

臺灣綜合大學系統 114 學年度學士班轉學生聯合招生考試試題

科目名稱	普通生物學	類組代碼	A04.B04.C07.C08.D06
		科目碼	A0401

※本項考試依簡章規定所有考科均「不可」使用計算機。
 ※第 1 至第 50 題為單選題，每題 2 分，不倒扣

本科試題共計 4 頁

- Which organelle is responsible for producing ATP in eukaryotic cells? (A) Golgi apparatus (B) lysosome (C) mitochondrion (D) smooth ER (E) endosome
- Which of the following is the most abundant molecule present in the plasma membrane in animal cells? (A) DNA (B) RNA (C) carbohydrates (D) lipids (E) proteins
- The endomembrane system governs the process of protein synthesis and several metabolic reactions in cells. Which of the following organelles is NOT included in the endomembrane system? (A) endoplasmic reticulum (B) Golgi apparatus (C) endosome (D) lysosome (E) mitochondria
- Which of the following tissue categories does NOT belong to the four fundamental tissues in animals? (A) adipose tissue (B) muscle tissue (C) nervous tissue (D) connective tissue (E) epithelial tissue
- Which of the following tissues is specialized for contraction? (A) nervous tissue (B) epithelial tissue (C) muscle tissue (D) connective tissue (E) adipose tissue
- Color blindness is an X-linked recessive hereditary disease due to the deficiency of specific photoreceptors in the retina. One man with color blindness got married to a carrier woman. If they give birth to two boys, what is the probability of both offspring being afflicted with this disease? (A) 1/2 (B) 1/4 (C) 1/8 (D) 1/16 (E) 1/64
- Which organ is responsible for filtering blood and generating urine in mammals? (A) heart (B) lung (C) stomach (D) small intestine (E) kidney
- Which of the following categories can NOT be perceived as taste when our mouth eats food or drinks a beverage? (A) sweet (B) salty (C) spicy (D) sour (E) umami
- The circulatory system is composed of the systemic circuit and the pulmonary circuit, which are essential for our survival. Which of the following tubes holds the highest oxygen levels? (A) pulmonary artery (B) pulmonary vein (C) capillary (D) superior vena cava (E) aorta
- Coagulation is a delicate mechanism controlling clot formation and preventing blood drainage. What kind of dietary deficiency and clotting factor deficiency would lead to defective blood clotting and hemophilia A? (A) vitamin E; factor VIII (B) vitamin B₁₂; factor VIII (C) vitamin E; von Willebrand factor (D) vitamin B₁₂; von Willebrand factor (E) vitamin K; factor VIII
- COVID-19 causes a global pandemic and millions of deaths. Vaccination is efficient for preventing virus infection, because which type of antibody will be secreted after this preventive medical treatment? (A) IgA (B) IgD (C) IgE (D) IgG (E) IgM
- Which brain structure is associated with memory formation, especially for short-term memory? (A) hippocampus (B) corpus callosum (C) amygdala (D) reticular formation (E) nucleus accumbens
- Which of the following structures acts as a pacemaker in the heart and is responsible for the establishment of the rhythm of heartbeat? (A) Bachmann bundle (B) AV node (C) SA node (D) bundle of His (E) Purkinje fiber
- Which part of the brain regulates vital functions like breathing and heart rate? (A) cerebrum (B) medulla oblongata (C) cerebellum (D) hippocampus (E) amygdala
- Humoral immune response is essential for combating pathogens. Which cells are responsible for producing antibodies? (A) T helper cells (B) natural killer cells (C) macrophages (D) plasma B cell (E) dendritic cells

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<p>16. After a high-carbohydrate meal, which hormone stimulates the utilization of glucose into the cell and lowers blood glucose? (A) insulin (B) glucagon (C) thyroxine (D) melatonin (E) serotonin</p> <p>17. What is the primary nitrogenous waste in mammals? (A) ammonia (B) urea (C) uric acid (D) nitrate (E) nitrogenous base</p> <p>18. Sponges are filter-feeders. Which structure enables this function? (A) Amoebocytes (B) Choanocytes (C) Spicules (D) Spongecoel</p> <p>19. Which statement about Echinodermata is incorrect? (A) Radial cleavage (B) Water vascular system (C) Bilateral larvae (D) Adult mouth develops from the blastopore of the embryo</p> <p>20. Which is a structure of cnidarians? (A) Choanocyte (B) Nematocyst (C) Choanoflagellate (D) Mesoderm (E) None of the above</p> <p>21. Which feature correctly matches the animal? (A) Mantle: annelid (B) Water vascular system: sponge (C) Skin respiration: reptile (D) Swim bladder: bony fish (E) Flame cells: tapeworm</p> <p>22. Which is not a characteristic of mammals? (A) Hair (B) Mammary glands (C) Middle ear (D) Nipple</p> <p>23. Which of the following organisms uses a lophophore for feeding? (A) Hydra (B) Sponge (C) Gastropod (D) Ectoproct</p> <p>24. Which is not a characteristic of all bony fish? (A) Swim bladder (B) Lateral line system (C) Flexible cartilage (D) Jaws</p> <p>25. What is the function of the notochord? (A) Circulation (B) Excretion (C) Neural transmission (D) Support</p> <p>26. DDT concentration is highest in dolphins due to which phenomenon? (A) Acid precipitation (B) Biological magnification (C) Environmental hormones (D) Global change (E) Global warming</p> <p>27. Which of the following describes a relationship where one species is harmed or inhibited while the other is unaffected? (A) Parasitism (B) Mutualism (C) Amensalism (D) Competition (E) Commensalism</p> <p>28. Energy left after plant use for herbivores is called: (A) Biogeochemical cycle (B) Ecological pyramid (C) Net primary productivity (D) Standing crop</p> <p>29. Total plant biomass in an ecosystem at a time is: (A) Biomass (B) Carrying capacity (C) Maximal sustainable yield (D) Standing crop</p> <p>30. In summer, temperate lakes develop: (A) Eutrophication (B) Hydrothermal vent (C) Overturn (D) Thermocline</p> <p>31. Which of the following is true about El Niño? (A) The Southern Oscillation Index is low (B) It occurs during the summer typhoon season (C) Heavy rainfall hits the western Pacific coasts (D) Sea surface temperatures decrease (E) Fishery yields rise in the eastern Pacific</p> <p>32. Which is not a K-selected trait? (A) Parental care (B) One-time reproduction (C) Long maturation (D) Large offspring size</p> <p>33. What is it called when plants begin colonizing barren land and form a community? (A) Primary succession (B) Secondary succession (C) Tertiary community (D) Climax community</p>			

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<p>34. Prop roots are the modified aerial adventitious roots of corn that _____. (A) enable the root system to obtain oxygen (B) enable the root system to anchor (C) wrap around other plants to support tall, top-heavy plants (D) support tall, top-heavy plants</p> <p>35. Carotenoids are often found in foods that are considered to have antioxidant properties in human nutrition. What related function do they have in plants? (A) They reflect orange light and enhance red light absorption by chlorophyll. (B) They protect against oxidative damage from excessive light energy. (C) They shield the sensitive chromosomes of the plant from harmful ultraviolet radiation. (D) They serve as accessory pigments to increase light absorption.</p> <p>36. Which of the following is a major trend in land plant evolution? (A) the trend toward a gametophyte-dominated life cycle (B) the trend toward a sporophyte-dominated life cycle (C) the trend toward larger gametophytes (D) the trend toward smaller size</p> <p>37. Which of the following frequently imposes a limit on cell size? (A) the number of mitochondria in the cytoplasm (B) the volume of the endomembrane system (C) ratios of surface area to volume (D) the absence of a nucleus</p> <p>38. A young farmer purchases some land in a relatively arid area and is interested in earning a reasonable profit for many years. Which of the following strategies would best allow the farmer to achieve such a goal? (A) establishing an extensive irrigation system (B) finding a way to sell all parts of crop plants (C) using plenty of the best fertilizers (D) selecting crops adapted to arid areas</p> <p>39. Which of the following types of cells are affected most by telomere shortening? (A) only animal cells (B) only prokaryotic cells (C) cells in prokaryotes and eukaryotes (D) only eukaryotic cells</p> <p>40. A principal problem with inserting an unmodified mammalian gene into a plasmid and then getting that gene expressed in bacteria is that _____. (A) bacteria cannot remove eukaryotic introns (B) bacteria translate only mRNAs that have multiple messages (C) prokaryotes use a different genetic code from that of eukaryotes (D) bacterial RNA polymerase cannot make RNA complementary to mammalian DNA</p> <p>41. Which of the following processes uses labeled probes to visualize the expression of genes in whole tissues and organisms? (A) DNA microarrays (B) <i>in situ</i> hybridization (C) RT-PCR (D) RNA interference</p> <p>42. Which structure or compartment is separate from the apoplastic route? (A) the cell wall of a mesophyll cell (B) the cell wall of a root hair (C) the lumen of a xylem vessel (D) the lumen of a sieve tube</p> <p>43. Under what conditions do photosynthesis and cellular respiration occur in plants? (A) Photosynthesis occurs only in the light, and cellular respiration occurs in both the dark and the light. (B) Photosynthesis and cellular respiration occur only in the light. (C) Photosynthesis occurs only in the light, and cellular respiration occurs only in the dark. (D) Photosynthesis and cellular respiration occur in both the dark and the light.</p> <p>44. Which of the following statements defines a <i>genome</i>? (A) the complete set of an organism's polypeptides (B) a karyotype (C) the complete set of a species' polypeptides (D) the complete set of an organism's genes and other DNA sequences</p> <p>45. Which of the following sex and generation combinations directly produces the pollen tube of angiosperms? (A) female gametophyte (B) male sporophyte (C) male gametophyte (D) female sporophyte</p>			

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<p>46. Biologists sometimes divide living organisms into two groups: autotrophs and heterotrophs. These two groups differ in _____. (A) their electron acceptors (B) the way that they generate ATP (C) their mode of inheritance (D) their sources of carbon</p> <p>47. Which of the following processes occurs in meiosis but not in mitosis? (A) synapsis of chromosomes (B) condensation of chromosomes (C) alignment of chromosomes at the equator (D) chromosome replication</p> <p>48. It became apparent to Watson and Crick after completion of their model that the DNA molecule could carry a vast amount of hereditary information. Which of the following characteristics of DNA is responsible for this? (A) phosphate-sugar backbones (B) side groups of nitrogenous bases (C) complementary pairing of bases (D) sequence of bases</p> <p>49. Which of the following observations about flagella is accurate and is consistent with the scientific conclusion that the flagella from archaea and bacteria evolved independently? (A) The protein structures in the flagella are different. (B) Both groups have flagella like those found in eukaryotes. (C) The flagella of the two groups differ in size. (D) The mechanisms of rotation are similar.</p> <p>50. Which domains of life are classified as prokaryotes? (A) Bacteria and Protista (B) Bacteria and Archaea (C) Archaea and Fungi (D) Bacteria and Eukarya</p>			