單一選擇題，共 140 題(每題：5/7 分)

1. A mutation that occurred in a plant petal would be best termed
   A. germinal B. somatic C. suppressor D. dominant E. recessive
2. The ClB test in *Drosophila* detects
   A.crossover suppressor mutations
   B.any mutations in the gene represented by "l"
   C.any lethal mutation on the X chromosome
   D.Bar-eye mutations.
   E.mutations in C, l, or B
3. In *Drosophila*, sex is determined by a balance between the number of haploid sets of autosomes and the number of _____.
   A. telomeres B. centromeres C. X chromosomes D. Y chromosomes
   E.nucleolar organizers
4. Huntington disease (HD) is a well-studied, autosomal dominant disorder which affects the nervous system. Symptoms usually appear after age 40 and victims usually die within 10 to 15 years after onset of the disease. It appears that at least in some cases of HD "stutter" mutations occur. Such mutations are characterized by
   A. uncontrolled verbal capacity of patients.
   B. extra trinucleotide repeats within the HD gene.
   C. RNA polymerase imperfections leading to altered DNAs.
   D. repeated DNA polymerases generating too many coding symbols.
   E. links between monoamine oxidase A (MAOA) and hexokinase.
5. A plant of genotype *C/C ; d/d* is crossed to *c/c ; D/D* and an F_1 testcrossed to *c/c ; d/d*. If the genes are linked, and 20 map units apart, the percentage of *c/c ; d/d* recombinants will be
   A. 10 B. 20 C. 25 D. 50 E.75
6. In a cross of two yeast strains of genotypes $c^+ a^+ \times c\ a$ the progeny were 40 $c^+ a^+$, 36 *c a*, 11 c^+ *a*, and 13 *c* a^+. What is the frequency of recombination?
   A. 76% B. 12% C. 11% D. 13% E. 24%
7. Heterochromatin contains
   A.no genes.
   B.only nonfunctional genes.
   C.only a few genes.
   D.the same number of genes per unit of DNA as euchromatin.
   E.more genes per unit of DNA than euchromatin.
8. In self-splicing RNA is acting like
   A. a replisome B. a ribosome C. a ribozyme D. an enhancer
   E. a rho protein
9. 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
10. What chromosomal aberration may reduce crossover in heterozygotes for the aberration?
    A. Inversion B. Deletion C. Duplication D. translocation E. trisomy
11. Hierarchical taxonomic system 提出者
    A. Darwin, B. Plato, C. Lamarck, D. Linnaeus, E. Cuvier
12. 首先提出 adaptation 觀念的是
    A. Darwin, B. Plato, C. Lamarck, D. Linnaeus, E. Lyell.

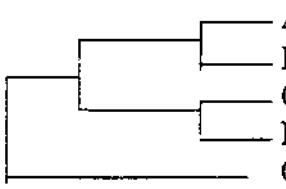
(背面仍有題目,請繼續作答)

13. 造成"differential success of reproduction and survival" 的機制稱爲
A. genetic drift, B. natural selection, C. adaptation, D. coalescence,
E. descent with modification

14. 下列何者不是 Darwinism
A. survival of the fittest, B. natural selection, C. descent with modification,
D. gradualism, E. branching.

15. 一 Hardy-Weinberg equilibrium 的社區中 9900 人爲 Rh+, 僅 100 人爲 Rh-, 決定 Rh-的遺傳因子 a 的頻度在第三世代時爲
A. 0.99, B. 0.9, C. 0.11, D. 0.01, E. 0.1

16. 下列何者不會改變族群內之 gene frequency
A. directional selection, B. assortative mating, C. deleterious mutation,
D. migration, E. genetic bottleneck.

17. 

演化樹中 O 爲外群，(B, C. D)爲一
A. natural group B.monophyletic group
C. paraphyletic group
D. polyphyletic group E. clade

18. 下列何者會降低族群間之奇異度
A. migration, B. directional selection, C. genetic drift,
D. inbreeding, E. founder effect.

19. sickle-cell anemia 在地中海地區維持極高比例的原因爲
A. migration B. assortative mating C. recurrent mutation
D. heterozygote advantage E. DTT

20. 那一種觀念強調 reproductive isolation
A. cohesion species concept, B. ecological species concept,
C. biological species concept, D. recognition species concept,
E. evolutionary species concept.

21. A high plasma Ca level causes
(A)bone demineralization, (B)increased formation of 1,25-dihydroxycholecalciferol. (C)decreased secretion of calcitonin, (D) decreased blood coagulability, (E)incresed formation of 24,25-dihydroxy-cholecalciferol .

22. Which of the following would be expected to cause an increase in ANP (atrial natriuretic peptide) secretiopn from the heart?
(A) Secretin; (B) growth hormone; (C) low sodium diet; (D)constriction of the ascending aorta; (E)constriction of the inferior vena cava.

23. In which of the following lists of blood vessels is the sequence of vessels arranged from highest to lowest total cross-sectional area in the body?
(A)Arteries, arterioles, capillaries, veins;
(B) Arterioles, capillaries, arteries, veins;
(C)Capillaries, arterioles, veins, arteries;
(D)Veins, capillaries, arterioles, arteries;
(E)Arteries, veins, arterioles, capillaries.

24. The pressure in a capillary in skeletal muscle is 35 mmHg at the arteriolar end and 14 mmHg at the venular end. The interstitial pressure is 0 mmHg. The colloid osmotic pressure is 25 mmHg in the capillary and 1 mmHg in the interstitium. The net force producing fluid movement across the capillary wall at its arteriolar end is (A)3 mmHg out of the capillary; (B) 3 mmHg into the capillary; (C)10 mmHg out of the capillary; (D)11 mmHg out of the capillary; (E)11 mmHg into the capillary.

25. Which of the following organs has the greatest blood flow per 100 g of tissues ?
(A) Brain; (B) Heart muscle; (C) Skin; (D) Liver; (E) Kidneys.

26. Which of the following is responsible for the movement of O2 from the alveoli into the blood in the pulmonary capillaries ?
(A)Active transport; (B) Filtration; (C) Secondary active transport;
(D) Facilitated diffusion; (E) Passive diffusion.

27. Which of the following has the greatest effect on the ability of blood to transport oxygen ?
(A)Capacity of the blood to dissolve oxygen;
(B) Amount of the hemoglobin in the blood; (C) pH of plasma;
(D) CO2 content of red blood cells; (E)Temperature of the blood.

28. Intravenous lactic acid increases ventilation. The receptors responsible for this effect are located in the
(A)medulla oblongata; (B)carotid bodies; (C)lung parenchyma;
(D)aortic baroreceptors; (E) trachea and large bronchi.

29. The action potential of a neuron
(A) is initiated by efflux of Na ions; (B)is terminated by efflux of K ions; (C)declines in amplitude as it moves along the axon; (D)results in a transient reversal of the concentration gradient of Na ions across the cell membrane; (E)is not associated with any net movement of Na or K ions across the cell membrane.

30. Which of the following receptors and sense organs are incorrectly paired ?
(A)Rods and cones : eye; (B)Hair cells : olfactory epithelium;
(C)Hair cells : inner ear; (D) Receptors sensitive to stretch : carotid sinus;
(E) Glomus cells : carotid body.

31. The cortical reaction of sea urchin eggs functions diretly in the
A. formation of a fertilization envelope
B. production of a fast block to polyspermy
C. release of hydrolytic enzymes from the sperm cell
D. fusion of egg and sperm nuclei
E. generation of an electrical impulse by the egg cell

32. Which of the following is common to both avian and mammalian development?
A. holoblastic cleavage B. epiblast and hyblast C. trophoblast
D. yolk plug E.gray crescent

33. In the early development of an amphibian embryo, an important "organizer" is the
A. neural tube B. notochord C. archenterons roof
D. dorsal lip of the blastopore E. dorsal ectoderm

34. Vertebrates and tunicates may seen as different as two animal groups can be, yet they share
A. jaw adapted for feeding
B. a high degree of cephalization
C. the formation of structures from the neural crest
D. an endoskeleton that includes a cranium
E. the presence of a notochord

35. Unlike eutherian mammals, both monotremes and marsupials
A. lack nipples
B. have some embryonic development outside the mother's uterus
C. lay eggs
D. are founding Australia and Africa
E. include only insectvores and herbivores

36. In addition to skeletal differences, cartilaginous fishes can be distinquished from

bony fishes
A. by the presence in bony fishes of a cranium
B. by the presence in bony fishes o a lateral line
C. by the presence in cartilaginous fishes of unpaired fins
D. by the absence in cartilaginous fishes of a swim bladder
E. by the absence in cartilaginous fishes of paired sensory organs.

37. Choose the phylum characterized by animals that have segmented bodies
A. Cnidaria B. Platyhemlminthes C. Porifera D. Arthropoda E. Mollusca

38. Which of the following combinations of phylum and description is ***incorrect***?
A. Echinodermata – branch bilateria , coelom from archenterons
B. Porifera – gastrovascular cavity, mouth from blastopore
C. Nematoda –roundworms, pseudocoelomate
D. Platyhelminthes – flatworms, gastrovascular cavity, acoelomate
E. Chorda – pharygn slit, spinal cord

39. Which is the advance body plan
A. acoelomate B. pseudocoelomate C. radiate D. deuterostomes
E. prostomes

40. Which of the following is the most likely explanation for hypothyroidism in a patient whose iodine level is normal?
A. a disproportionate production of T3 to T4
B. hyposecretion of TSH
C. hypersecretion of TSH
D. hypersecretion of MSH
E. a decrease in the thyroid secretion of calcitonin

41. Bacteria are found in which nutritional category?
A. photoautotrophs **B.** photoheterotrophs **C.** chemoautotrophs
D.chemoheterotrophs **E.** all of the above

42. Robert Paine established the concept of the keystone species using rocky intertidal communities. In doing so, which of the following was NOT used by Paine?
A. He used ecological logic to state the concept as a testable hypothesis
B. He conducted comparative studies across different communities to see if existing patterns were consistent with his hypothesis
C. He experimentally removed potential keystone predators from communities and measured species diversity response.
D. He experimentally added potential keystone predators to communities and measured species diversity response.
E. All of the above were done by Paine.

43. Which of the following does NOT fit the inhibition model of succession?
A. All species can initially colonize equally well.
B. Early colonists prevent establishment of subsequent colonizers.
C. "Climax" species establish after other species have created favorable conditions for them.
D. Rapid colonizers typically suffer more mortality than slower colonizers.
E. Different "climax" communities can occur, depending on whether disturbance occurs during succession.

44. A community whose structure changes greatly following a disturbance but returns quickly to its pre-disturbance structure can be said to have
A. high resistance and low resilience
B. low resistance and high resilience
C. high resistance and high resilience

D. low resistance and low resilience
E. none of the above

45. Gross primary productivity is:
A. amount of energy captured by herbivores
B. the energy in the producer trophic level
C. rate of energy capture by autotrophs
D. the rate of energy capture by heterotrophs

46. Which of the following are MISMATCHED?
A. Gross primary productivity : the total amount of energy assimilated by photosynthesis.
B. biogeochemical cycles : movement of elements through living organisms and the physical environment.
C. Troposphere : the lowest layer of the atmosphere
D. Thermocline : the depth at which water reaches 4°C
E. Food Web : the linear sequence of who eats whom

47. What is not part of the nitrogen cycle?
A. Legume plants release water into atmosphere by transpiration
B. Green plants assimilate nitrogen as ammonium
C. Soil bacteria convert ammonia into minerals used by autotrophs
D. Bacteria return nitrogen from urea to the cycle

48. Which best describes an energy pyramid?
A. Net gain occurs as energy is transferred from one organism to another
B. Total energy in plants is less than in herbivores
C. 1st trophic level is at the top of pyramid
D. Total mass of carnivores is more than total mass of plants
E. Each small trophic level possesses less available energy than previous level

49. Which of the following usually results when members of the same species require the same food and space?
A. primary succession
B. intra-specific competition
C. secondary succession
D. inter-specific competition

50. In the following food chain, approximately what percent of the energy will be lost as heat or other sources from one trophic level to the next?
algae → *Daphnia* → *minnow fish* → *trout* → *human*
A.100% **B.** 90% **C.** 50% **D.** 10% **E.** 0%

51. Indicate the following hormones that involve in long term stress response
A. glucagon and epinephrine
B. epinephrine and glucocorticoids
C. epinephrine and mineralocorticorids
D. glucocorticoids and mineralocorticoids
E. prolactin and oxytocin

52. Goiter is resulted from the shortage of
A). PTH B). epinephrine C). T3/T4 D). a and b E). a and c

53. Growth hormone is produced by
A). hypothalamus B). posterior pituitary gland C). anterior pituitary gland
D). thymus E). parathyroid gland

54. Identify the **incorrect** statement shown as follows
A). oxytocin is secreted from posterior pituitary.
B). glucagon is secreted by the alpha cells of the islet in the pancreas.

C). epinephrine modulates long term stress response.
D). epinephrine is an amine hormone.
E). calcitonin is a peptide hormone.

55. Indicate the **incorrect** statement
A). A radioactive isotope is one in which the nucleus decays spontaneously, giving off particles and energy.
B). radioactive carbon decays to form nitrogen.
C). in nature, an element occurs as a mixture of its isotopes.
D). both ^{12}C and ^{13}C are unstable particles.
E). a given element and its isotopes have the same number of protons.

56. Indicate the **incorrect** statement
A). Sugars owe their solubility in water to the presence of hydroxyl groups.
B). carbonyl group is on the end of a carbon skeleton; the organic compound is called a ketone.
C). one function of phosphate groups is the transfer of energy between organic molecules.
D). organic compounds containing sulfhydryl groups are called thiols.
E). compounds containing carboxyl groups are known as carboxylic acids.

57. Indicate the **correct** pair
A). L-DOPA and D-DOPA – enantiomers.
B). L-DOPA and D-DOPA – structural isomers.
C). L-DOPA and D-DOPA – Geometric isomers
D). L-DOPA – biological inactive
E). D-DOPA – effective against Parkinson's disease.

58. Indicate the **correct** statement shown as follows
A). thymus was formerly called the "master gland".
B). antidiuretic hormone acts on the kidneys, decreasing urine volume.
C). antidiuretic hormone acts on the bladder, increasing water retention.
D). a and b. E). a and c

59. The bones that are broken when water vaporizes are
A). ionic bonds B). bonds between water molecules
C). bonds between atoms of individual water molecules
D). polar covalent bonds E). nonpolar covalent bonds.

60. A mole of table sugar and a mole of vitamin C are equal in their
A). weight in daltons B). weight in grams C). number of molecules
D). number of atoms E). volume.

61. Of the mechanisms by which organisms exchange heat with their surrroundings, which one results in only loss of heat from the organism?
A. Conduction B. Convection C. Radiation D. Evaporation E. Metabolism

62. You are shoveling snow in the middle of a snowstorm and all of a sudden you begin to shiver. Why?
A. The flow of heat to the environment is exceeding metabolic heat production.
B. Shivering increases heat production to closer match the heat loss.
C. Shivering acts as a reflex action stimulated by the sight of snow.
D. Only A and B are correct.
E. A, B and C are correct.

63. The advantage of excreting wastes as urea rather than ammonia is that
A. Urea can be exchanged for Na^+.
B. Urea is less toxic than ammonia.
C. Urea requires less water for excretion than ammonia.

D. Urea does not affect the osmolar gradient.
E. Both B and C are advantages.

64. In addition to their role in gas exchange, fish gills are also directly involved in
A. Digestion B. Osmoregulation C. Thermoregulation
D. The excretion of uric acid E. The release of atrial natriuretic proteins

65. Which of the following processes of osmoregulation by the kidney is the least selective?
A. Salt pumping to control osmolarity
B. H+ ion pumping to control pH
C. Reabsorption D. Filtration E. Secretion

66. Whenever energy is transformed, there is always an increase in the
A. free energy of the system.
B. free energy of the universe.
C. entropy of the system.
D. entropy of the universe.
E. enthalpy of the universe.

67. When glucose monomers are joined together by glycosidic linkages to form a cellulose polymer, the changes in free energy, total energy and entrophy are as follows:
A. $+\Delta G \quad +\Delta H \quad +\Delta S$
B. $+\Delta G \quad +\Delta H \quad -\Delta S$
C. $+\Delta G \quad -\Delta H \quad -\Delta S$
D. $-\Delta G \quad +\Delta H \quad +\Delta S$
E. $-\Delta G \quad -\Delta H \quad -\Delta S$

68. During a laboratory experiment, you discover that an enzyme has a ΔG of –20 kcal / mol. You double the amount of enzyme in the reaction, and the ΔG now equals
A. –40 kcal / mol B. –20 kcal / mol C. 0 kcal / mol D. +20 kcal / mol
E. +40 kcal / mol

69. Location of an enzyme within a specific membrane-enclosed organelle
A. allows the use of ATP and cofactors by the enzyme.
B. brings order and promotes efficiency within eukaryotic cells.
C. allows cells to evolve by violating the second law of thermodynamics.
D. protects the enzyme from feedback inhibition
E. is restricted to allosteric enzymes because it allows two polypeptide subunits to join efficiently.

70. If an enzyme solution is saturated with substrate, the most effective way to obtain an even faster yield of products is to
A. add more of the enzyme.
B. heat the solution to 90° C.
C. add more substrate.
D. add an allosteric inhibitor.
E. add a noncompetitive inhibitor.

71. Which of the following method can avoid graft versus host reaction?
A. Active immunization
B. Passive immunization
C. MHC class I matching
D. MHC class II matching

(背面仍有題目,請繼續作答)

E. Both MHC class I and II matching

72. Which description is not right for R factor?
A. Circular ds-DNA
B. Extrachromosomal DNA
C. Responsible for drug resistance
D. Responsible for transduction
E. A useful vector.

73. Which item is not the major characteristic of specific immunity?
A. Specificity B. Memory C. Recognition of self and non-self antigen
D. Diversity E. Inflammation

74. The protein shell that encloses the viral genome is called
A. envelope B. spike C. capsid D. non-structural protein E. capsomere.

75. Virus may infect a bacterium without causing lysis, but instead, integrating its genome into host DNA. This bacterium is now called
A. prophage B. lysogenic cycle C. episome D. F factor E. lysogen.

76. Which statement describing the replication of bacterial chromosome is most true?
A. Semiconservative replication
B. Reverse transcription
C. Uni-directional semiconservative replication
D. Bi-directional semiconservative replication
E. Binary fission.

77. The bacterial *lac* operon can be regulated by
A. both negative and positive control
B. positive control only C. negative control only
D. attenuation E. *lac* Z.

78. Insertion sequence is the basic structure of
A. plasmid B. transponson C. prion D. R factor E. viroid.

79. A. Skin barrier B. T cell C. B cell D. Antibody E. Allergy response belongs to nonspecific resistance against infection.

80. A. IgA B. IgG C. IgD D. IgE E. IgM is usually present in the form of pentamer in circulation.

81. An organism' s interaction with its biotic and abiotic environment describes its
A. Population. B. niche. C. community. D. ecosystem. E. habitat.

82. Which of the following is not a major terrestrial biome?
A. subtropical B. shrubland C. desert D. woodland E. grassland

83. Type III survivorship curves would most likely be associated with
A. many fish populations. B. rodent populations. C. human populations.
D. most mammal populations.

84. All of the following statements about the logistic model of population growth are correct EXCEPT:
A. It fits an S-shaped curve.
B. It incorporates the concept of carrying capacity.
C. It describes population density shifts over time.
D. It exactly predicts the population growth of most populations.
E. It predicts an eventual state in which birth rate equals death rate.

85. Rain shadows are
A. areas that are cloudy over 50% of the year.
B. areas of high annual precipitation.
C. the result of the decimation of forests by logging.
D. areas of warm dry air.

86.The master time-setter in the temperate zone is
A. moisture. B. diapause. C. temperature. D. light. E. melatonin.

87. Which of the following levels of organization is arranged in the correct sequence from least to most 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

88. Which of the following is responsible for the summer and winter stratification of lakes?
A. Water is densest at 4° C
B. Oxygen is most abundant is deeper waters.
C. Winter ice sinks in the summer.
D. Stratification is caused by a thermocline.
E. Stratification always follows the fall and spring turnovers.

89. Animals that help other animals of the same species are expected to
A. have excess energy reserves.
B. be bigger and stronger than the other animals.
C. be genetically related to the other animals.
D. be male.
E. have defective genes controlling behavior.

90. A type of learning that can occur only during a brief period of early life and results
in a behavior that is difficult to modify through later experiences is called
A. insight. B. imprinting. C. habituation. D. operant conditioning.
E. trial-and-error learning.

91.In what way does bacterial binary fission resemble eukaryotic mitosis ?
A. movement of chromosomes
B. genetically identical daughter cells
C. intracellular mechanisms
D. B and C only E. A, B, and C

92. The essence of meiosis is that
A. gametes are formed that receive one copy of each member of each pair of homologous chromosomes.
B. gametes are formed that are diploid.
C. each gamete receives one member of each pair of homologous chromosomes.
D. gametes are formed that are haploid.
E. both C and D are correct

93. At the end of telophase□in corn (20 chromosomes) ,which of the following is true ?
A. Each cell has 10 chromosomes
B. Each chromosomes is duplicated
C. Centromeres are undivided.
D. A and B only
E. A, B, and C

94. Eglenoids
A. sometimes reproduce faster than their chloroplasts, so that colorless eugleniods are produced.
B. may become a serious parasitic infection in some small children.

C. reproduce by conjugation.
D. usually can survive only in light.
E. both A and D, but not B and C

95. Four of the five answers listed below are related to pairing of chromosomes.Select the exception.

A. synapsis B.crossing over C. exchange of genes D.pairing of homologues
E. interkinesis

96.An incompletely dominant gene controls the color of the chicken so that BB produces black, Bb produces a slate-gray color called blue, and bb produces splashed white. A second gene controls comb shape, with the dominant gene R producing a rose comb and r producing a single comb. If a pure-breeding black chicken with a rose comb is mated to a splashed white chicken with a single comb in the F_2 generation, what fraction of the offspring will be blue with single comb ?
A. 9/16 B. 3/8 C. 3/16 D.1/8 E.1/16

97.In radishes, red and white are the pure-breeding colors and long and round are the pure-breeding shapes, while the hybrids are purple and oval. The F_2 generation of a cross between long and white and red and round will produce
A. offspring that will all express dominant traits.
B. offspring that will all be phenotypically identical.
C. offspring that will all be genotypically identical
D. purple round, purple long, white oval, and red oval offspring in equal numbers, as well as other phenotype.
E. both B and C, but not A or B.

98.Which of the following organisms dose NOT move by pseudopods ?
A. amoebas B. foraminiferans C. diatoms D.heliozoans E. radiolarians

99.Which of the following disease is not caused by a flagellated protozoan ?
A. malaria B. sleeping sickness C. Chagas disease D.vaginal trichomonas
E. intestinal giardiasis

100.In comparing mitosis and meiosis, which of the following statements is true ?
A. Meiosis□ is more like mitosis than is meiosis II.
B. Both processes result in four cells.
C. Synapsis occurs in both.
D. Chromatids are present only in mitosis.
E. Meiosis II resembles mitosis.

101. The body is capable of catabolizing many substances as sources of energy. Which of the following could be used as a source of energy but would be the last utilized for this purpose?
A) protein in muscle tissue B) fat in adipose tissue C) glucose in the blood
D) calcium phosphate in bone E) glycogen in muscle cells

102. Which of the following terms could be applied to any organism with a digestive system?
A) herbivore B) bulk feeder C) autotroph D) heterotroph E) omnivore

103. If you were to "design" an animal but could provide it with only one protein-digesting enzyme, which of the following would you choose so that the animal could absorb the maximum number of amino acids?
A) enteropeptidase B)carboxypeptidase C)trypsin D)a dipeptidase
E) pepsin

104. Cows are able to survive on a diet consisting almost entirely of cellulose because
A) cows can manufacture all 15 amino acids out of sugars in the liver.

B) The cow's saliva has enzymes capable of digesting cellulose.
C) Cows have cellulose-digesting, symbiotic microorganisms in their rumens.
D) The cow, like the rabbit, reingests its feces.
E) Cows are autotrophic.

105. Why do genetic mutations in asexual organisms lead to more evolutionary change than genetic mutations in sexual forms?
A) The haploid mutations of asexual organisms are immediately expressed.
B) Asexual organisms have more dominant genes than organisms that reproduce sexually.
C) More genetic variation is present in organisms that reproduce asexually.
D) Asexual organisms devote more time and energy to the process of reproduction.
E) Sexual organisms can produce more offspring in a given time.

106. The diploid chromosome number for humans is 46. How many chromatids will there be in a secondary spermatocyte?
A) 23 B) 46 C) 92 D) 184 E) 69

107. How do the estrous and menstrual cycles compare?
A) There are more pronounced behavioral changes during menstrual cycles than during estrous cycles.
B) There are stronger effects of season and climate on menstrual cycles.
C) Copulatoin can only occur during the period surrounding ovulation in both the estrous and menstrual cycles.
D) The length of both cycles averages 28 days.
E) In menstrual cycles, endometrial bleeding occurs, while the endometrium is reabsorbed by the uterus in estrous cycles.

108. Which of the following statements is (are) *true* concerning the vitelline layer of the sea urchin egg?
A) It releases calcium, which initiates the cortical reaction.
B) It is outside the fertilization membrane.
C) It has receptor molecules that are specific for binding acrosomal proteins.
D) Only A and B are correct.
E) A, B, and C are correct.

109. Arrange the following stages of fertilization and early development into a proper sequence.
I. onsent of new DNA synthesis
II. cortical reaction
III. first cell division
IV. acrosomal reaction; plasma membrane depolarization
V. fusion of egg and sperm nuclei complete
A) V, III, I, II, IV B) III, V, I, IV, II C) IV, II, V, I, III
D) V, I, IV, II, III E) I, III, II, IV, V

110. In humans, identical twins are possible because
A) of convergent extentsion.
B) of the heterozygeneous distribution of cytoplasmic determinants in unfertilized eggs.
C) the gray crescent divides the dorsal-ventral axis into new cells.
D) of interactions between extraembryonic cells and the zygote nucleus.
E) the blastomeres are genetically the same.

111. Which of the following would be found in an animal cell, but NOT in a bacterial cell?

(背面仍有題目,請繼續作答)

A. DNA B. cell wall C. plasma membrane
D. ribosomes E. endoplasmic reticulum

112. Plasmadesmata in plant cells are similar in function to which structure in animal cells?
A. peroxisomes B. desmosomes C. gap juctions
B. glycocalyx E. tight junctions.

113. A cell has the following molecules and structures: enzymes, DNA, ribosomes, plasma membrane, and mitochondria. It could be a cell Wrom: F
A. a bacteria B. an animal C. a plant D. a plant or an animal
E. any kind of organism.

114. Eukaryotic cells are typically larger than prokaryotic cells because:
A. their plasma membrane has more control over the movement of materials into the cell.
B. their internal membrane system allows compartmentalization of functions and extra surface area for nutrient exchange and placement of enzymes.
C. their DNA is localized in the nucleus, whereas protein synthesis occurs in the cytoplasm, separating these competing functions.
D. they have more chromosomes and a mitotic process of cell division.
E. they have a cytoskelwton composed of microtubules and microfilaments.

115. One of the functions of cholesterol in animal cell membranes is to:
A. facilitate transport of ions. B. store energy. C. maintain membrane fluidity.
D. speed difussion. E. phosphorylate ADP.

116. What membrane-surface molecules are thought to be most important as cells recognize each other?
A. phospholipids B. internal proteins C. peripheral proteins
D. cholesterol E. glycoproteins.

117. You eat a cheeseburger and a fresh salad. Which of the following molecules in your food is NOT normally oxidized in aerobic respiration to generate ATP?
A.sucrose. B. lipids. C. nucleic acids. D. proteins. E. amino acids.

118. What causes the rhythmic change in cyclin concentration in the cell cycle?
A. an increase in production once the restriction point is passed
B. the cascade of increased production once its enzyme is phosphorylated by cdc2
C. the changing ratio of cytoplasm to genome
D. its destruction by an enzyme phosphorylated by MPF
E. the binding of PDGF to receptors on the cell surface

119. If there are 12 chromosomes in an animal cell in the G1 stage of the cell cycle, what is the diploid number of chromosomes for this organism?
A. 6 B. 12 C. 24 D. 36 E. 48

120. If radioactive sulfur (35S) is used in the culture medium of bacteria that harbor phage viruses, it will later appear in the
A. viral DNA B. bacterial RNA C. viral coats D. viral RNA
E. bacterial cell wall

121. Which of the following sequences correctly represents the flow of electrons during phototsynthesis ?
A. NADPH→ O_2→CO_2 B. H_2O→ NADPH→ Calvin cycle
C. NADPH→ chlorophyll→ Calvin cycle
D. H_2O → photosystem I→ photosystem II
E. NADPH→ electron transport chain→ O_2

122. The color of light *least* effective in driving photosynthesis is
A. blue. B. red. C. orange D. green. E. yellow

123. What provides the energy for water transport upward in the xylem ?
A. ATP B. sucrose C. the sun D. proton gradients E. cohesion

124. Stomata open when guard cells
A. sense an increase in CO_2 in the air spaces of the leaf.
B. flop open because of a decrease in turgor pressure.
C. become more turgid because of an influx of K^+, followed by the osmotic entry of water.
D. close aquaporins, preventing uptake of water.
E. accumulate water by active transport.

125. The bulk of a plant's dry weight is derived from
A. soil minerals. B. CO_2. C. the hydrogen from H_2O.
D. the oxygen from H_2O. E. the uptake of organic nutrients from the soil.

126. The N-P-K percentages on a package of fertilizer refer to the
A. total protein content of the three major ingredients of the fertilizer.
B. percentages of manure collected from different types of animals.
C. relative percentages of organic and inorganic nutrients in the fertilizer.
D. percentages of three important mineral nutrients.
E. proportions of three different nitrogen sources.

127. The step(s) between a plant's perception of a change in the environment and the plant's response to that change is best called
A. a mutation. B. hormone production. C. pH change.
D. signal transduction. E. an "all-or-none" response.

128. Plant hormones produce their effects by
A. altering the expression of genes.
B. modifying the permeability of the plasma membrane.
C. modifying the structure of the nuclear envelope membrane.
D. both A and B. E. both B and C.

129. While responses to plant hormones are normally slow, which of the following hormones has been shown to be involved in the rapidopening and closing of stomata ?
A. auxin B. cytokinin C. ethylene D. abscisic acid E. gibberellin

130. What do results of research on gravitropic responses of roots and stems show ?
A. Different tissues have the same response to auxin.
B. The effect of a plant hormone can depend on the tissue.
C. Some responses of plants require no hormones at all.
D. Light is required for the gravitropic response.
E. Cytokinin can only function in the presence of auxin.

131. Organisms of the division Rhodophyta
A. are never multicellular gametophytes
B. have chlorophyll b and β-carotene
C. have non-flagellated sperm cells
D. have no cell walls
E. transport food in the form of mannitol

132. The book or reference that has been legislated as the starting point for scientific names is titled:
A. International Code of Botanical Nomenclature
B. Voyage of the Beagle
C. Species Plantarum

(背面仍有題目,請繼續作答)

D. Materia Medica
E. On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life

133. "A group of interbreeding populations reproductively isolated from other populations" defines a -?- species.
A. Linnaean B. artificial C. biological D. morphological E. immutable

134. The structure of compacted hyphae in the Ascomycota that bears the reproductive parts is called the
A. ascocarp B. ascogonium C. basidiocarp D. basidiothecium
E. perigynium

135. The fundamental processes occurring in all plants that undergo sexual reproduction (a sexual life cycle) include
A. gamete fusion (fertilization) B. zygote formation C. meiosis
D. all of the former E. none of the former

136. In angiosperms, the primary purpose of the petals is
A. to attract pollinating animals.
B. to collect pollen so the eggs can be fertilized..
C. to disperse fruits away from the mother plant.
D. to protect the reproductive parts until the fruit develops..
E. none of the former

137. _____ are **always** diploid.
A. Gametes B. Gametophytes C. Megaspores D. Zoospores E. Zygotes

138. Laminarin is a food storage substance in the division
A. Chlorophyta B. Chrysophyta C. Euglenophyta D. Phaeophyta
E. Pyrrhophyta

139. The structure at the opening of a moss capsule that consists of teeth that flex with changes in humidity is called a
A. calyptra B. elater C. operculum D. peristome E. seta

140. The five kingdoms described by Margulis and used in many textbooks are
A. Animalia, Monera, Fungi, Plantae, Protista
B. Cyanobacteria, Protista, Animalia, Plantae, Monera
C. Fungi, Archaebacteria, Animalia, Protista, Monera
D. monasteries, proctologists, animists, funnybones, and planks
E. Protozoa, Plantae, Fungi, Algae, Animalia