每題 1 分，總分 100 分。

1. How does RNA polymerase know where to start transcribing a gene into mRNA?

A. It starts at one end of the chromosome.

B. Transfer RNA acts to translate the message to RNA polymerase.

C. It starts at a certain nucleotide sequence called a promoter.

D. The ribosome directs it to the correct portion of the DNA molecule.

E. It looks for the AUG start codon.

2. If phages are labeled with radioactive sulfur and allowed to infect bacterial cells, the phage progeny resulting from lysis are expected

A. to be non-radioactive.

B. to have radioactive DNA.

C. to have radioactive proteins.

D. to have radioactive DNA and proteins.

E. to have radioactive carbohydrates.

3. Amino acids are attached to tRNAs by enzymes called:

A. protein synthetases.

B. RNA polymerase.

C. aminoacyl-tRNA synthetases.

D. triplet synthetase.

E. DNA polymerases.

4. Which of the following characteristics or processes is common to both bacteria and virus?

A. binary fission.

B. mitosis.

C. nucleic acid as genetic material.

D. ribosomes in the cytoplasm.

E. conjugation.

5. In cats, black fur color is caused by an X-linked allele; the other allele at this locus causes orange color. The heterozygote is tortoiseshell. What kinds of offspring would you expect from the cross of a black female and an orange male?

A. tortoiseshell female; black male.

B. tortoiseshell female; tortoiseshell male.

（背面仍有題目，請繼續作答）

C. orange female; black male.

D. black female; orange male.

E. orange female; orange male.

6. Crossing over usually contributes to genetic variation by exchanging chromosomal segments between

A. nonhomologous loci of the genome.

B. nonsister chromatids of homologues.

C. chromatids of nonhomologues.

D. sister chromatids of a chromosome.

E. autosomes and sex chromosomes.

7. A frameshift mutation could result from

A. deletion of three consecutive bases.

B. a base substitution only.

C. a base deletion only.

D. a base insertion only.

E. either an insertion or a deletion of a base.

8. Black fur in mice (B) is dominant to brown fur (b). Short tails (T) are dominant to long tails (t). What fraction of the progeny of the cross BbTt multiply BBtt will have black fur and long tails?

A. 3/16.

B. 3/8.

C. 1/16.

D. 9/16.

E. 1/2.

9. A class of mutations which results in multiple contiguous amino acid changes in proteins is likely to be the following.

A. base analogue.

B. transversion.

C. transition.

D. frameshift.

E. recombinant.

10. How does the sexual life cycle increase the genetic variation in a species?

A. by allowing crossing over.

B. by allowing random fertilization.

C .by allowing independent assortment of chromosomes.

D. (A) and (B) only.

E. (A), (B), and (C).

11. Which of the following contributes to the emergence of viral disease?

A. production of new virus strains through mutation

B. spread of existing virus from one host species to another

C. transformation from lytic to lysogenic activity

D. A and B only

E. A, B, and C

12. What does the operon model attempt to explain?

A. the coordinated control of gene expression in bacteria

B. bacterial resistance to antibiotics

C. how genes move between homologous regions of DNA

D. the mechanism of viral attachment to a host cell

E. horizontal transmission of plant viruses

13. Which of the following mechanisms is (are) used to coordinately control the expression of multiple, related genes in eukaryotic cells?

A. organization of the genes into clusters, with local chromatin structures influencing the expression of all the genes at once

B. each of the genes sharing a common control element, allowing a single activator to turn on their transcription at once, regardless of their location in the genome

C. organizing the genes into large operons, allowing them to be transcribed as a single unit

D. A and B only

E. A, B , and C

14. Tumor suppressor genes

A. are frequently overexpressed in cancerous cells.

B. are cancer-causing genes introduced into cells by viruses.

（背面仍有題目，請繼續作答）

C. can encode proteins that promote DNA repair or cell-cell adhesion.

D. often encode proteins that stimulate the cell cycle.

E. all of the above

15. A gene that contains introns can be made shorter (but remain functional) for genetic engineering purposes by using

A. RNA polymerase to transcribe the gene.

B. a restriction enzyme to cut the gene into shorter pieces.

C. reverse transcriptase to reconstruct the gene from its mRNA.

D. DNA polymerase to reconstruct the gene from its polypeptide product.

E. DNA ligase to put together fragments of the DNA that codes for a particular polypeptide.

16. Which of the following is *least* related to the others?

A. Southern blotting

B. denaturation

C. nucleic acid probe

D. RNA interference

E. nucleic acid hybridization

17. In the inflammatory response, the absence of which of the following would prevent all the others from happening?

A. dilation of arterioles

B. increased permeability of blood vessels

C. increased population of phagocytes in the area

D. release of histamine

E. leakage of plasma to the affected area

18. In which of the following situations will helper T cells be activated?

A. when an antigen is displayed by a dendritic cell

B. when a cytotoxic T cell releases cytokines

C. when natural killer (NK) cells come in contact with a tumor cell

D. in the bone marrow during the self tolerance test

E. when B cells respond to T-independent antigens

19. Hydrocarbons are not soluble in water because

A. they are hydrophilic.

B. the C—H bond is very nonpolar.

C. they do not ionize.

D. they sore energy in the many C—H bonds along the carbon backbone.

E. they were lighter than water.

20. The functional group that can cause an organic molecule to act as a base is

A. —COOH.

B. —OH.

C. —SH.

D. —$NH_2$.

E. —$OPO_3^{-2}$

21. Which of the following is **not** true of a pentose?

A. It can be found in the nucleic acid.

B. It can occur in a ring structure.

C. It has a formula $C_5H_{12}O_5$.

D. It has one carbonyl and four hydroxyl groups.

E. It may be an aldose or a ketose.

22. What happens when a protein denatures?

A. it loses its primary structure.

B. it loses its secondary and tertiary structure.

C. it becomes irreversibly insoluble and precipitates.

D. it hydrolyzes into component amino acids.

E. its hydrogen bonds, ionic bonds, hydrophobic interactions, disulfide bridges, and peptide bonds are disrupted.

23. When a protein forms from amino acids, the following changes apply:

A. $+\Delta H, -\Delta S, +\Delta G$

B. $+\Delta H, +\Delta S, -\Delta G$

C. $+\Delta H, +\Delta S, +\Delta G$

D. $-\Delta H, +\Delta S, +\Delta G$

（背面仍有題目,請繼續作答）

E. $-\Delta H, -\Delta S, +\Delta G$

24. At equilibrium,

A. no enzymes are functioning.

B. $\Delta G = 0$

C. the forward and backward reactions have stopped.

D. the products and reactants have equal values of H.

E. a reaction has a $+\Delta G$.

25. Breathing rate will increase when _____ $CO_2$ in your blood causes a _____ in pH.

A. increased / rise

B. increased / drop

C. decreased / rise

D. decreased / drop

E. it is the level of $O_2$ in the blood that normally signals changes in breathing rate.

26. Which of the following is **not** a factor in the exchange of substances in capillary beds?

A. endocytosis and exocytosis

B. passive diffusion

C. hydrostatic pressure

D. bulk flow through clefts between endothelial cells

E. active transport by white blood cells

27. A freshwater fish would be expected to

A. pump salt out through salt glands in the gills.

B. produces copious quantities of dilute urine.

C. diffuse urea out across the epithelium of the gills.

D. have scales that reduce water loss to the environment.

E. do all of the above.

28. All of the following are functions of the vertebrate liver **except**

A. detoxification of drugs and toxins.

B. synthesis of plasma proteins.

C. interconversion of glucose and glycogen.

D. synthesis of urine.

E. synthesis of bile.

29. Only certain cells in the body are target cells for the steroid hormone aldosterone. Which of the following is the best explanation for why these are the only cells that respond to this hormone?

A. Only target cells are exposed to aldosterone.

B. Only target cells contain receptors for aldosterone.

C. Aldosterone is unable to enter nontarget cells.

D. Nontarget cells destroy aldosterone before it can produce its effect.

E. Nontarget cells convert aldosterone to a hormone to which they do respond.

30. Frequently, very few molecules of a hormone are required to affect changes in a target cell. This is because

A. hormones are lipid-soluble and readily penetrate the membranes of the target cell.

B. hormones are large molecules that remain in circulation for months and can repeatedly stimulate the same cell.

C. the mechanism of hormonal action involves an enzyme cascade that amplifies the response to a hormone.

D. the mechanism of hormonal action involves the rapid replication of the hormone within the target cell.

E. the mechanism of hormonal action involves memory cells that have had prior contact with the hormone.

31. When neurotransmitter Z is released into the extracellular fluid in contact with a portion of the cell membrane, channels open that allow both $X^-$ and $Y^-$ through the membrane. Which of the following is *incorrect*?

A. The magnitude of the potential will immediately increase.

B. $Y^-$ will diffuse into the cell.

C. $X^-$ will diffuse out of the cell.

D. The membrane will depolarize.

E. The channels are chemically gated.

32. What do Wernicke's and Broca's regions of the brain affect?

A. olfaction

B. vision

（背面仍有題目,請繼續作答）

C. speech

D. memory

E. hearing

33. Immediately after putting on a shirt, your skin feels itchy. However, the itching stops after a few minutes and you are unaware that you are wearing a shirt. Why?

A. Sensory adaptation has occurred.

B. Accommodation has increased.

C. Transduction has increased.

D. Motor unit recruitment has decreased.

E. Receptor amplification has decreased.

34. Which function associated with muscle would be most directly affected by low levels of calcium?

A. ATP hydrolysis

B. the initiation of an action potential

C. the muscle fiber resting membrane potential

D. muscle contraction

E. muscle fatigue

35. Of the evolutionary forces, which causes stochastic changes of gene frequencies between generations?

A. gene flow.

B. random mating.

C. mutation.

D. genetic drift.

E. natural selection.

36. Of the following forces, which does not favor homozygotes and thereby maintains genetic diversity within populations?

A. balancing selection.

B. founder's effect.

C. migration.

D. assortative mating.;

E. genetic cross-over.

37. Of the followings, which pair is incorrect?

A. Linnaeus – hierarchy of life.

B. Lamarck – use and disuse.

C. Weissman – inheritance of acquired characters.

D. Darwin – descent with modification.

E. Mendel – genetics

38. Sympatric speciation is

A. the process by which most animal species have evolved.

B. the emergence of many species from a single ancestor.

C. initiated by the appearance of a geographical barrier.

D. the appearance of a new species in the same area as the parent population.

E. especially important in the evolution of island species.

39. Biologists have found more than 500 species of fruit flies on the various Hawaiian Islands, all apparently descended from a single ancestor species. This example illustrates

A. adaptive radiation.

B. polyploidy.

C. temporal isolation.

D. hybrid breakdown.

E. meiotic failure.

40. In a population of 10000 individuals, 9 were born with PKU disease. There are two alleles at the gene. Of the following which is 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

41. In a sparrow population; individuals with long wings survive sever storms better than those with average-sized wings illustrating

A. bottleneck effect.

B. neutral variation.

（背面仍有題目,請繼續作答）

C. directional selection.
D. stabilizing selection.
E. founder's effects.

42. 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.

43. Which of the following terms is/are correctly described?
I. Benthic zone: in a lake, the well-lit, open surface water farther from shore.
II. Estuaries: the area where a freshwater stream or river merges with the ocean.
III. Intertidal zone: open water at the edge of the continental shelf.
IV. Littoral zone: in a lake, the shallow, well-lit water close to shore.
A. II, IV
B. I, II,
C. I, IV
D. II, III

44. In a mark-recapture study of NCKU campus lizard population, 50 lizards were captured, marked, and released. In a second capture, 60 lizards were captured; 10 of which were marked. What is the estimated lizard population size on campus?
A. 250
B. 300
C. 500
D. 3000

45. Animals that are small in size and produce many young in one breeding season in general
A. can reproduce for many years.
B. exhibit intensive parental care.
C. live at a density below carry capacity.
D. face a higher rate of juvenile mortality.

46. The diversity and complexity of bird songs may be associated with

I. where a bird is distributed, II. how old a bird is, III its reproductive success, IV physiological and genetic conditions,

A. all of them

B. none of them

C. only II, III

D. only I, III

47. Sexually mature offspring of Taiwan blue Magpies usually stay with parents and help raising other siblings. All of the following statements about this behavior are considered correct except

A. This is a case of altruism.

B. Kin selection is the selection force for this type of behavior.

C. Group selection is the selection force for this type behavior.

D. Natural selection is the selection force for this type behavior.

48. Which statement about dispersal is correct?

I. Dispersal occurs only on an evolutionary time scale

II. A lot of plants depend on animals for their seed dispersal

III. The ability to disperse can limit the geographic distribution of a species

IV. Dispersal is a common component of the life cycles of plants and animals.

A. I, II, III, IV

B. I, III, IV

C. I, II, IV

D. II, III, IV

49. Lichens are

A. a symbiotic association of algae and fungi.

B. a symbiotic association of fungi and bacteria.

C. prokaryotes.

D. unicellular

50. Bacteria are classified by all of the following **EXCEPT** their

A. antigens.

B. biochemical reactions.

（背面仍有題目，請繼續作答）

C. DNA or RNA genome.

D. Gram stain reaction.

51. Bacteria produce ATP in/on their

A. cell walls.

B. mitochondria.

C. plasma membranes.

D. storage granules.

52. NAG and NAM, constituents of peptidoglycan, are

A. lipids.

B. nucleic acids.

C. peptides.

D. saccharides.

53. Which of the following structures is most directly associated with the secretion of compounds that will become part of the plant cell wall?

A. smooth ER

B. plasmodesmata

C. Golgi-derived vesicles

D. rough ER

E. Golgi apparatus

54. A biologist ground up some plant leaf cells and then centrifuged the mixture to fractionate the organelles. Organelles in one of the heavier fractions could produce ATP in the light, while organelles in the lighter fraction could produce ATP in the dark. The heavier and lighter fractions are most likely to contain, respectively,

A. mitochondria and chloroplasts.

B. chloroplasts and peroxisomes.

C. peroxisomes and chloroplasts.

D. chloroplasts and mitochondria.

E. mitochondria and peroxisomes.

55. When biological membranes are frozen and then fractured, they tend to break along the middle of the

bilayer. The best explanation for this is that

A. the integral membrane proteins are not strong enough to hold the bilayer together.

B. water that is present in the middle of the bilayer freezes and is easily fractured.

C. hydrophilic interactions between the opposite membrane surfaces are destroyed on freezing.

D. the carbon-carbon bonds of the phospholipid tails are easily broken.

E. the hydrophobic interactions that hold the membrane together are weakest at this point.

56. What is the voltage across a membrane called?

A. water potential

B. chemical gradient

C. electrochemical gradient

D. osmotic potential

E. membrane potential

57. When a glucose molecule loses a hydrogen atom (not a hydrogen ion) as the result of an oxidation-reduction reaction, the molecule becomes

A. oxidized.

B. reduced.

C. dehydrogenated.

D. hydrogenated.

E. an oxidizing agent.

58. Glycolysis is thought to be one of the most ancient of metabolic processes. Which statement supports this idea?

A. Glycolysis is the most widespread metabolic pathway.

B. Glycolysis neither uses nor needs $O_2$.

C. Glycolysis is found in all eukaryotic cells.

D. The enzymes of glycolysis are found in the cytosol rather than in a membrane-enclosed organelle.

E. Ancient prokaryotic cells, the most primitive of cells, made extensive use of glycolysis long before oxygen was present in Earth's atmosphere.

59. A small molecule that specifically binds to another molecule, usually a larger one

A. is called a signal transducer.

B. is called a ligand.

（背面仍有題目，請繼續作答）

C. is called a polymer.

D. seldom is involved in hormonal signaling.

E. usually terminates a signal reception.

60. Which of the following most likely would be an immediate result of growth factor binding to its receptor?

A. protein kinase activity

B. adenylyl cyclase activity

C. GTPase activity

D. protein phosphatase activity

E. phosphorylase activity

61. If there are 20 chromatids in a cell at metaphase, how many chromosomes are there in each daughter cell following cytokinesis?

A. 5

B. 10

C. 20

D. 40

E. 80

62. A particular cyclin called cyclin E forms a complex with a cyclin-dependent kinase called Cdk 2. This complex is important for the progression of the cell from $G_1$ into the S phase of the cell cycle. Which of the following statements is *correct*?

A. The amount of cyclin E is greatest during the S phase.

B. The amount of Cdk 2 is greater during $G_1$ compared to the S phase.

C. The amount of cyclin E is highest during $G_1$.

D. The amount of Cdk 2 is greatest during $G_1$.

E. The activity of the cyclin E/Cdk 2 complex is highest during $G_2$.

63. In the non-cyclic electron transfer chain of light reaction photosynthesis, _____ is the electron donor for the photosystem II and the final receptors of electron are _____

A. $CO_2$ ... ATP

B. $H_2O$ ... $O_2$

C. $H_2O$... ATP

D. $CO_2$ ... glyceraldehyde-3-phosophate

E. $H_2O$ ... NADPH

64. The reactions of the Calvin cycle are not directly dependent on light, but they usually do not occur at night. Why?
A. Stomata close at night thus limit carbon dioxide concentrations required for the reaction
B. It is often too cold at night for these reactions to take place.
C. The Calvin cycle depends on products of the light reactions.
D. Water transport from the root dramatically decreases at night due to the stop of transpiration.
E. The Calvin cycle requires light-activated phytochrome

65. The energy used to produce ATP in the light reactions of photosynthesis comes from:
A. the burning of sugar molecules
B. splitting water
C. movement of protons through the thylakoid membrane
D. carbon fixation
E. fluorescence

66. Which of the following is the product generated from the Calvin cycle? Where does the Calvin cycle occur?
A. sucrose [$(C_6H_{12}O_6)_2$]; thylakoid space
B. glucose ($C_6H_{12}O_6$); thylakoid stroma
C. glyceraldehyde-3-phosophate ($C_3H_7O_6P$); chloroplast stroma
D. malate ($C_4H_6O_5$); thylakoid membrane
E. starch; cytoplasm

67. Which of the following processes is aided by the membrane potential established by the proton pump?
A. uptake of $K^+$
B. cotransport of $NO3^-$
C. both (A) and (B) are correct.
D. transport of sucrose
E. all of the above answers are correct

68. A plant cell with solute potential of – 0.7 MPa and pressure potential of 0 MPa is placed in the solution with solute potential of -0.13 MPa in an open container. This plant cell will:
A. lose water and become turgid
B. lose water and plasmolyze
C. gain water and become turgid
D. gain water and break apart
E. remain the same shape

（背面仍有題目，請繼續作答）

69. In alternation of generations in plants:
A. the sporophyte is the haploid generation
B. a sporophyte grows from a spore
C. the spores are produced by the gametophyte by meiosis and cellular differentiation
D. the gametes are produced by the gametophyte through mitosis and cellular differentiation
E. the gametes are produced by the gametophyte through meiosis and cellular differentiation

70. Which hormone is **INCORRECTLY** paired with its function?
A. auxin- promotes stem growth through cell elongation
B. gibberellins- induce seed germination and promote apical dominance
C. cytokinins- stimulate cell division
D. ethylene- promotes programmed cell death (apoptosis)
E. brassinosteroids- induce cell elongation and cell division in stem and seedlings

71. Some seeds require light for germination, which is controlled by the phytochrome system. In which one of the following treatments would germination **NOT** occur?
A. red light only
B. red light followed by blue light
C. blue light followed by red light
D. red light followed by far-red light
E. far-red light followed by red light

72. A short-day plant flowers only if days are shorter than 10 hours. Which of the following orders of treatments will cause it to flower?
A. 6 hours light, 10 hours dark, flash of light, 8 hours dark
B. 6 hours light, 10 hours dark, flash of red light, 8 hours dark
C. 14 hours light, 10 hours dark
D. 8 hours light, 8 hours dark, flash of red light, 8 hours dark
E. 8 hours light, 8 hours dark, flash of red light, flash of far-red light, 8 hours dark

73. A botanist discovers a new species of plant in a tropical rain forest. After observing its anatomy and life cycle, the following characteristics are noted: flagellated sperm, xylem with tracheids, separate gametophyte and sporophyte generations, and no seeds. This plant is probably most closely related to
A. Bryophyta
B. Charophyta
C. Pteridophyta
D. Ascomycota

E. Anthophyta (Angiosperm)

74. All of the following are characteristic of angiosperms *except*
A. coevolution with animal pollinators.
B. double internal fertilization.
C. free-living gametophytes.
D. styles and stigmas.
E. fruit.

75. Where in an angiosperm would you find a megasporangium?
A. in the style of a flower
B. producing a megaspore within the archegonium of the female gametophyte
C. enclosed in the stigma of a flower
D. within an ovule contained within an ovary of a flower
E. packed into pollen sacs within the anthers found on a stamen

76. Which of the following tissues is *incorrectly* matched with its characteristics?
A. collenchyma-uniformly thick-walled supportive tissue
B. epidermis-protective outer covering of plant body
C. sclerenchyma-heavily lignified secondary walls
D. meristematic tissue-undifferentiated tissue capable of cell division
E. parenchyma-thin-walled, loosely packed, unspecialized cells

77. Which of the following is *true* about secondary growth in plants?
A. Flowers may have secondary growth.
B. Secondary growth is a common feature of eudicot leaves.
C. Secondary growth is produced by both the vascular cambium and the cork cambium.
D. Primary growth and secondary growth alternate in the life cycle of a plant.
E. Plants with secondary growth are typically the smallest ones in an ecosystem.

78. Which structure is *incorrectly* paired with its tissue system?
A. root hair-dermal tissue
B. palisade parenchyma-ground tissue
C. guard cell-dermal tissue

（背面仍有題目,請繼續作答）

D. companion cell-ground tissue

E. tracheid-vascular tissue

79. In flowering plants, meiosis occurs specifically in the

A. spore mother cells.

B. gametophytes.

C. endosperm.

D. gametes.

E. embryos.

80. Lichens sometimes reproduce asexually using

A. aseptate fungal hyphae located within photosynthetic cells.

B. the fruiting bodies of fungi.

C. flagellated, conjoined spores of both the fungus and alga.

D. specialized conidiophores.

E. small clusters of fungal hyphae surrounding photosynthetic cells.

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

A. mitosis

B. morphogenesis

C. totipotency

D. differentiation

E. pluripotency

82. The process of cellular differentiation is a direct result of

A. differential gene expression.

B. cell division.

C. differences in cellular genomes.

D. morphogenesis.

E. apoptosis.

83. Which chemical is not normally found in any sponges?

A. chitin

B. silica

C. calcium carbonate

D. spongin

E. cribrostatin

84. While sampling marine plankton in a lab, a student encounters large numbers of fertilized eggs. She rears some of the eggs in the laboratory for further study and finds that the blastopore becomes the mouth. The embryo develops into a trochophore larva and eventually has a coelom. These eggs probably belonged to a(n)
A. echinoderm.
B. arthropod.
C. annelid.
D. mollusc.
E. nematode.

85. To which of these are the scales of chondrichthyans most closely related in a structural sense?
A. osteichthyan scales
B. reptilian scales
C. mammalian scales
D. chondrichthyan teeth
E. bird scales

86. What permits reptiles to thrive in arid environments?
A. A cartilaginous endoskeleton provides needed flexibility for locomotion on sand.
B. They have an acute sense of sight, especially in bright sunlight.
C. Their bright coloration reflects the intense UV radiation.
D. Their scales contain the protein keratin, which helps prevent dehydration.
E. A large number of prey and a limited number of predators are available in the desert.

87. Which of the following describes cardiac muscle?
A. smooth and voluntary
B. striated and branched
C. smooth and involuntary
D. striated and unbranched
E. striated and voluntary

88. Which of the following layers of the stomach is best described as being composed primarily of epithelial tissue?
A. mucosa
B. lumen
C. muscularis

(背面仍有題目,請繼續作答)

D. submucosa
E. serosa

89. In lakes and ponds, eutrophication occurs when _____; it can lead to _____.
A. levels of dissolved $CO_2$ rise ... bicarbonate levels too high to support life
B. pesticides are washed off agricultural land ... decreased aquatic biodiversity
C. toxic substances accumulate in lake sediments ... biohazards in the food web
D. nutrients from human-altered terrestrial ecosystems are deposited in the water body ... anaerobic conditions in deeper waters
E. primary producers are killed by pollution ... starvation of organisms at higher trophic levels

90. Biogeochemical cycles are crucial to ecosystem function because _____.
A. they keep the planet warm enough for living things to survive
B. nutrients and other life-sustaining molecules are in limited supply and must be continually recycled
C. energy flows through ecosystems in one direction only and is eventually dissipated as heat
D. they remove poisons and keep them locked up in "sinks"
E. they prevent catastrophic extinctions

91. What is the term for a top predator that contributes to the maintenance of species diversity among its animal prey?
A. keystone species
B. keystone mutualist
C. landscape species
D. primary consumer
E. tertiary consumer

92. Which of the following is *not* used in calculating an ecological footprint?
A. arable land
B. pasture and forest lands
C. fossil energy land
D. demographically transitional land
E. built-up land

93. Which of the following is **not** true about edge effects?
A. They are defining features of landscapes.
B. Edges have their own set of physical conditions, which differ from those on either side.

C. As a habitat patch becomes progressively smaller, the percentage of the patch influenced by the edge effect increases.
D. As habitats are fragmented, edge-adapted species benefit at the expense of other species that are not edge-adapted.
E. When edges expand, this is detrimental to all species.

94. What is the key factor driving an extinction vortex?
A. loss of genetic variation
B. the size of the endangered organisms
C. the size of the population
D. the major threats to biodiversity that were involved in making the species endangered
E. how involved humans are in saving the population from extinction

95. Which of the following statement is incorrect ?
A. Human body tends to story any excess fat instead of using them for fuel.
B. Fat in the diet can have more direct effect on weight gain than dietary carbohydrates.
C. Body tends to increase its rate of carbohydrate oxidation.
D. Leptin cues the brain to depress the appetite.
E. None of the above.

96. Cows are able to survive on a diet consisting almost entirely of cellulose because
A. Cows are autotrophic.
B. The cow, like the rabbit, reingests its feces.
C. Cows can manufacture all 15 amino acids out of sugars in the liver.
D. The cow's saliva has enzymes capable of digesting cellulose.
E. Cows have cellulose-digesting, symbiotic microorganisms in their rumens.

97. Why is internal fertilization considered more advantageous than external fertilization?
A. Usually fewer offspring are produced, so ample food supply is available.
B. The time and energy devoted to reproduction is decreased.
C. The smaller number of offspring often receive a greater amount of parental protection.
D. The increased survival rate results in rapid population increases.
E. Usually a smaller number of genes are present, which promotes genetic stability.

98. Which of the following statement is correct?
A. oogenesis produces one functional ovum, whereas spermatogenesis produces four functional spermatozoa.
B. spermatogenesis is not complete until fertilization occurs.

(背面仍有題目,請繼續作答)

C. oogenesis begins at the onset of sexual maturity.
D. During the meiotic divisions of oogenesis cytokinesis is equal.
E. None of the above.

99. Which developmental sequence is correct?
A. cleavage, blastula, gastrula, and morula
B. cleavage, gastrula, morula, and blastula
C. cleavage, morula, blastula, and gastrula
D. gastrula, morula, blastula, and cleavage
E. morula, cleavage, gastrula, and blastula

100. The shaping of an animal and its individual parts into a body form with specialized organs and tissues is called
A. pattern formation.
B. induction.
C. differentiation.
D. determination.
E. organogenesis.