

本試題是否可以使用計算機： 可使用， 不可使用（請命題老師勾選）（以下每題 1 分）

1. Assume that a cross is made between $AaBb$ and $aabb$ plants and the offspring occur in the following numbers: 106 $AaBb$, 48 $Aabb$, 52 $aaBb$, 94 $aabb$. These results are consistent with the following circumstance:
 - A. sex-linked inheritance with 30 % crossing over.
 - B. linkage with 50% crossing over.
 - C. linkage with approximately 33 map units between the two gene loci.
 - D. independent assortment.
 - E. 100% recombination.
2. In self-splicing RNA is acting like
 - A. a replisome.
 - B. a ribosome.
 - C. a ribozyme.
 - D. an enhancer.
 - E. a rho protein.
3. Regarding eukaryotic and prokaryotic genetic regulation, what process seems to be the most similar between the two.
 - A. transcriptional regulation.
 - B. RNA splicing regulation.
 - C. intron/exon shuffling.
 - D. 5'-capping regulation.
 - E. poly(A) tail addition.
4. Human males are much more likely to be have hemophilia (a failure of blood to clot properly) than human females. This is the case because
 - A. hemophilia is a contagious disease to which males are more susceptible.
 - B. the gene for hemophilia is carried on the Y chromosome.
 - C. hemophilia is carried on the autosomes.
 - D. hemophilia is the wild type.
 - E. the gene for hemophilia is sex-linked.
5. After the formation of replication bubbles, which of the following is the correct sequence of enzyme use for the synthesis of the lagging DNA strand?
 - A. primase, helicases, DNA polymerase, ligase.
 - B. helicases, primase, ligase, DNA polymerase.
 - C. helicases, primase, DNA polymerase, ligase.
 - D. helicases, DNA polymerase, primase, ligase.
 - E. ligase, primase, DNA polymerase, helicases.

1 (背面仍有題目,請繼續作答)

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6. Which of the following best describes the complete sequences of steps occurring during *every cycle* of PCR?

- (1) The primers hybridized to the target DNA.
- (2) The mixture is heated to a high temperature to denature the double-stranded target DNA.
- (3) Fresh DNA polymerase is added.
- (4) DNA polymerase extends the primers to make a copy of the target DNA.

- A. (2), (1), (4).
- B. (1), (3), (2), (4).
- C. (3), (4), (1), (2).
- D. (3), (4), (2).
- E. (2), (3), (4).

7. During interphase of the cell cycle, mitosis or meiosis,

- A. DNA recombines.
- B. sister chromatids move to opposite poles.
- C. the nuclear membrane disappears.
- D. RNA replicates.
- E. DNA content essentially doubles.

8. The mouse autosomal genes *B* and *S* are linked and 38 map units apart. Genotypes *BS/BS* and *bs/bs* are intercrossed and the F_1 is testcrossed to *bs/bs*. The proportion of *B-S-* progeny will be

- A. 0.38.
- B. 0.76.
- C. 0.50.
- D. 0.31.
- E. 0.18.

9. Which one of these following statements is true?

- A. DNA is translated into RNA by RNA polymerase.
- B. mRNA is translated to a nucleotide sequence to make a protein.
- C. during translation, amino acids are brought to the ribosome by a tRNA molecule.
- D. RNA is transcribed to DNA.
- E. none of the above.

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10. Genes contain the instructions for building proteins. Where are those instructions located?
- in the bonds between complementary bases.
 - in the sugar and phosphate groups that are part of each nucleotide.
 - in the tRNA.
 - in the nuclear membrane.
 - in the order of the DNA bases.
11. A plasmid vector has a gene for erythromycin resistance (Ery^R) and a gene for ampicillin resistance (Amp^R). The Amp gene is cut with restriction enzyme, and donor DNA treated with the same enzyme is added. What genotype of cells needs to be selected to show evidence of transformation?
- $Amp^R Ery^R$.
 - $Amp^R Ery^S$.
 - $Amp^S Ery^R$.
 - $Amp^S Ery^S$.
 - none of the above.
12. Which of the following terms best characterizes catabolite repression associated with the lactose operon in *E. coli*?
- inducible system.
 - repressible system.
 - negative control.
 - positive control.
 - constitutive
13. B lymphocytes can not
- attack virus-infected cells directly.
 - be transformed into tumor by virus.
 - become plasma cells after activation by antigen.
 - produce cytokines after activation.
 - help T_H cells.
14. Which of the following statements concerning natural killer cells is wrong?
- They are derived from stem cells.
 - They can destroy virus-infected cells.
 - They destroy virus-infected cells by inducing necrosis.
 - They can destroy cancer cells.
 - They contain interferon receptors.

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15. The elimination of viral infection can be achieved by
- A. activation of specific Tc cells only.
 - B. induction of specific humoral immunity only.
 - C. natural killer cells.
 - D. activation of complement system.
 - E. All of the above.
16. Which item is not a secondary lymphoid organ?
- A. Bone marrow.
 - B. Spleen.
 - C. Peyer's patch.
 - D. Tonsil.
 - E. Lymph node.
17. The viral envelope may not
- A. decide viral host range.
 - B. be the target of neutralizing antibody.
 - C. function in viral attachment.
 - D. be attacked by interferon directly.
 - E. be related with viral structural integrity.
18. When the tryptophan is present, the *trp* operon
- A. is on by using the tryptophan itself as co-inducer.
 - B. is on by using the tryptophan itself as co-repressor.
 - C. is off by using the tryptophan itself as co-inducer.
 - D. is off by using the tryptophan itself as co-repressor.
 - E. is not controlled by tryptophan, but by repressor only.
19. Which kind of protein could usually be tagged by ubiquitin for degradation?
- A. Only cellular gene-expressed protein.
 - B. Only viral gene-coded protein expressed inside the infected cell.
 - C. Both cellular and infected viral gene-coded proteins.
 - D. The phagocytized viral proteins.
 - E. Any phagocytized proteins.
20. What roles are usually played by *lacZ* and *amp^R* (ampicillin resistance) genes on the bacterial cloning

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vector?

- A. *lacZ* as gene insertion site and selection marker; *amp^R* as selection marker only.
- B. *lacZ* as gene insertion site only; *amp^R* as selection marker only.
- C. *lacZ* as gene insertion site and selection marker; *amp^R* as gene integration site too.
- D. Both *lacZ* and *amp^R* as gene insertion sites and selection markers.
- E. Both *lacZ* and *amp^R* as selection markers only.

21. Before they attempt to understand the properties of molecules, scientists first try to understand the atoms found in the molecules. This illustrates

- A. A reductionist approach to science
- B. An existential approach to science
- C. A holistic approach to science
- D. The emergent properties of matter
- E. That the whole is greater than the sum of its part.

22. Which of the following is not a trace element in the human body?

- A. Fluorine
- B. Nitrogen
- C. Zinc
- D. Manganese
- E. Iodine

23. Radioactive isotopes

- A. Have no medical usage
- B. Can be used in conjunction with PET scans to diagnose a patient
- C. Have no effect on living tissue
- D. Never occur naturally
- E. Are never incorporated into organic compounds

24. Table salt is formed when

- A. Chlorine gives an electron to sodium
- B. A hydrogen bond forms between sodium and chlorine
- C. Sodium and chlorine share electrons to form a bond
- D. Sodium crystals combine with chlorine crystals
- E. None of the above

25. A molecule with the formula $C_{55}H_{110}O_{55}$ is probably a(n)

- A. Oil
- B. Steroid
- C. Wax
- D. Protein

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E. Polysaccharide

26. Lipids are important in animal cells as

- A. Energy-containing molecules
- B. Components of cell membranes
- C. Steroids and hormones
- D. Enzymes
- E. A, b and c

27. A gas exchange surface must be wet to function because

- A. Blood is mostly water
- B. Interstitial fluid is mostly water
- C. Life requires water
- D. Gaseous oxygen cannot cross a cellular membrane
- E. Active transport requires water

28. The maximum amount of air that a human can inhale and exhale is called the

- A. Tital volume
- B. Vital capacity
- C. Maximum capacity
- D. Physiological volume
- E. Inhalation capacity

29. Hydra does not need a circulatory system because

- A. It is an aquatic animal
- B. It has no skeleton
- C. It has tentacles to move water
- D. It does not move rapidly
- E. It has a very thin body wall

30. What is the most common cause of anemia?

- A. Vital deficient
- B. Low blood pressure
- C. Iron deficient
- D. Inefficient hemoglobin production
- E. Bone marrow cancer

31. Animals require certain basic amino acids in their diet. An amino acid that is referred to as nonessential would be best described as one that

- A. can be made by the animal's body from other substances.
- B. is not used by the animal in biosynthesis.

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- C. must be ingested in the diet.
D. is less important than an essential amino acid.
E. is not found in many proteins.
32. Why are cattle able to survive on a diet consisting almost entirely of plant material?
A. They are autotrophic.
B. Cattle, like the rabbit, reingests its feces.
C. They manufacture all 15 amino acids out of sugars in the liver.
D. Cattle saliva has enzymes capable of digesting cellulose.
E. They have cellulose-digesting, symbiotic microorganisms in chambers of their stomachs.
33. Which of the following statements about gametogenesis is *incorrect*?
A. spermatogenesis continues throughout the male's life; oogenesis stops at menopause.
B. oogenesis results in one ovum, while spermatogenesis results in millions of sperm.
C. spermatogenesis is a continuous, uninterrupted process; oogenesis undergoes long "resting" periods.
D. the process of oogenesis is completed when the egg cell is penetrated by sperm.
E. the primary spermatocyte is a haploid cell.
34. If the release of LH were inhibited in a human female, which of the following events would not occur?
A. release of FSH from the pituitary
B. maturation of a primary follicle and oocyte
C. ovulation of a secondary oocyte
D. release of GnRH from the hypothalamus
E. production of estrogen by follicle cells
35. A puppy is born with a malformed right leg. A veterinarian studies the animal and determines that all of the correct types of cells are present, but that the leg simply took on the wrong shape. This is most likely a problem of
A. morphogenesis.
B. cell differentiation.
C. histogenesis.
D. preformation.
E. fertilization.
36. Which developmental sequence is correct?
A. cleavage, blastula, gastrula, morula
B. cleavage, gastrula, morula, blastula
C. cleavage, morula, blastula, gastrula

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D. gastrula, morula, blastula, cleavage

E. morula, cleavage, gastrula, blastula

37. When sound strikes a sound-receptor cell, the cell depolarizes. Which of the following could explain why this depolarization occurs?
- A. an influx of chloride ions
 - B. an efflux of potassium ions
 - C. an influx of positively charged ions
 - D. an efflux of sodium ions
38. What role does the cornea play in the vertebrate eye?
- A. controls the amount of light entering the eye
 - B. focuses light on the retina
 - C. contains light-sensitive cells that send signals to the brain to process the visual image
 - D. the opening through which light passes into the eye
39. Calcium channels in the axon terminal open in response to
- A. transmitter
 - B. hyperpolarization.
 - C. opening of K⁺ channels.
 - D. ligand
 - E. depolarization
40. The action potential is produced by a combination of an influx of sodium ions and an efflux of potassium ions. Since these ions carry similar charge and are moving in opposite directions, why don't their movements simply cancel each other out so that there is no change in the membrane potential?
- A. Voltage-gated potassium channels open at the same time as voltage-gated sodium channels.
 - B. Voltage-gated sodium channels open at the same time as voltage-gated potassium channels.
 - C. The opening of voltage-gated sodium channels is delayed.
 - D. The opening of voltage-gated potassium channels is delayed.
41. Which of the following hormones travels from its site of production to its "target tissue" by way of secretory neurons?
- A. aldosterone
 - B. epinephrine
 - C. corticotropin releasing factor

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- D. thyroxin
42. Which of the following best illustrates the concept of feedback inhibition within the endocrine system?
- A. An increase in CRH release by the hypothalamus causes a decrease in ACTH release by the anterior pituitary gland.
 - B. An increase in CRH release by the hypothalamus causes an increase in ACTH release by the anterior pituitary gland.
 - C. An increase in cortisol release by the adrenal glands causes a decrease in CRH release by the hypothalamus.
 - D. An increase in cortisol release by the adrenal glands causes a decrease in CRH release by the anterior pituitary gland.
43. In evolutionary terms, an organism's fitness is measured by its
- A. stability in the face of environmental change.
 - B. health.
 - C. migration rate.
 - D. contribution to the gene pool of the next generation.
 - E. genetic variability.
44. Of the evolutionary forces, which causes stochastic changes of gene frequencies between generations?
- A. gene flow.
 - B. genetic drift.
 - C. natural selection.
 - D. random mating.
 - E. mutation.
45. In a sparrow population; individuals with long wings survive severe storms better than those with average-sized wings illustrating
- A. bottleneck effect.
 - B. neutral variation.
 - C. stabilizing selection.
 - D. directional selection.
 - E. founder's effects.
46. A phylogenetic tree of plant families constructed by cladistic analysis would most clearly show which of the following?
- A. characteristics shared by all plant families.
 - B. evolutionary relationships among families.
 - C. families that look most alike.
 - D. analogous structures shared by various species.

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- E. relative ages of living species of plants.
47. In a population of 10000 individuals, 9 were born with PKU disease. There are two alleles at the gene. Of the following which are correct?
- A. Frequency of the recessive allele = 0.0009.
 - B. Frequency of the heterozygote = 0.0291.
 - C. Frequency of the dominant allele = 0.03.
 - D. Given Hardy-Weinberg equilibrium, frequency of dominant homozygote = 0.941.
 - E. In the next generation, frequency of recessive allele = 0.0009
48. Of the followings, which one is Carolus Linnaeus' contributions?
- A. particulate genetics.
 - B. descent with modification.
 - C. genetic drift.
 - D. natural selection.
 - E. hierarchy of life.
49. Which of the followings is NOT an observation or inference upon which natural selection is based?
- A. There is heritable variation among individuals.
 - B. Because only a fraction of offspring survive, there is a struggle for limited Resources.
 - C. Individuals whose inherited characters best fit them to environments will leave more offspring.
 - D. Poorly adapted individuals never leave offspring.
 - E. Unequal reproductive success leads to adaptation.
50. Most of the time, species are identified by their appearance. Why?
- A. This is the criterion used to define a biological species.
 - B. If two organisms look different, they must be different species.
 - C. If two organisms look alike, they must be the same species.
 - D. This is the most convenient way of identifying species.
 - E. Most organisms reproduce asexually
51. Which of the following statements about Phylum Arthropoda is correct?
- A. Arthropods have an open circulatory system.
 - B. Insects and mites belong to the same Class.
 - C. All arthropods have exoskeleton and six legs.
 - D. Subphylum Crustacea is characterized with four pairs of legs.
 - E. Subphylum Hexapoda is characterized with two pairs of wings.

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52. Which of the following statements about survivorship curves are correct?
- Organisms with type I curve experience very high mortality when young.
 - Organisms with type II curve have a constant death rate over the life span.
 - Type III curve is usually associated with organisms provide good parental care.
 - Some organisms can show more complex pattern in different life stages.
- I, III, and IV
 - III only
 - I and II
 - I, II, III, and IV
 - II and IV
53. Which of the following animal characteristics are more likely shaped by sexual selection than by natural selection? I. Vocal signals of Tree Frogs; II. Cryptic color on Tree Sparrows; III. Ornament feather on Litter Egrets; IV. Yellow and black pattern on Monarch Butterflies
- IV only.
 - I and III only.
 - II and IV only.
 - I, II, and III only.
 - none of above.
54. Fixed action pattern in animals is a major characteristic of
- Playing behavior.
 - Imprinting behavior.
 - Learning behavior.
 - Instinct behavior.
 - Habituation behavior.
55. Recent studies on ecological footprints calculated that
- The earth's carrying capacity for humans is about 10 billion.
 - The earth's carrying capacity would increase if per capita mean consumption increased.
 - The current demand by industrialized countries for resources is much smaller than the ecological footprint of those countries
 - The ecological footprint of the United States is larger than the ecological capacity of its land.
 - It is not possible for technological improvements to increase earth's carrying capacity for humans.

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56. Which of the following relationships are different in the evolutionary history of animals between the phylogenies based on form-and-body-plan and based on molecular evidence:
I. between Nematoda and Arthropoda, II. between Chordata and Echinodermata,
III. between Rotifera and Nematoda, IV. between Mollusca and Arthropoda,
V. between Annelida and Arthropoda.
A. I, III, IV
B. III, V
C. I, II, V
D. III, IV
E. I, II, IV, V
57. Which of the following statements about the effects of oceans to the biosphere are correct:
I. producing a substantial amount of the biosphere's oxygen,
II. removing carbon dioxide from the atmosphere;
III. moderating the climate of terrestrial biomes;
IV. being the source of terrestrial rainfall.
A. I, III, IV.
B. I, II, III.
C. II, III, IV.
D. II only
E. I, IV.
58. In which seasons a lake most likely to have a homogeneous and balanced distribution of nutrients and O₂ along the entire lake? I. winter; II. Autumn; III. Summer; IV. spring, IV. both spring and summer
A. IV
B. I, III
C. I, IV
D. II, III
E. II, IV
59. Arrange these taxonomic terms from most inclusive (*i.e.* most general) to least inclusive (*i.e.* most specific).
1. lobe-fins
2. amphibians
3. gnathostomes
4. osteichthyans

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5. tetrapods
- A. 4, 3, 1, 5, 2
 - B. 4, 3, 2, 5, 1
 - C. 4, 2, 3, 5, 1
 - D. 3, 4, 1, 5, 2
 - E. 3, 4, 5, 1, 2
60. Which of the following is a problem faced by animals as they increase in size?
- A. decreasing surface-to-volume ratio
 - B. reproducing in aqueous environments
 - C. the tendency for larger bodies to be more variable in metabolic rate
 - D. A and B only
 - E. A, B, and C
61. Resource partitioning is best described by which of the following statements?
- A. Competitive exclusion results in the success of the superior species.
 - B. Slight variations in niche allow similar species to coexist.
 - C. Two species can coevolve and share the same niche.
 - D. Species diversity is maintained by switching between prey species.
 - E. A climax community is reached when no new niches are available.
62. Which of the following interactions can correctly be labeled coevolution?
- A. the tendency of coyotes to respond to human habitat encroachment by including pet dogs and cats in their diets.
 - B. a genetic change in a virus that allows it to exploit a new host, which responds to virus-imposed selection by changing its genetically controlled habitat preferences
 - C. a genetic change in foxes that allows them to tolerate human presence (and food)
 - D. the adaptation of cockroaches to human habitation
 - E. the ability of rats to survive in a variety of novel environments
63. Syntrophy is illustrated by the relationship(s) of:
- A. Bacteroids and legumes.
 - B. Nitrosifying bacteria and nitrifying bacteria.
 - C. Thiovolum and some giant tube worms in deep-sea thermal vents.
 - D. A and C only.
 - E. A, B, and C.

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64. Some cyanobacteria produce potent neurotoxins that, if ingested, will kill humans. These cyanobacteria are most likely to contaminate:
- A. Waters rich in organic carbon wastes but poor in phosphate.
 - B. Waters that are anoxic.
 - C. Waters rich in phosphate wastes but poor in organic carbon.
 - D. Shellfish living in polluted waters.
 - E. C and D only.
65. The introduction of wastes rich in organic carbon into marine water causes:
- A. Rapid growth of microorganisms.
 - B. Reduction in oxygen.
 - C. Increase in hydrogen sulfide.
 - D. A and B only.
 - E. A, B, and C.
66. We would be most likely to find an organism that is psychrophilic, anaerobic and obligately barophilic:
- A. In refrigerated vacuum-packed foods.
 - B. Near thermal vents in the deep sea.
 - C. In the deep sea but not near thermal vents.
 - D. In the thermocline layer of a stratified lake.
 - E. In a particle of surface soil.
67. Sake is a Japanese alcoholic drink produced from steamed rice (which is primarily starch) by the combined actions of *Saccharomyces cerevisiae* and one other organism. From this, we can deduce that:
- A. The other organism is one that excretes amylases, such as *Aspergillus oryzae*.
 - B. Sake is a wine rather than a beer.
 - C. The other organism is a species of *Acetobacter*.
 - D. The other organism must act on the rice before *S. cerevisiae*.
 - E. A and D only.
68. The coliform test:
- A. Identifies water-borne pathogens.
 - B. Is sufficient to prove that water is safe to drink.
 - C. Reliably estimates the risk of pathogens in drinking water based on its content of coliform bacteria.
 - D. Reliably estimates the risk of pathogens in meat products based on their content of coliform bacteria.
 - E. All of the above.
69. The greenhouse effect is increased by the action of:

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- A. Fast growing algae that synthesize storage lipids as a large fraction of their weight.
B. Methane monooxygenase.
C. Methanogens.
D. Methanotrophs.
E. RubisCO.
70. The level of nitrate in drinking water has been rising over time. Which of the following contributes to this increase?
A. Denitrifying bacteria.
B. Dumping of wastewater that has received secondary but not tertiary treatment.
C. The inhibitor of the nitrosifiers, nitrapyrin.
D. Nitrifying bacteria.
E. B and D only.
71. The symptoms of a certain inherited disorder in humans include breathing problems and, in males, sterility. Which of the following is a reasonable hypothesis for the molecular basis of this disorder? (Explain your answer.)
A. a defective enzyme in the mitochondria
B. defective actin molecules in cellular microfilaments
C. defective dynein molecules in cilia and flagella
D. abnormal hydrolytic enzymes in the lysosomes
E. defective ribosome assembly in the nucleolus
72. Cyanide binds with at least one of the molecules involved in the production of ATP. Following exposure of a cell to cyanide, most of the cyanide could be expected to be found within the
A. mitochondria.
B. ribosomes.
C. Peroxisomes.
D. Lysosomes.
E. endoplasmic reticulum.
73. According to the fluid mosaic model of membrane structure, proteins of the membrane are mostly
A. spread in a continuous layer over the inner and outer surfaces of the membrane.
B. confined to the hydrophobic core of the membrane.
C. embedded in a lipid bilayer.
D. randomly oriented in the membrane, with no fixed inside-outside polarity.

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- E. free to depart from the fluid membrane and dissolve in the surrounding solution.
74. Which of the following factors would tend to increase membrane fluidity?
- A. a greater proportion of unsaturated phospholipids
 - B. a greater proportion of saturated phospholipids
 - C. a lower temperature
 - D. a relatively high protein content in the membrane
 - E. a greater proportion of relatively large glycolipids compared to lipids having smaller molecular masses
75. The final electron acceptor of the electron transport chain that functions in oxidative phosphorylation is
- A. oxygen.
 - B. water.
 - C. NAD^+ .
 - D. pyruvate.
 - E. ADP.
76. Cell do not catabolize carbon dioxide because
- A. its double bonds are too stable to be broken.
 - B. CO_2 has fewer bonding electrons than other organic compounds.
 - C. CO_2 is already completely reduced.
 - D. CO_2 is already completely oxidized.
 - E. The molecule has too few atoms.
77. Protein phosphorylation is commonly involved with all of the following except
- A. Regulation of transcription by extracellular signal molecules.
 - B. Enzyme activation.
 - C. Activation of G-protein-linked receptors.
 - D. Activation of receptor tyrosine kinases.
 - E. Activation of protein kinase molecules.
78. Consider this pathway: epinephrine \rightarrow G-protein-linked receptor \rightarrow G protein \rightarrow adenylyl cyclase \rightarrow cAMP.
Identify the second messenger.
- A. cAMP
 - B. G protein
 - C. GTP
 - D. adenylyl cyclase

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E. G-protein-linked receptor

79. The decline of MPF activity at the end of mitosis is caused by

- A. the destruction of the protein kinase(Cdk).
- B. decreased synthesis of cyclin.
- C. The degradation of cyclin.
- D. Synthesis of DNA.
- E. An increase in the cell's volume-to-genome ratio.

80. In some organisms, mitosis occurs without cytokinesis occurring. This will result in

- A. cells with more than one nucleus.
- B. cells that are unusually small.
- C. cells lacking nuclei.
- D. destruction of chromosomes.
- E. cell cycles lacking an S phase.

81. What is the term for the physical processes that give rise to the shape of an organism?

- A. morphogenesis
- B. differentiation
- C. totipotency
- D. pluripotency
- E. mitosis

82. The fact that plants can be cloned from somatic cells demonstrates that

- A. differentiated cells retain all the genes of zygote.
- B. genes are lost during differentiation.
- C. the differentiated state is normally very unstable.
- D. differentiated cells contain masked mRNA.
- E. differentiation does not occur in plants.

83. A disadvantage of monoculture is that

- A. the whole crop ripens at one time.
- B. genetics uniformity makes a crop vulnerable to a new pest or disease.
- C. it predominantly uses vegetative propagation.
- D. most grain crops self-pollinate.
- E. it allows for the cultivation of large areas of land.

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84. Which of the following statements is correct about protoplast fusion?
- A. It is used to develop gene banks to maintain genetic variability.
 - B. It is the method of test-tube cloning thousands of copies.
 - C. It can be used to form new plant species.
 - D. It occurs within a callus.
 - E. It requires that the cell wall remain intact during the fusion process.
85. If you were shipping green bananas to a supermarket thousands of miles away, which of the following chemicals would you want to eliminate from the plants' environment?
- A. CO₂
 - B. Cytokinins
 - C. Ethylene
 - D. Auxin
 - E. Gibberellic acids
86. The transduction pathway that activates systemic acquired resistance in plants is initially signaled by
- A. antisense RNA
 - B. phytochrome
 - C. salicylic acid.
 - D. abscisic acid.
 - E. red light.
87. Which of the following is a *correct* statement about sugar movement in phloem?
- A. Diffusion can account for the observed rates of transport.
 - B. Only phloem cells with nuclei can perform sugar movement.
 - C. Movement can occur both upward and downward in the plant.
 - D. Sugar transport does not require energy.
 - E. Sugar is translocated from sinks to sources.
88. Which of the following is *not* true of micronutrients in plants?
- A. They are the essential elements of small size and molecular weight.
 - B. They are the elements required in relatively small amounts.
 - C. Overdoses of them can be toxic.
 - D. They are required for a plant to grow from a seed and complete its life cycle.
 - E. They generally help in catalytic functions in the plant.
89. Assume a thylakoid is somehow punctured so that the interior of the thylakoid is no longer separated from

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the stroma. This damage will have the most direct-effect on which of the following processes?

- A. the synthesis of ATP
- B. the splitting of water
- C. the flow of electrons from photosystem II to photosystem I
- D. the reduction of NADP⁺
- E. the absorption of light energy by chlorophyll

90. Which of the following is *true* concerning the water potential of a plant cell?

- A. It is higher than that of air.
- B. It becomes lower after the uptake of water by osmosis.
- C. It becomes higher when K⁺ is actively moved into the cell.
- D. It is equal to 0.23 MPa.
- E. It is equal to zero when the cell is in pure water and is turgid.

91. Which of the following sequences correctly represents the flow of electrons during photosynthesis?

- A. NADPH→O₂→CO₂
- B. NADPH→chlorophyll→Calvin cycle
- C. H₂O→photosystem I→photosystem II
- D. H₂O→NADPH→Calvin cycle
- E. NADPH→electron transport chain→O₂

92. Which of the following conclusions does *not* follow from studying the absorption spectrum for chlorophyll *a* and the action spectrum for photosynthesis?

- A. There must be accessory pigments that broaden the spectrum of light that contributes to photosynthesis.
- B. Chlorophyll *a* has two absorption peaks.
- C. Chlorophyll owes its color to the absorption of green light.
- D. Not all wavelengths are equally effective for photosynthesis.
- E. The red and blue areas of the spectrum are most effective in driving photosynthesis.

93. The photosynthetic symbiont of a lichen is often a(n)

- A. moss.
- B. green alga.
- C. brown alga.
- D. ascomycete.
- E. small vascular plant.

94. With respect to angiosperms, which of the following is incorrectly paired with its chromosome count?

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- A. egg cell-n
 - B. megaspore-2n
 - C. microspore-n
 - D. zygote-2n
 - E. sperm-n
95. Which of the following traits is not shared by most angiosperms?
- A. two cotyledons
 - B. vessel elements
 - C. taproot
 - D. pollen grain with three openings
 - E. parallel leaf venation
96. Gymnosperms and angiosperms have the following in common except
- A. seeds.
 - B. pollen.
 - C. vascular tissue.
 - D. ovules.
 - E. ovaries.
97. Which of the following characteristics do mosses, liverworts, and hornworts share?
- A. reproductive cells in gametangia; embryos
 - B. branched sporophytes
 - C. vascular tissues, true leaves, and a waxy cuticle
 - D. seeds
 - E. lignified walls
98. Which of the following is not common to all phyla of vascular plants?
- A. the development of seeds
 - B. alternation of generations
 - C. dominance of the diploid generation
 - D. xylem and phloem
 - E. the addition of lignin to cell walls
99. A heterosporous plant species is one that
- A. produces a gametophyte that bears both antheridia and archegonia.
 - B. produces microspores and megaspores, which give rise to male and female gametophytes.
 - C. produces spores all year long instead of during just one season.
 - D. produces two kinds of spores, one asexually by mitosis and the other sexually by meiosis.
 - E. reproduces only sexually.

G 17¹⁵

編號：G 79

系所：生物多樣性研究所

科目：普通生物學

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100. Which of the following is diploid?

- A. the archegonia of a liverwort
- B. a nonreproductive cell in the gametangia of a moss
- C. a cell that is part of the stalk (seta) of a moss sporophyte
- D. a spore produced by a fern sporophyte
- E. a subterranean gametophyte of a lycophyte