

高雄醫學大學 115 學年度學生轉系考試【普通生物學】試題

說明：

- 一、「選擇題」請以答案卡劃卡作答，限用黑色2B軟心鉛筆劃記於答案卡上，劃線要粗黑、清晰，不可出格，答案卡不得折損，修正作答請以軟性橡皮擦擦拭乾淨，且不得使用修正液（帶）修正，未遵照正確作答方法而致無法判讀者，考生自行負責，不得提出異議。
- 二、考生應在答案卡上規定範圍內作答，且不得書寫任何與答案無關之文字、符號，違者該科不予計分。
- 三、答案卡每人各一張，不得要求增補；試題與答案卡必須繳回，不得攜出試場。

選擇題 50 題（每題 2 分，共 100 分）

1. The scientists who demonstrated that DNA replication is semiconservative.
(A) Hershey and Chase (B) Watson and Crick
(C) Meselson and Stahl (D) Avery and Chargaff
2. Which of the following histones is NOT a component of nucleosome?
(A) H1 (B) H2B (C) H3 (D) H4
3. Which of the following items does NOT belong to innate immunity?
(A) complement (B) interferon
(C) natural killer cell (D) antibody
4. Different species of lizards live in close proximity and feed on insects and arthropods. Each species has preferred perch and distinct niche. This phenomenon is
(A) resource partitioning (B) competitive exclusion
(C) sympatric competition (D) allopatric competition
5. What is the function of 5' cap in the eukaryotic mRNA?
(A) facilitate the export of mRNA from nucleus
(B) mediate the ribosome attachment to mRNA
(C) prevent from hydrolytic enzyme digestion
(D) all of the above
6. Which of the following cells are phagocytic cells?
(A) lymphocyte and natural killer cell (B) monocyte and eosinophil
(C) neutrophil and basophil (D) basophil and monocyte
7. Which of the following statements is True for prokaryotic and eukaryotic DNA replication?
(A) only a single origin of replication is in prokaryotic chromosome, whereas multiple origins of replication are in an eukaryotic cell.
(B) both prokaryotic and eukaryotic DNA replications are bidirectional.
(C) DNA polymerases responsible for DNA replication are different in prokaryotic and eukaryotic cells.
(D) all of the above.
8. This fungus is also known as club fungus, this fungus is
(A) ascomycetes (B) basidiomycetes (C) chytrids (D) mucoromycetes

高雄醫學大學 115 學年度學生轉系考試【普通生物學】試題

9. A new organism has been found that is autotrophic and has a cell wall consisting of silica. This organism can be
(A) radiolarian or forams (B) diatom or forams
(C) dinoflagellate or forams (D) radiolarian or diatom
10. What kind of animal excretes their nitrogenous waste entirely as ammonia?
(A) bird (B) fish (C) snail (D) insect
11. Which of the following structures present in the embryos of higher plants develops into the primary root of the seedling?
(A) radicle (B) hypocotyl (C) cotyledon (D) epicotyl
12. What is the plant hormone that is produced in roots and promotes the attraction of mycorrhizal fungi to the root?
(A) brassinosteroids (B) jasmonates
(C) strigolactones (D) abscisic acid
13. Which pairs of structures have the same function and purpose of adherence in bacteria?
(A) slime layer, cell wall (B) capsule, fimbriae
(C) flagella, fimbriae (D) capsule, cell wall
14. "chicken pox" disease is caused by a virus that is
(A) the virus also causes shingles (B) an animal virus
(C) in the family of cowpox and smallpox (D) all of the above
15. Which of the following pigments is directly involved in light absorption during photosynthesis?
(A) chlorophyll a (B) chlorophyll b (C) chlorophyll c (D) carotenoid
16. Which of following members of the SAR supergroup is CORRECTLY paired with its clade?
(A) Stramenopiles-brown algae (B) Alveolates-Plasmodium
(C) Alveolates-trichomonas (D) Stramenopiles-green algae
17. From the examples of ground squirrels, honeybees and mole rats, those animals have a common behavior.
(A) foraging behavior (B) learning behavior
(C) altruistic behavior (D) cognition behavior
18. Which Toll-like receptors (TLRs) is specifically responsible for recognizing double-stranded RNA (dsRNA), a molecular pattern characteristic of certain viruses?
(A) TLR4 (B) TLR5 (C) TLR3 (D) TLR9
19. Comparing the circulatory systems of vertebrates, which statement regarding "double circulation" is CORRECT?
(A) In amphibians, oxygen-poor blood flows through the pulmonary circuit only.
(B) In reptiles, a complete septum always divides the ventricle into two separate chambers.
(C) Double circulation maintains lower blood pressure in the organs compared to single circulation.
(D) In amphibians, the pulmocutaneous circuit allows for gas exchange through both the lungs and the skin.
20. Which of the following describes the correct sequence of electrical impulses in the mammalian heart?
(A) AV node → SA node → Purkinje fibers → Bundle branches.
(B) SA node → AV node → Bundle branches → Purkinje fibers.
(C) AV node → Bundle branches → AV node → Purkinje fibers.
(D) SA node → AV node → Purkinje fibers → Bundle branches.

高雄醫學大學 115 學年度學生轉系考試【普通生物學】試題

21. How do diving mammals adapt to stay underwater for extended periods without breathing?
- (A) They have a low blood-to-body volume ratio to conserve energy.
 - (B) They store massive amounts of O₂ in their lungs before diving.
 - (C) They utilize myoglobin proteins to store oxygen in their muscles and route blood only to vital tissues.
 - (D) They increase their heart rate and metabolic rate to process O₂ faster.
22. Which part of the digestive tract secretes appetite suppressant to counter appetite stimulant?
- (A) small intestine
 - (B) pancreas
 - (C) stomach
 - (D) liver
23. Which of the following statements about the motility of Paramecium is True?
- (A) Paramecium has no structure for motility
 - (B) Paramecium employs a pseudopod
 - (C) Paramecium employs a single flagellum
 - (D) Paramecium uses cilia
24. If a microRNA (miRNA) molecule forms a perfect complementary match with a target mRNA, what is the most likely outcome?
- (A) The mRNA will be translated slowly.
 - (B) The mRNA will be exported to the cytoplasm.
 - (C) The mRNA will be degraded.
 - (D) The mRNA translation will be blocked.
25. Which part of the digestive tract secretes bicarbonate to neutralize chyme?
- (A) small intestine
 - (B) pancreas
 - (C) stomach
 - (D) liver
26. Which of the following conditions is the monosomy in humans, resulting in sterile females with an XO genotype?
- (A) Klinefelter syndrome
 - (B) Down syndrome
 - (C) Turner syndrome
 - (D) Kawasaki disease
27. In an animal, coat color is determined by two genes. One gene dictates the pigment color, while another gene determines whether the pigment is deposited in the hair. This interaction is known as
- (A) Polygenic inheritance
 - (B) Incomplete dominance
 - (C) Pleiotropy
 - (D) Epistasis
28. How does the mammalian cochlea distinguish different pitches of sound?
- (A) By varying the volume of fluid in the vestibular canal.
 - (B) By the speed at which the three middle ear bones vibrate.
 - (C) Because different regions of the basilar membrane are tuned to particular vibration frequencies.
 - (D) By the number of hair cell receptors that are hyperpolarized simultaneously.
29. What mechanism allows a single eukaryotic gene to produce several different polypeptide chains?
- (A) Promoter methylation of different exons.
 - (B) Use of multiple different RNA polymerases.
 - (C) Use of different transcriptional factors.
 - (D) Alternative RNA splicing.
30. In eukaryotic cells, distal control elements that can be located far upstream or downstream of a gene are called _____.
- (A) promoters
 - (B) enhancers
 - (C) transcription factors
 - (D) TATA boxes

高雄醫學大學 115 學年度學生轉系考試【普通生物學】試題

31. In the *trp* operon of *E. coli*, what is the specific role of tryptophan in the negative regulation of gene expression?
- (A) It acts as an inducer that inactivates the repressor.
 - (B) It binds to the operator to block RNA polymerase directly.
 - (C) It functions as a corepressor that activates the *trp* repressor.
 - (D) It increases the level of cyclic AMP to stimulate the promoter.
32. In the hormonal control of the male reproductive system, what is the specific function of inhibin?
- (A) Inhibin provides negative feedback to the anterior pituitary to reduce FSH secretion.
 - (B) Inhibin acts on the hypothalamus to increase the secretion of GnRH.
 - (C) Inhibin triggers the thickening of the endometrium for potential implantation.
 - (D) Inhibin stimulates the Leydig cells to produce more testosterone.
33. Which of the following is a key difference between spermatogenesis and oogenesis in humans?
- (A) Spermatogenesis involves only mitosis, while oogenesis involves only meiosis.
 - (B) Spermatogenesis results in four functional gametes from one precursor cell, whereas oogenesis produces only one functional egg.
 - (C) Oogenesis is a continuous process that begins at adolescence and producing persistently.
 - (D) Primary oocytes complete meiosis II before birth.
34. Marine organisms with porous shells made of organic material hardened by calcium carbonate.
- (A) foraminiferan (B) opisthokont (C) unikons (D) cercozoan
35. The nitrogen-fixing activity of cyanobacteria takes place in
- (A) chloroplast (B) thylakoid (C) cell envelope (D) heterocyte
36. What is the difference between the cell walls of Bacteria and Archaea?
- (A) Archaea are without cell walls.
 - (B) Bacterial cell walls contain peptidoglycan, but cell walls of Archaea lack peptidoglycan.
 - (C) Archaea have simpler walls, while bacteria have a cell wall and an outer membrane.
 - (D) Archaea have complex cell walls, while bacteria lack peptidoglycan.
37. Which of the following statements best describes CRISPR?
- (A) CRISPR is a RNA sequence that complements the target DNA.
 - (B) CRISPR contains nuclease to destroy target DNA.
 - (C) CRISPR is present in archaea and bacteria.
 - (D) CRISPR is only existed in bacteria.
38. Which of the following hormones stimulates the release of bicarbonate to neutralize chyme?
- (A) cholecystokinin (B) gastrin (C) secretin (D) ghrelin
39. Which one of the following structures has the most similar function of capsule?
- (A) fimbriae (B) slime layer (C) outer membrane (D) cell wall
40. In which of the stages of viral life cycle do enveloped viruses usually acquire their envelopes?
- (A) release (B) assembly (C) maturation (D) replication
41. Which of the following interacts with Cas protein to target invading phage DNA?
- (A) CRISPR nuclease (B) CRISPR protein
 - (C) CRISPR DNA (D) CRISPR RNA

高雄醫學大學 115 學年度學生轉系考試【普通生物學】試題

42. What is prion?
(A) A small genetic element that causes animal degenerative disease.
(B) Complex animal viruses with a double-stranded DNA genome.
(C) Slow-acting infectious protein that relates to Parkinson's disease.
(D) An emerging virus that suddenly appears and has a great impact.
43. F plasmid is incorporated into chromosome after conjugation. The bacterial cell is
(A) Hfr cell (B) F(+) cell (C) F(-) cell (D) F factor cell
44. Transduction of bacteria is mediated by
(A) sex pilus (B) plasmid (C) bacteriophage (D) conjugation
45. Euglena belongs to Excavates and is
(A) prokaryotic (B) autotrophic (C) heterotrophic (D) mixotrophic
46. Gram's stain is for the staining of bacteria
(A) cell wall (B) cell membrane (C) nucleus (D) outer membrane
47. Which of the following about Gram-positive and Gram-negative bacteria is True?
(A) Gram-negative bacteria have more peptidoglycan in their cell walls.
(B) Gram-positive bacteria have fimbriae but Gram-negative bacteria do not.
(C) certain bacteria are not Gram-positive or Gram-negative.
(D) endotoxin exists in Gram-positive bacteria but not Gram-negative bacteria
48. Which of the following statements about the lytic cycle of phage is True?
(A) phage replicates without destroying the host cell during lysogeny
(B) a large number of phages are released
(C) a bacterial cell contains phage DNA
(D) phage genome integrates into the chromosome of bacteria
49. Which of the following characteristics is referred to HIV?
(A) 2 copies of RNA molecules (B) enveloped virus
(C) reverse transcription (D) all of the above
50. Which clade of Archaea is composed of most extreme thermophiles?
(A) Lokiarchaeota (B) Thaumarchaeota (C) Euryarchaeota (D) Crenarchaeota