

臺灣綜合大學系統 106 學年度學士班轉學生聯合招生考試試題

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|------|-------|------|-------------|
| 科目名稱 | 普通生物學 | 類組代碼 | A04/C07/C08 |
|      |       | 科目碼  | A0401       |

※本項考試依簡章規定各考科均「不可以」使用計算機

本科試題共計 6 頁

單選題共 50 題，每題 2 分，答錯不倒扣。

1. A drug binds to the active site of the enzyme and it prevents substrate binding. This drug is a  
A) competitive activator B) allosteric inhibitor C) allosteric activator D) competitive inhibitor
2. The nucleolus in a cell nucleus is the site of  
A) chromosome replication B) uncoiling chromosomes C) ribosome assembly D) protein synthesis
3. What do we usually call the reactant in an enzyme-catalyzed reaction?  
A) substrate B) catalyst C) coenzyme D) product
4. During glycolysis, how many net ATP molecule(s) does a molecule of glucose can generate?  
A) 0 B) 2 C) 4 D) 8
5. What step in cellular respiration occurs in the cytoplasm of eukaryotic cells?  
A) Glycolysis B) ATP synthesis C) The Krebs cycle D) The electron transport chain
6. What step in plant photosynthesis occurs the splitting of water and the generation of oxygen?  
A) Photosystem I B) Photosystem II C) The Calvin Cycle D) The Krebs Cycle
7. What molecule is the electron donor for the light dependent reaction in plant photosynthesis?  
A) carbon dioxide B) oxygen C) RuBP D) water
8. Which type of plant can utilize the Calvin cycle?  
A) C<sub>3</sub> plants B) C<sub>4</sub> plants C) CAM plants D) C<sub>3</sub>, C<sub>4</sub>, and CAM plants
9. The cell surface receptors that can act only indirectly on plasma membrane-bound enzymes or ion channels are called as  
A) G protein-coupled receptors B) gated ion channels C) enzymatic receptors D) second messenger receptors
10. What enzyme phosphorylates MAP kinase?  
A) MAP B) MAP kinase C) MAP kinase kinase D) MAP phosphatase

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11. There are 24 sister chromatids in a normal somatic cell. How many chromosomes are there?  
A) 8 B) 12 C) 24 D) 48
12. Which structures demonstrate the sites of crossing over?  
A) chiasmata B) centromeres C) kinetochores D) spindle fibers
13. How many Barr bodies can be found in a diploid cell from a normal human female?  
A) 0 B) 1 C) 2 D) 4
14. During DNA replication, which enzyme removes the RNA primers and fills in the gap?  
A) DNA pol I B) DNA pol III C) DNA primase D) DNA ligase
15. If eukaryotic mRNA molecules contain non-coding sequences that can be removed before translation. These non-coding sequences are  
A) anticodons B) introns C) exons D) nucleosomes
16. Micro RNA (miRNA) can regulate gene expression by binding directly to  
A) mRNA to prevent transcription B) mRNA to prevent translation C) tRNA to prevent transcription D) tRNA to prevent translation
17. There are two distinct domains for specific transcription factors in eukaryotes and they are  
A) a DNA-binding domain and an operator domain B) a DNA-binding domain and an activation domain C) a DNA-binding domain and a repressor domain D) a DNA-binding domain and an enhancer domain
18. The most common DNA-binding motif is the  
A) non-helical zipper B) leucine zipper C) zinc finger D) helix-turn-helix
19. The enzyme dicer can chop dsRNA molecules into small pieces and they are  
A) mRNA and miRNA B) miRNA and siRNA C) siRNA and rRNA D) mRNA and siRNA
20. We calculate recombination frequency between genes to generate a  
A) genetic map B) physical map C) restriction map D) haplotype map
21. Which model organism we can find a complete cell lineage map?

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- A) *C. elegans* B) *Drosophila* C) mouse D) rice
22. Some flowering plants show disassortative mating by preventing self-pollination and it increases their tendency to mate with different phenotypes. What effect would disassortative mating make on a population in Hardy-Weinberg equilibrium?  
A) an increase in heterozygotes B) an increase in homozygotes C) a decrease in heterozygotes D) stay in Hardy-Weinberg equilibrium
23. Natural selection for a certain phenotype will affect the  
A) genotype of a population B) genotype of an individual C) allele frequency of a population D) allele frequency of an individual
24. The evolution of similar forms in different lineages if exposed to the same selective pressures. We call  
A) divergence B) convergence C) successive homologies D) descent
25. A monophyletic group is that  
A) all members share homoplastic traits B) not all descendants of the common ancestor are included C) all members of the group share a common ancestor that is included in the group D) the group does not contain the most recent common ancestor
26. If genes have been mutated by introducing stop codons or transposons disrupting within the coding sequence and they are no longer expressed. We call these genes as  
A) homologues B) orthologues C) paralogues D) pseudogenes
27. Synteny is  
A) the rearrangement of gene order due to inversions B) the constancy of chromosome numbers in related clades C) only observed in closely related clades D) the conservation of gene order along chromosomes
28. Viruses may cause cancer by  
A) disrupting a cancer-causing gene B) inserting cancer causing genes into the cell's genome C) triggering cell division through attachment to a cell surface receptor D) triggering the expression of cancer-causing genes present in the genome

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| <p>29. What is the strong evidence to suggest a protist is phagotrophic?<br/> A) an abundance of lysosomes B) locomotion using polar flagella C) silicon dioxide cell walls<br/> D) benthic lifestyle</p> <p>30. Which nutrient would mycorrhizae be especially effective in helping plant roots uptake?<br/> A) nitrogen B) phosphorus C) potassium D) magnesium</p> <p>31. Why do many seeds contain oils form in a significant part of the nutritional reserves?<br/> A) Oils help keep the embryo hydrated, allowing the seed to survive in dry habitats B) The oils reduce the density of the seed and allow for water dispersal C) Hormones diffuse more quickly through oils D) Oils store twice as much energy as an equivalent mass of starch</p> <p>32. Erythropoietin stimulates red blood cell production in the bone marrow. What nonendocrine organ can produce erythropoietin?<br/> A) kidneys B) heart C) liver D) pituitary</p> <p>33. The myofibrils consist of both thin and thick filaments. The thick filaments are composed of<br/> A) actin B) troponin C) myosin D) tropomyosin</p> <p>34. If a man has not eaten for three days, what molecule will be in high level?<br/> A) insulin B) glucagon C) glycogen D) blood glucose</p> <p>35. If uric acid accumulates in high level in joints of humans, we refer this condition as<br/> A) atherosclerosis B) hypertension C) diabetes insipidus D) gout</p> <p>36. In vertebrates, most of the fluid that ultimately exits the body as urine first enters the nephron tubules by the process of<br/> A) secretion B) excretion C) absorption D) filtration</p> <p>37. What cells are the precursors of macrophages?<br/> A) B cells B) monocytes C) plasma cells D) T cells</p> <p>38. Which cells produce antibodies?<br/> A) B cells B) monocytes C) plasma cells D) macrophages</p> |       |            |             |

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39. What molecule would prompt monthly preparation of uterus for pregnancy?  
A) progesterone B) testosterone C) prolactin D) estradiol
40. What molecule stimulates ovulation?  
A) progesterone B) FSH, or follicle-stimulating hormone C) LH, or luteinizing hormone  
D) estradiol
41. What structure is formed from both fetal and maternal tissue?  
A) chorion B) amnion C) yolk sac D) placenta
42. What factor will make the strongest influence on the cleavage pattern of an embryo?  
A) incubation temperature B) amount of yolk C) maturity of cytoplasm D) viscosity of albumin
43. The degree of parental investment required often results in the non-random mating behavior and we call it as  
A) fidelity B) preferability C) mate choice D) allopatry
44. Some plants can produce chemicals that play the significant role in protecting plants from being eaten by herbivores or predators. We call these chemicals as  
A) primary compounds B) secondary compounds C) detergents D) drugs
45. The way that a species fits in its environment can be called as  
A) resource partitioning B) its habitat C) its niche D) intraspecific competition.
46. Species competition shapes ecological communities because there are usually limited in  
A) species B) resources C) interactions D) space
47. Restriction enzymes are what type of enzymes?  
A) proteases B) lipases C) endonucleases D) exonucleases
48. Which step of PCR requires a heat stable polymerase?  
A) synthesis B) annealing of primers C) denaturation D) digestion
49. A process that communities evolve to have greater biomass and species richness is called  
A) succession B) adaptive modifications C) sympatric interactions D) symbiotic relationships

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50. Where is the "respiratory control center" located?

- A) larynx B) cerebellum C) spinal cord D) medulla oblongata