular region of meristem
E) expression of cytoplasmic determinants
19. New alleles originate from _____.
A) natural selection B) genetic drift
C) sexual recombination
D) the environment E) mutation

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20. Which one of the following conditions is necessary for speciation to occur?
- A) reproductive isolation
 - B) sympatric speciation
 - C) adaptive radiation
 - D) mass extinction
 - E) interbreeding among neighboring populations
21. Which of these events occurred earliest in the history of Earth?
- A) origin of eukaryotes
 - B) evolution of land plants, fungi, and land animals
 - C) origin of multicellularity
 - D) formation of oxygen
 - E) first humans
22. Bacteria that use light for their energy source and CO₂ for their carbon source are called _____.
- A) photoheterotrophs
 - B) photoautotrophs
 - C) chemoheterotrophs
 - D) chemoautotrophs
 - E) photochemoheterotrophs
23. A gram-negative cell wall consists of _____.
- A) two layers of peptidoglycan with a layer of lipid in between
 - B) cholesterol and peptidoglycan
 - C) bacteriorhodopsin and periplasmic gel
 - D) a thick layer of peptidoglycan surrounded by an outer membrane
 - E) a thin layer of peptidoglycan surrounded by an outer membrane
24. How do trypanosomes withstand the attack of a host's immune system?
- A) They reproduce so fast that they can compensate for the death rate caused by the immune system
 - B) They live only in the cerebrospinal fluid, where the immune system can't reach them.
 - C) They specifically poison helper T cells.
 - D) The molecular composition of their surface changes continually.
 - E) All of the above.
25. _____ protect(s) pollen grains from environmental damage.
- A) Tannins
 - B) Sporopollenin
 - C) Lignin
 - D) Cuticle
 - E) Stomata
26. The development of the _____ prevents plants from drying out and protects them from microbes.
- A) cuticle
 - B) apical meristem
 - C) gametangia
 - D) terpene
 - E) flavonoid
27. In flowering plants the integuments of the ovule develop into a(n) _____.
- A) endosperm
 - B) cotyledon
 - C) fruit
 - D) sporophyte
 - E) seed coat
28. In the pine, microsporangia form _____ microspores by _____.
- A) triploid ... fertilization
 - B) diploid ... mitosis
 - C) diploid ... meiosis
 - D) haploid ... mitosis
 - E) haploid ... meiosis
29. Which feature below is unique to chytrids?
- A) asci (spore-producing sacs)
 - B) zoospores (flagellated spores)
 - C) cell walls made of chitin
 - D) conidia (asexual spores)
 - E) soredia

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30. Which choice below generally represents the correct order of events in fungal sexual reproduction?

- A) meiosis, plasmogamy, karyogamy, germination
- B) karyogamy, meiosis, plasmogamy, germination
- C) germination, meiosis, karyogamy, plasmogamy
- D) plasmogamy, karyogamy, meiosis, germination
- E) plasmogamy, meiosis, germination, karyogamy

二、名詞翻譯：將下列名詞翻成英文。每題 1 分，共 12 分。題號標示不清不給分。

- | | | |
|---------|-------------|----------------|
| 1. 轉錄 | 5. 呼吸作用 | 9. 周鞘 |
| 2. 轉譯 | 6. 鑑識酶 | 10. 胚珠 |
| 3. 性狀導入 | 7. 胚胎幹細胞 | 11. 氣孔 (寫高等植物) |
| 4. 光和作用 | 8. 人類 (寫學名) | 12. 神經系統 |

三、說明下列名詞。每題 2 分，共 36 分。翻譯不給分。題號標示不清不給分。

- | | |
|---|--------------------------------------|
| 1. receptor-mediated endocytosis | 10. epigenetic inheritance |
| 2. enzyme inhibitors: noncompetitive inhibition | 11. <i>lac</i> operon |
| 3. oxidative phosphorylation | 12. proteasome |
| 4. Communication between mating yeast | 13. proto-oncogenes |
| 5. Chorionic villus sampling | 14. totipotent |
| 6. origins of replication | 15. lymphatic system |
| 7. RNA processing | 16. duodenum |
| 8. F plasmid | 17. open circulatory system |
| 9. retrotransposon | 18. antigen receptors on lymphocytes |

四、問答題。各題分數標示在題號後，共 7 分。題號標示不清不給分。

- 1. 請寫出動物組織之細胞間的連結(intercellular junction)方式。(3%)
- 2. 請簡明扼要寫出細胞組成之合成到送到細胞膜之流程。(4%)

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試題完