高雄醫學大學九十一學年度學士後西醫學系招生考試試題

科目：生物

試題分析：

1. **細胞學題不算多，**Microscopes **的題目一題都沒有，**cell junction **也沒考出來，光合作用、演化論像蜻蜓點水，意思意思考一點。**
2. **免疫學幾乎都考抗體。**
3. **直接出自** Campbell Biology **的習題的並不很多。**
4. **全部以英文出題是首次嘗試，原本預計考** 50 **題選擇，卻共考了** 65 **題，**80 **分鐘內做完勉強了一點。**
5. **試題分佈如下表：**

內容	題數	分數	內容	題數	分數
1 概論	0	0	11 動物分類學	1	1
2 生命分子	0	0	12 植物生理學(一)	2	2
3 細胞學	5	8	13 植物生理學(二)	4	5
4 光合作用	1	1	14 動物組織營養消化與排泄	3	5
5 細胞呼吸	3	5	15 內液循環免疫與呼吸	7	10
6 孟氏與細胞傳學	3	5	16 內分泌與生殖	6	10
7 分子遺傳學	4	6	17 動物胚胎發育	2	4
8 演化論	1	2	18 神經與肌肉	8	14
9 生命起源與微生物	4	6	19 行為與生態學	5	7
10 植物分類學	3	3	20DNA 技術學	3	5

6.**並無特別深的題目，重大爭議題也減少很多。**
7.**原先考生擔心考出** 200 **年版** Campbell Biology **的顧慮，完全解除。新版的資料一題都沒有。**
8.**程度高的討不了“好”，程度低的也低不了多少分，這就是此醫普通生物學試題的特色。**
9.**不難、不難，**85 **分以上是用功的！考不到** 75 **分的該打一大板！！**
10.**幾達** 100%**都可在黃志清老著“普通生物學精輯”第** 18 **版書上找到答案。**

Ⅰ.單選題1-30題，每題1分。30%

說明：每題選出一個最適當的選項，標示在答案卡上。每題答對得 1 **分，答錯倒扣** 0.25 **分，未作答者，不給分亦不扣分）**

(C) 1.Imagine a tree is attacked by fungus that parasitizes and destroys phloem. What would be a likely cause of the tree's death?
(A)inability to capture water from the soil (B)inability to transport water to the leaves
(C)starvation of the roots (D)inhibition of photosynthesis (E)A and B

(B) 2.How does the immune system produce so many different antibodies?
(A)vertebrates inherit millions of different antibody genes
(B)each antibody is the product of several different genes that are shuffled to produce new combinations
(C)meiotic recombination and independent assortment lead to antibody variations
(D)the immune system creates new B cells each time it is exposed to a new antigen
(E)all of the above

(C) 3.Which of the following is true for both prokaryotic and eukaryotic gene expression?
(A)after transcription, a 3' poly-A tail and a 5' cap are added to mRNA
(B)transcription of mRNA can begin before transcription is completed

(C)RNA polymerase may recognize a promoter region upstream from the gene
(D)mRNA is synthesized in the 3' →5' direction
(E)the mRNA is transcript is the exact complement of the gene from which it was copied

(B) 4.During cellular respiration, pyruvate must be transported across
(A)the cell membrane into intercellular space
(B)both mitochondria membranes into the matrix
(C)the outer mitochondria membrane into the stroma
(D)the outer mitochondria membrane into the cytosol
(E)the nuclear envelop into nucleus

(C) 5.Which of the following statements about nonspecific defenses is false?
(A)they include inflammatory responses (B)the include physical and chemical barriers
(C)they must be primed by the presence of antigen
(D)they may involve the formation of membrane attack complexes
(E)marcophages and natural killer cells are participants in the process

(E) 6.Mitochondria and chloroplasts have double membranes because
(A)their DNA is light-sensitive (B)they need protection from lysosomes
(C)they are derived from eukaryotes
(D)the double membrane is required to maintain a hydrogen ion gradient
(E)the originated from endosymbiosis

(D) 7.A flower without sepals and petals is most likely pollinated by
(A)bees (B)moths (C)bats (D)wind (E)insects

(D) 8.A species concept defined by phenotypic characters is referred as
(A)biological species concept (B)ecological species concept
(C)evolutionary species concept (D)morphological species concept
(E)recognition species concept

(B) 9._____ are generally characterized by sporophyte with vascular system and without seed production in life cycle.
(A)Mosses (B)Ferns (C)Gymnosperms (D)Angiosperms (E)Algae

(E) 10.A structure in seed, which is equivalent to a leaf, is
(A)seed coat (B)plumule (C)endosperm (D)coleoptile (E)cotyledon

(D) 11.A biodiversity hot spot is
(A)a low species diversity in a small area (B)a low species diversity in a large area
(C)a high species abundance in a large area (D)a high species diversity in small area
(E)a large species population size in a small area

(D) 12.Which of the following is an INCORRECT statement about plants?
(A)they are sometimes referred to as embryophytes (B)they are all eukaryotic
(C)they are mostly teriestrial (D)they are polyphyletic
(E)they have two dimorphic generations

(E) 13.Which of the following responses that plants cope with water deficit is INCORRECT?
(A)reducing the rate of transpiration
(B)stimulating increased synthesis and release of sbscisic acid
(C)increasing defoliation (D)rolling the leaves
(E)altering the lipid composition of their cell membranes

(A) 14.An eutrophic lake is usually characterized by its
(A)shallow water depth and high nutrient content
(B)shallow water depth and low nutrient content
(C)deep water depth and high nutrient content (D)deep water depth and low nutrient content
(E)medium water depth and moderate nutrient content

(E) 15.Which of the following correctly matches an organelle with its function?
(A)mitochondria-photosynthesis (B)nucleus-cellular respiration
(C)ribosome-manufacture of lipids (D)lysosome-movement (E)central vacuole-storage

(C) 16.Scientists think that some birds may find their way during migration by
(A)imprinting on faint odors (B)listening to high-pitched sounds
(C)sensing the magnetism of the Earth (D)seeing wavelengths of light that we cannot see
(E)sensing the gravitational pull of the sun and moon
根據 Campbell Biology (2002 年版)p1136 應選(C)

(D) 17.The part of a neuron that carries nerve impulses toward the cell body is called
(A)a nerve (B)white matter (C)a neurotransmitter (D)a dendrite (E)an axon

(B) 18.Nitrogen fixation is
(A)using nitrogen to build molecules such as proteins and nucleic acids
(B)converting nitrogen in the air into a form usable by plants
(C)recycling nitrogen from organic matter in the soil
(D)absorbing N_2 from the soil (E)an unhealthy interest in nitrogen

(E) 19.DNA fingerprints were used to determine whether Sam could be the father of Becky's baby. Which of the following would show that Sam is not the father? If _____ genetic fingerprint showed some bands not in genetic fingerprint.
(A)Sam's ... the baby's (B)Becky's ... the baby's (C)the baby's ... Sam's
(D)the baby's...Becky's (E)the baby's...Sam's or becky's

(D) 20.Which of the following hormones has the broadest range of targets?
(A)ADH (B)oxytocin (C)TSH (D)epinephrine (E)ACTH

(A) 21.Two of the most common second messengers are
(A)calcium ion and cAMP (B)GTP and GDP (C)kinase and phosphate
(D)G proteins and calmodulin (E)kinase and phosphatase

(E) 22.Whales and dolphins are known to send out clicking sounds and listen to the echoes. This suggests that they might find their prey in the same way that
(A)a rattlesnake finds a mouse in total darkness (B)a salmon loctes its home stream
(C)an owl locates a mouse in a dark barn (D)an electric eel finds its prey in a muddy river
(E)bats navigate in dark caves

(C) 23.The concentration of calcium in a cell is 0.3%. The concentration of calcium in the surrounding fluid is 0.1%. How could the cell obtain more calcium?
(A)passive transport (B)diffusion (C)active transport (D)osmosis (E)all of the above

(D) 24.What is a key difference between mitosis and meiosis?
(A)only mitosis has a metaphase
(B)sister chromatids separate during mitosis but not meiosis
(C)DNA synthesis does not occur during anaphase of mitosis
(D)only in mitosis are daughter cells genetically identical to parent cell
(E)only mitosis has DNA replication

(D) 25.How does AZT (azidothymidine) block DNA replication?
(A)AZT forms base pair with any other nucleotide
(B)AZT forms no base pairs with other nucleotide
(C)AZT causes a T-T dimmer mutation
(D)AZT cannot form a bond to the phosphate of another nucleotide
(E)AZT prevents cytokinesis

(A) 26.What happens to a tRNA molecule during and after its particiption in protein synthesis?
(A)it is stripped of its amino acid and released from the ribosome
(B)it is covalently bound to the growing mRNA strand
(C)it is charged with ATP (D)it is split from its DNA strand by enzymes
(E)A and D

(E) 27.Which organ system is present in flatworms?
(A)muscular (B)digestive (C)reproductive (D)excretory (E)all of the above

(B) 28.The function of a mature B cell is to
(A)make antibodies against several different antigens
(B)make antibodies against only a single antigen
(C)leave the lymph node to search out and destroy invaders
(D)differentiate into a killer T cell (E)differentiate into a macrophage

(D) 29.Which part of a bone is likely to have the greatest concentration of cells?
(A)compact bone (B)spongy bone (C)diaphysis (D)marrow (E)epiphysis
epiphysis 是 secondary ossification center 所在雖有許多 bone-forming cells 在工作，並不表示 cells 最集中，而 marrow 是 stem cells 集中處，是以應選(D)

(D) 30.Which plant hormone induces and maintains dormancy?
(A)gibberelline (B)auxins (C)cytokinins (D)abscisic acid (E)phytochrome

II.單選題：31-65題，每題2分。70%

說明：每題選出一個最適當的選項，標示在答案卡上。每題答對得 2 分，答錯倒扣 0.5 分，未作答者，不給分亦不扣分）

(E) 31.A nursing infant is able to obtain disease-fighting antibodies, which are large protein molecules, from its mother's milk. These molecules probably enter the cells lining the baby's digestive tract via
(A)osmosis (B)passive transport (C)exocytosis (D)active transport (E)endocytosis

(D) 32.During a secondary immune response,
(A)selected B cell generates antibody-producing effector B cells called plasma cells
(B)the stricken individual may become ill
(C)about 10 to 17 days are required from exposure to maximum effector response
(D)the generation of effector cells begins with memory cells produced during the primary immune response
(E)all of the above

(A) 33.Which gland and organ work together to regulate the sodium level in the blood?
(A)adrenal gland and kidney (B)thyroid gland and bone (C)hypothalamus and pituitary
(D)pancreas and gall bladder (E)parathyroid and kidney

(A) 34.What happens at the nodes of Ranvier?
(A)ions flow through the plasma membrane
(B)the myelin sheath insulates the axon from dendrites
(C)giant axons connect to one another
(D)action potentials can jump from one axon to another
(E)neurotransmitters are released

(A) 35.Unlike animals, in plants
(A)cell division requires the formation of a cell plate
(B)mitosis involves separation of chromatids during anaphase
(C)mitosis is accomplished by binary fission
(D)mitosis does not involve microtubules
(E)cells can move about within a developing organ

(E) 36.A geneticist found that a particular mutation had no effect on the polypeptide coded by a gene. This mutation probably involved
(A)deletion of one nucleotide (B)alteration of the start codon
(C)insertion of one nucleotide (D)deletion of the entire gene
(E)substitution of one nucleotide

(B) 37.The tendency for characteristics to be more different in sympatric populations of two species than in allopatric populations of the same two species is called.
(A)competitive exclusion (B)character displacement (C)niche shift (D)speciation
(E)dynamic equilibrium
根據 Campbell Biology(2002 年版)p1177 應選(B)

(E) 38. Which of the following is an INCORRECT statement about cyanobacteria?
(A) they are photoautotrophic (B) they were formerly known as blue-green algae
(C) they belong to Domain Bacteria
(D) some of their members produce specialized heterocysts for nitrogen fixation
(E) their cells contain chloroplasts

(C) 39. Noncyclic photophosphorylation is different from cyclic photophosphorylation in that
(A) noncyclic photophosphorylation produces ATP
(B) cyclic photophosphorylation produces ATP
(C) noncyclic photophosphorylation produces NADPH
(D) cyclic photophosphorylation produces NADPH
(E) noncyclic photophosphorylation includes dark reactions

(C) 40. What is the function of calcium ions in muscle contraction?
(A) They cause actin and myosin filaments to shorten (B) They make membranes permeable
(C) They allow cross-bridges to from between actin and myosin
(D) They increase the action potential of the fiber
(E) They decrease the action potential of the fiber

(E) 41. A graduate student growing plant cells in a laboratory dish wanted to cause them to _____, so the graduate student treated them with cytokinins.
(A) enlarge (B) become dormant (C) grow roots (D) produce auxins (E) divide

(B) 42. Which of the following structuries is incorrectly paired with its function?
(A) epididymis-maturation and storage of sperm (B) uterus-fertilization of an egg
(C) seminal vesicles-add sugar and mucus to semen
(D) placenta-maternal/fetal exchange organ; progesterone producing
(E) prostate gland-adds alkaline substances to semen

(C) 43. An area of habitat where a population's reproductive success exceeds mortality is
(A) the results of edge effect (B) going to occur speciation very soon
(C) a source habitat to the population (D) going to decrease population size
(E) the effective size of the population

(C) 44. Which of the following is an INCORRECT statement about fungi?
(A) they are heterotrophs (B) most of their bodies are constructed of hyphae
(C) their cell walls mainly consist of cellulose
(D) they are more closely related to animals than plants
(E) they serve as decomposers in communities

(C) 45. Fermentation is essentially glycolysis plus an extra step in which pyruvic acid is reduced to form lactic acid or alcohol and carbon dioxide. This last step
(A) removes poisonous oxygen from the environment
(B) extracts a bit more energy from glucose (C) enables the cell to recycle NAD^+
(D) inactivates toxic pyruvic acid (E) enables the cell to make pyruvic acid into substances it can use

(C) 46. A biologist isolated a gene from a human cell, attached it to a plasmid, and inserted the plasmid into a bacterium. The bacterium made a new protein, but it was nothing like the protein normally produced in a human cell. Why?
(A) the bacterium had undergone transformation (B) the gene did not have sticky ends
(C) the gene contained introns (D) the gene did not come from a genomic library
(E) the biologist should have cloned the gene first

(D) 47. During kidney dialysis, blood and a dialyzing solution are separated by a semipermeable membrane. For kidney dialysis to work properly, the dialyzing solution should contain
(A) a lower solute concentration than blood (B) a higher concentration of urea than blood
(C) a lower glucose concentration than blood (D) a lower concentration of urea than blood
(E) a much smaller volume of fluid than the blood passing through it

(C) 48. It takes much longer for sex hormones and other steroids to produce their effects than it takes for nonsteroid hormones. Why?
(A) steroids are bigger, slower molecules
(B) steroids usually must be carried longer distances by the blood
(C) steroids cause target cells to make new proteins, which takes time
(D) steroids must relay their message via a second messenger
(E) it takes longer for endocrine cells to make and secrete steroids

(D) 49. A peak in _____ triggers ovulation on about the _____ day of the monthly cycle.
(A) progesterone...fourteenth (B) LH...seventh (C) FSH...second (D) LH...fourteenth
(E) estrogen...twentieth

(C) 50. Mitosis and cytokinesis result in the formation of _____, meiosis and cytokinesis result in the formation of _____.
(A) 4 diploid cells ... 4 haploid cells (B) 2 diploid cells ... 2 haploid cells
(C) 2 diploid cells ... 4 haploid cells (D) 2 diploid cells ... 2 diploid cells
(E) 4 haploid cells ... 2 diploid cells

(B) 51. During the early development of a human embryo the _____ eventually forms _____.
(A) blastocoel...archenteron (B) epiblast...ectodermal, mesodermal, and endodermal tissues
(C) epiblast...placenta (D) trophoblast...embryo proper (E) hypoblast...amniotic cavity

(B) 52. You would expect a cell with an extensive Golgi apparatus to
(A) make a lot of ATP (B) secrete a lot of material (C) move actively
(D) perform photosynthesis (E) store large quantities of food

(C) 53. In a laboratory, a scientist feeds yeast cells sugar made with ratioactive carbon and keeps oxygen gas out of the container. In which substance will the radioactive carbon appear first?
(A) water (B) phospholipids (C) pyruvate (D) carbon dioxide
(E) electron transport molecules

(C) 54. Which of the following people would probably be making the most antidiuretic hormone?
(A) a person drinking beer (B) a person swimming in a cold lake
(C) a person eating salty potato chips (D) a person drinking acidic lemonade
(E) none of the above-the production of antidiuretic hormone is constant

(B) 55. The brain perceives the brightness of light by sensing
(A) the voltage of action potentials in the optic nerve
(B) the frequency of action potentials in the optic nerve
(C) which specific rod cells are stimulated
(D) how many hair cells are stimulated
(E) action potentials from brightness-sensing neurons

(B) 56. In what symptoms may be resulted by damage to the corpus callosum?
(A) loss of short-term memory
(B) inability to integrate information from the two sides of the body
(C) inability to form long-term memory (D) sleeplessness (E) loss of fine motor control

(E) 57. What does the Hardy-Weinberg expression 2pq represent?
(A) the gene frequency of the dominant allele (B) the gene frequency of the recessive allele
(C) the frequency of the dominant phenotype (D) the frequency of the recessive phenotype
(E) the frequency of heterozygotes

(D) 58. Which developmental sequence is correct?
(A) fertilization→gastrulation→blastula formation→morula formation→cleavage
(B) cleavage→fertilization→blastula formation→morula formation→gastrulation
(C) fertilization→cleavage→blastula formation→morula formation→gastrulation
(D) ertilization→cleavage→morula formation→ blastula formation → gastrulation
(E) ertilization→cleavage→morula formation→gastrulation→blastula formation

(E) 59. Which of the following best represents the path of a signal that causes muscle contraction?
(A) motor neuron→sarcoplasmic reticulum→sarcolemma→transverse tubules

(B)transverse tubules→sarcoplasmic reticulum→sarcolemma→motor neuron
(C)motor neuron→transverse tubules→sarcolemma→sarcoplasmic reticulum
(D)sarcoplasmic reticulum→transverse tubules→sarcolemma→motor neuron
(E)motor neuron→sarcolemma→transverse tubules→sarcoplasmic reticulum

(A) 60. What prevents an action potential from propagating in both directions along an axon?
(A)During the refractory period, a patch of membrane cannot conduct another action potential.
(B)The sodium channels allow the passage of ions in only one direction.
(C)ATP stores are temporarily exhausted following an action potential.
(D)The sodium-potassium pumps are temporarily disabled by an action potential.
(E)All of the above.

(A) 61. In the atmosphere, the partial pressure of oxygen is 0.21 atmosphere; of carbon dioxide, 0.0003. Which of the following statements is not true?
(A)The partial pressure of oxygen in lung capillary is greater than 0.21.
(B)In the pulmonary vein, the partial pressure of oxygen is greater than in the inferior vena cava.
(C)In the pulmonary artery, the partial pressure of carbon dioxide is greater than 0.0003.
(D)The partial pressure of oxygen in muscle capillaries is less than 0.21.
(E)In the renal artery, the partial pressure of oxygen is greater than in the renal vein.

(A) 62. The following sequence shows a "gene" encoding a small peptide. The three stop codons are UAA, UAG, and UGA. How many amino acids will be encoded by this "gene"? The promoter region is underlined.
5' (<u>ATGACGTATAA</u>)TGACCGTACATGAGTAATACATAAATGAG3'
(A)4 (B)5 (C)7 (D)8 (E)12

(A) 63. Which of the following statements regarding transposons is false?
(A)Transposons have a specific target site within the genome.
(B)Transposons are found in both prokaryotes and eukaryotes.
(C)Transposons can move from a plasmid to the chromosome of the bacterium.
(D)Transposons may replicate at the original site and insert the copy at another site.
(E)Transposons may carry only the genes necessary for insertion.

(B) 64. Which of the following statements is correct about Gram-negative bacteria?
(A)Penicillins are efffective antibiotics against them.
(B)They often possess an outer cell membrane containing toxic lipopolysaccharides.
(C)On cell-to-cell basis, they possess more DNA than the cells of any taxonomically higher organism do.
(D)Their chromosomes are composed of DNA tightly wrapped around histone protein.
(E)Their cell walls are primarily composed of peptidoglycan.

(D) 65. Which of the following statements is true about arteries?
(A)arteries always carry deoxygenated blood (B)arteries always carry oxygenated blood
(C)arteries always carry blood toward the heart
(D)arteries always carry blood away from the heart (E)B and D