

國立中興大學 100 學年度碩士在職專班招生考試試題

科目：生物學

系所：生命科學院

選擇題：每題兩分，共五十題

- () 下列何者最能顯示所有生物個體間的共通性(unity)？
(A) matching DNA nucleotide sequences
(B) descent with modification
(C) the structure and function of DNA
(D) natural selection
- () 多數細胞無法利用熱能來進行工作，原因是：
(A) heat is not a form of energy
(B) temperature is usually uniform throughout a cell
(C) heat can never be used to do work
(D) heat denatures enzymes
- () 分解反應(catabolism)時，大多數的 CO₂ 在何階段被釋放？
(A) glycolysis
(B) the citric acid cycle
(C) electron transport
(D) oxidative phosphorylation
- () 下列何者在卡爾文循環(Calvin cycle)中不會發生？
(A) carbon fixation
(B) release of oxygen
(C) regeneration of the CO₂ acceptor
(D) consumption of ATP
- () 含有 22 個常染色體(autosomes) 和一個 Y 染色體的人類細胞是
(A) a sperm
(B) an egg
(C) a zygote
(D) a somatic cell of a male
- () 在核小體(nucleosome) 中，DNA 是纏繞在
(A) polymerase molecules.
(B) histones.
(C) a thymine dimer.
(D) ribosomes.
- () 下列有關密碼子(codon)的敘述何者是錯誤的？
(A) It consists of three nucleotides.
(B) It may code for the same amino acid as another codon.
(C) It never codes for more than one amino acid.
(D) It extends from one end of a tRNA molecule..

8. () 植物的分生組織(meristems)，其唯一的機能是
- (A) divide.
 - (B) photosynthesize.
 - (C) absorb ions.
 - (D) produce flowers.
9. () 側邊分生組織(lateral meristems)所產生的細胞是
- (A) dermal and ground tissue.
 - (B) pith.
 - (C) secondary tissues.
 - (D) shoots and roots.
10. () 控制花部發育的 A gene 產生突變時，花的哪一個部位受到影響？
- (A) sepals.
 - (B) petals
 - (C) stamens.
 - (D) carpels.
11. () 假如 $\Psi_p=0.3 \text{ MPa}$ ，而 $\Psi_s=-0.5 \text{ MPa}$ ，試問水份潛勢(Ψ) 為
- (A) + 0.8 MPa
 - (B) - 0.8 MPa
 - (C) - 0.2 MPa
 - (D) + 0.2MPa
12. () 下列何者有最低的水分潛勢(water potential)？
- (A) soil
 - (B) root xylem
 - (C) stem
 - (D) leaf air spaces
13. () 蔗糖的韌皮部輸送是從供源到積貯(source to sink)，下列何者不屬於積貯組織？
- (A) growing leaf
 - (B) storage root
 - (C) maturing leaf
 - (D) shoot tip
14. () 固氮作用(nitrogen fixation) 的過程為
- (A) recycles nitrogen compounds from dead and decaying materials.
 - (B) converts ammonia to nitrate.
 - (C) releases nitrate from the rock substrate.
 - (D) converts nitrogen gas into ammonia.

15. () 植物的根和真菌間的相互關係(mutualistic association) 稱之為
- (A) nitrogen fixation
 - (B) Rhizobium infection
 - (C) mycorrhizae
 - (D) parasitism
16. () 開花植物的花粉(pollen) 是由下列何者釋放出來的？
- (A) anther.
 - (B) carpel.
 - (C) filament.
 - (D) pollen tube.
17. () 有關果實老化和成熟(aging and ripening of fruit)的植物荷爾蒙是
- (A) auxin.
 - (B) ethylene.
 - (C) abscisic acid.
 - (D) gibberellin.
18. () 多數植物夜間關閉氣孔，午夜時欲讓氣孔打開，下列那一種顏色的光最有效？
- (A) red
 - (B) far-red
 - (C) blue
 - (D) far-red followed by blue
19. () 植物開花現象會受到夜間強光照射的抑制，此種植物稱之為
- (A) long-day plants.
 - (B) short-day plants.
 - (C) short-night plants.
 - (D) day-neutral plants.
20. () 一病原真菌侵入植物體時，此被感染的植物將產生何種物質來對抗？
- (A) statolith
 - (B) phytochrome
 - (C) antisense RNA
 - (D) phytoalexins
21. () 海平面的大氣壓力為 760 mm Hg，請問氧氣(21%)的分壓為？
- (A) 20 mm Hg
 - (B) 76 mm Hg
 - (C) 160 mm Hg
 - (D) 508 mm Hg
22. () 影響水生植物初級生長(primary productivity) 最重要的限制因子是？

- (A) increased pressure with depth
 - (B) light and nutrient availability
 - (C) disease
 - (D) temperature
23. () 過去 150 年來，地球大氣中 CO₂ 含量增加的最主要原因是
- (A) the burning of large amounts of wood and fossil fuels.
 - (B) additional respiration by the rapidly growing human population.
 - (C) increased worldwide primary production.
 - (D) increased worldwide standing crop.
24. () 估計地球上現存的物種(extant species on Earth)有幾種？
- (A) 50,000 to 150,000
 - (B) 500,000 to 1,000,000
 - (C) 10,000,000 to 200,000,000
 - (D) 5 billion-10billion
25. () 造成生物多樣性危機的主要原因是
- (A) pollution.
 - (B) global warming.
 - (C) introduced species.
 - (D) overpopulation of humans.
26. () 依據二名法(binomial scientific name)下列何者為鯔魚的正確學名
- (A) Mugil Cephalus Linnaeus, 1758
 - (B) Mugil cephalus *Linnaeus*, 1758
 - (C) *Mugil Cephalus Linnaeus*, 1758
 - (D) *Mugil cephalus* Linnaeus, 1758
27. () 現生脊椎動物那一類種類最多
- (A) Ray-finned fishes
 - (B) Mammals.
 - (C) Non-bird reptiles
 - (D) Amphibians
28. () 以分子技術來做親子鑑定時使用那種遺傳標誌最適合
- (A) Nuclear 28S ribosomal DNA sequences.
 - (B) Microsatellite DNA sequences.
 - (C) Mitochondrial cytochrome b (Cyt *b*) DNA sequences.
 - (D) Insulin-like growth factor amino acid sequences.
29. () 若水牛的基因體中 cytosine 占 32%則 guanine 約占
- (A) 6%
 - (B) 18%

- (C) 32%
- (D) 68%

- 30 () 蛋白質解碼基因的 DNA 序列中發生下列何者變化最有可能破壞蛋白質原有的功能:
- (A) A base pair deletion.
 - (B) A codon substitution.
 - (C) A point mutation.
 - (D) A synonymous substitution.
31. () HIV 病毒的 DNA 演化比人類 DNA 快是因為
- (A) The lack of proofreading by the enzyme that converts HIV's RNA into a DNA genome.
 - (B) Its gp41 and protease attach to CD4 of human immune system cell.
 - (C) The relatively small number of genes in the genome.
 - (D) The genome's ability to insert itself into the genome of the host.
- 32.() 進行 PCR (polymerase chain reaction) 不需下列那種反應物 :
- (A) *Taq* DNA polymerase
 - (B) Restriction enzyme
 - (C) Deoxyribonucleotide triphosphate (dNTP)
 - (D) Primers
- 33.() 測量湖水的 pH 值為 4 則湖水中氫離子(hydrogen ion)濃度為
- (A) 4 M
 - (B) 10^{-4} M
 - (C) 0.04 M
 - (D) 10,000 M
34. () Resource partitioning 最有可能發生在那種情況
- (A) Sympatric populations of predator and its prey.
 - (B) Sympatric populations of species with similar ecological niches.
 - (C) Sympatric populations of flowering plant and its specialized insect pollinator.
 - (D) Allopatric populations of species with similar ecological niches.
- 35.() Sexual dimorphism 通常是下由甚麼造成的
- (A) Stabilizing selection.
 - (B) Intrasexual selection.
 - (C) Intersexual selection
 - (D) Disruptive selection
36. () 鰻魚由海水洄游到淡水河川中要行滲透壓調節，血液中甚麼荷爾蒙濃度會上升
- (A) Cortisol
 - (B) Oxytocin

- (C) Prolactin
- (D) Serotonin

37. () 甚麼是 prion?

- (A) misfolded brain protein.
- (B) A small interfering RNA (siRNA).
- (C) A RNA virus that invade bacteria.
- (D) A mobile segment of DNA.

38. () 那種下視丘荷爾蒙刺激 FSH 的分泌

- (A) luteinizing hormone (LH)
- (B) serotonin
- (C) human chorionic gonadotropin
- (D) gonadotropin-releasing hormone (GnRH)

39. () 若分佈於臺灣河川的羅漢魚的某基因只有 a 及 A，二個對偶基因(alleles)。若 A 的頻率(frequency)為 0.2 則族群雜合子(heterozygote)的理論頻率值為

- (A) 80%
- (B) 40%
- (C) 32%
- (D) 16%

40. () 承上題，羅漢魚的 heterozygosity 為何?

- (A) 0.28
- (B) 0.32
- (C) 0.68
- (D) 0.84

41. () Hamilton's rule 是描述

- (A) Kin selection
- (B) Balance selection
- (C) Sexual selection
- (D) Disruptive selection

42. () 你與你的表妹的 coefficient of relatedness (r) 為

- (A) 1/2
- (B) 1/4
- (C) 1/8
- (D) 1/16

43. () 不同種的達爾文雀(Darwin's finch)牠們鳥喙(beak)長短不同是主要因為甚麼蛋白質在胚胎時期表現不同造成的?

- (A) Calmodulin
- (B) Oxytocin.

- (C) Autocrine motility factor receptor
- (D) Melatonin

44. () 豬流感 (swine flu)H1N1 屬於那一類流感?
- (A) Influenza A
 - (B) Influenza B
 - (C) Influenza C
 - (D) Influenza D
45. () 下列那種脊椎動物不是 amniotes
- (A) Amphibians
 - (B) Non-bird reptiles
 - (C) Egg-laying mammals
 - (D) Placental mammals
46. () DNA 被甲基化 (methylated DNA)可能的作用為
- (A) be replicating nearly continuously.
 - (B) be unwinding in preparation for protein synthesis.
 - (C) have turned off or slowed down the process of transcription.
 - (D) induce protein synthesis by not allowing repressor to bind to it.
47. () 下列那細胞負責啟動 secondary immune response?
- (A) Memory cells
 - (B) Macrophages
 - (C) T cells
 - (D) B cells
48. () 下列那種非生物因子對植物的新陳代謝影響最大
- (A) Water
 - (B) Wind
 - (C) Soil and rock
 - (D) Temperature
49. () 植物性浮游生物(phytoplankton)最常被發現在那個區域
- (A) Photic
 - (B) Benthic
 - (C) Abyssal
 - (D) Oligotrophic
50. () 天擇(Natural selection)與下列何者意義最相似
- (A) Gene flow
 - (B) Mutation
 - (C) Differential reproductive success
 - (D) Non-random mating