

銘傳大學九十一學年度管理科學研究所碩士班招生考試

(甲組) 第一節

生物學 試題

Choose the best answer (2% each)

1. What characterizes a prokaryotic cell?
 - (A) the presence of mitochondria
 - (B) the lack of a membrane-enclosed nucleus
 - (C) the lack of ribosomes
 - (D) the presence of nucleus with no DNA
 - (E) having a cell wall without a cell membrane
2. At what temperature is water at its densest?
 - (A) 0°C
 - (B) 4°C
 - (C) 32°C
 - (D) 100°C
 - (E) 212°C
3. Which type of molecule would be most abundant in a typical cell?
 - (A) hydrocarbon
 - (B) protein
 - (C) water
 - (D) lipid
 - (E) carbohydrate
4. The alpha helix and the beta pleated sheet are both common forms found in which level of structure of proteins?
 - (A) primary
 - (B) secondary
 - (C) tertiary
 - (D) quaternary
5. ATP generally energizes a cellular process by
 - (A) releasing heat upon hydrolysis
 - (B) acting as a catalyst
 - (C) direct chemical transfer of a phosphate group
 - (D) emitting light flashes
 - (E) releasing ribose electrons to drive reactions
6. Which of the following cell components is NOT directly involved in synthesis or secretion?

- (A) ribosomes
 - (B) rough endoplasmic reticulum
 - (C) Golgi bodies
 - (D) smooth endoplasmic reticulum
 - (E) lysosome
7. The kinds of molecules that pass through a cell membrane most easily are
- (A) large and hydrophobic
 - (B) small and hydrophobic
 - (C) ionic
 - (D) large polar molecules
 - (E) monosaccharides such as glucose
8. During aerobic respiration, electrons travel downhill from
- (A) food → Krebs cycle → ATP → NAD⁺
 - (B) glucose → ATP → oxygen
 - (C) food → NADH → electron transport chain → oxygen
 - (D) glucose → ATP → electron transport chain → NADH
 - (E) food → glycolysis → Krebs cycle → NADH → ATP
9. The process of noncyclic photophosphorylation uses light energy to synthesize
- (A) ADP and ATP
 - (B) ATP and P700
 - (C) ATP and NADPH
 - (D) ADP and NADP
 - (E) P700 and P680
10. If cells in the process of dividing are subjected to colchicines, a drug that interferes with the functioning of the spindle apparatus, at which stage will mitosis be arrested?
- (A) anaphase
 - (B) prophase
 - (C) telophase
 - (D) metaphase
 - (E) interphase
11. The process of transduction usually begins
- (A) when the chemical signal is released from the cell
 - (B) when the signal molecule changes the receptor protein in some way.
 - (C) after the target cell divides
 - (D) after the third stage of cell signaling is completed
 - (E) when the hormone is released from the gland into the blood

12. Crossing over occurs during which phase of meiosis?
- (A) prophase I
 - (B) anaphase I
 - (C) telophase I
 - (D) prophase II
 - (E) metaphase II
13. Black fur in mice (B) is dominant to brown fur (b). Short tails (T) is dominant to long tails (t). What proportion of the progeny of the cross BbTt x BBrr will have black fur and long tails?
- (A) 1/16
 - (B) 3/16
 - (C) 6/16
 - (D) 8/16
 - (E) 9/16
14. There is good evidence for linkage when
- (A) two genes occur together in the same gamete
 - (B) a gene is associated with a specific phenotype
 - (C) genes do not segregate independently during meiosis
 - (D) two characteristics are caused by a single gene
 - (E) two genes work together to control a specific characteristic
15. If cytosine makes up 22% of the nucleotides in a sample of DNA from an organism, then adenine would make up what percent of the bases?
- (A) 22
 - (B) 44
 - (C) 28
 - (D) 56
 - (E) It cannot be determined from the information provided
16. Where is ribosomal RNA transcribed?
- (A) the Golgi apparatus
 - (B) ribosomes
 - (C) nucleoli
 - (D) X chromosomes
 - (E) Prokaryotic cells only
17. The role of a metabolite that control a repressible operon is to
- (A) bind to the promoter region and decrease the affinity of RNA polymerase for the promoter
 - (B) bind to the operator region and block the attachment of RNA polymerase to the promoter

- (C) increase the production of inactive repressor proteins
 - (D) bind to the repressor protein and inactivate it
 - (E) bind to the repressor protein and activate it
18. What percentage of the DNA in a typical eukaryotic cell is expressed at any given time?
- (A) 3-5%
 - (B) 5-20%
 - (C) 20-40%
 - (D) 40-60%
 - (E) 60-90%
19. The process of cellular differentiation is a direct result of
- (A) differential gene expression
 - (B) morphogenesis
 - (C) cell division
 - (D) induction
 - (E) differences in cellular genomes
20. Plant spores give rise directly to
- (A) sporophytes
 - (B) gametes
 - (C) gametophytes
 - (D) zygotes
 - (E) seeds
21. Which of the following is an acceptable definition of evolution?
- (A) a change in the phenotypic makeup of a population
 - (B) a change in the genetic makeup of a population
 - (C) a change in the genotypic makeup of an individual
 - (D) a change in the environmental conditions
 - (E) a change in the species composition of a community
22. Which factor is the most important in producing the variability that occurs in each generation of humans?
- (A) diploidy
 - (B) genetic recombination
 - (C) genetic drift
 - (D) nonrandom mating
 - (E) natural selection
23. The reproductive barrier that maintains the species boundary between horses and donkeys is
- (A) mechanical isolation

- (B) gametic isolation
 - (C) hybrid inviability
 - (D) hybrid sterility
 - (E) hybrid breakdown
24. The correct sequence from the most to the least comprehensive taxonomic level is
- (A) family, phylum, class, kingdom, order, species, and genus
 - (B) kingdom, phylum, class, order, family, genus, and species
 - (C) kingdom, phylum, order, class, family, genus, and species
 - (D) phylum, kingdom, order, class, species, family, and genus
 - (E) phylum, family, class, order, kingdom, genus, and species
25. The first genetic material was most likely
- (A) a DNA polymer
 - (B) a DNA oligonucleotide
 - (C) an RNA polymer
 - (D) a protein
 - (E) a protein enzyme
26. The primary ecological role of prokaryotes is
- (A) parasitizing eukaryotes, thus causing diseases
 - (B) the decomposition of organic matter
 - (C) metabolizing materials in extreme environments
 - (D) to show that cells can exist with cell wall
 - (E) to show that a diverse group of organisms can be remarkably similar in many ways
27. Which of the following procedures would produce RFLPs?
- (A) incubating a mixture of single-stranded DNA from two closely related species
 - (B) incubating DNA nucleotides with DNA polymerase
 - (C) incubating DNA with restriction endonucleases
 - (D) incubating RNA with DNA nucleotides and reverse transcriptase
 - (E) incubating DNA fragments with “sticky ends” with ligase
28. Which of the following flower parts develops into fruit after pollination?
- (A) stigma
 - (B) style
 - (C) ovule
 - (D) ovary
 - (E) receptacle
29. What is the best definition of a fungus?

- (A) eukaryotic, heterotrophic plants
 - (B) eukaryotic, parasitic plants
 - (C) saprobic plants
 - (D) eukaryotic, multicellular heterotrophs
 - (E) saprobic heterotrophs
30. Why are red algae red?
- (A) They live in warm coastal waters
 - (B) They absorb blue and green light
 - (C) They use red light for photosynthesis
 - (D) They are related to cyanobacteria
 - (E) They lack chlorophyll
31. The blastopore is a structure that is evident in the
- (A) zygote
 - (B) blastula
 - (C) eight-cell stage
 - (D) gastrula
 - (E) egg and sperm
32. Among the invertebrates, arthropods are unique in possessing
- (A) a notochord
 - (B) ventral nerve cords
 - (C) open circulation
 - (D) jointed appendages
 - (E) segmented bodies
33. What are the most abundant and diverse vertebrates?
- (A) bony fishes
 - (B) birds
 - (C) amphibians
 - (D) reptiles
 - (E) mammals
34. The photosynthetic cells in the interior of a leaf are what kind of cells?
- (A) parenchyma
 - (B) collenchyma
 - (C) sclerenchyma
 - (D) phloem
 - (E) endodermis
35. What provides the energy for water transport upward in the xylem?
- (A) ATP
 - (B) sucrose

- (C) the sun
 - (D) cohesion
 - (E) proton gradients
36. Why is nitrogen fixation such an important process?
- (A) Nitrogen fixation can only be done by certain prokaryotes.
 - (B) Fixed nitrogen is most often the limiting factor in plant growth
 - (C) Nitrogen fixation is very expensive in terms of metabolic energy
 - (D) Nitrogen fixers are sometimes symbiotic with legumes
 - (E) Nitrogen fixing capacity can be genetically engineered
37. The product of meiosis in plants is always which of the following?
- (A) spores
 - (B) eggs
 - (C) sperm
 - (D) seeds
 - (E) Both B and C are correct
38. Which plant hormone(s) is(are) most closely associated with cell division?
- (A) ethylene
 - (B) cytokinin
 - (C) abscisic acid
 - (D) phytochrome
 - (E) brassinosteroids
39. The major role of most homeostatic control systems in animals to maintain the constancy of fluid
- (A) with cells
 - (B) within blood vessels
 - (C) around cells
 - (D) within body cavities
 - (E) within the intestine
40. Most of the carbon dioxide in the blood of humans is transported
- (A) as dissolved CO₂ in plasma
 - (B) as bicarbonate in plasma
 - (C) attached to hemoglobin in red blood cells
 - (D) attached to hemocyanin in plasma
 - (E) as carbonic acid
41. Most enzymatic hydrolysis of the macromolecules in food occurs in the
- (A) small intestine
 - (B) large intestine
 - (C) stomach

- (D) liver
 - (E) mouth
42. The clonal selection theory implies that
- (A) related people have similar immune responses
 - (B) antigens activate specific lymphocytes.
 - (C) only certain cells can produce interferon
 - (D) memory cells are present at birth
 - (E) the body selects which antigens it will respond to
43. The digestion and utilization of which nutrient creates the greatest need for osmoregulation by the kidneys?
- (A) protein
 - (B) starch
 - (C) fat
 - (D) oil
 - (E) cellulose
44. Hormones are able to control homeostasis because
- (A) they are not produced by exocrine glands
 - (B) they are subject to negative feedback
 - (C) they may be found in the lymphatic system
 - (D) they are present at low concentrations
 - (E) they are steroids
45. Pregnancy tests are based on the detection of which of the following hormones?
- (A) HCG
 - (B) FSH
 - (C) GnRH
 - (D) Estrogen
 - (E) progesterone
46. Which of the process called that involves the movement of cells into new relative positions in an embryo and results in the establishment of three tissue layers?
- (A) determination
 - (B) cleavage
 - (C) fertilization
 - (D) induction
 - (E) gastrulation
47. What part of the vertebrate nervous system is most involved in preparation for “fight or flight”?

- (A) Sympathetic
 - (B) somatic
 - (C) central
 - (D) visceral
 - (E) parasympathetic
48. The perceived pitch of a sound depend partly on
- (A) the amplitude of the sound waves
 - (B) which bones of the middle ear move
 - (C) which hair cells of the colchlea are stimulated
 - (D) where particles settle in the semicircular canals
 - (E) whether it is the round window or the oval window that vibrates
49. Fire suppression by humans
- (A) will always result in an increase in the number of species in a given biome
 - (B) can change the species' composition within biological communities
 - (C) will result ultimately in sustainable production of increased amounts of wood for human use
 - (D) is necessary for the protection of threatened and endangered forest species
 - (E) None of the above is true
50. Which of the following levels of organization is arranged in the correct sequence from most to least inclusive?
- (A) community, ecosystem, individual, population
 - (B) ecosystem, community, population, individual
 - (C) population, ecosystem, individual, community
 - (D) individual, population, community, ecosystem
 - (E) individual, community, population, ecosystem

試題完