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本科目試題共 16 頁

單選題：請從 ABCDE 選項中選出一個最正確的答案 答錯不倒扣。第 1-15 題 每題 1 分；第 16-45 題 每題 2 分；第 46-70 題 每題 3 分。

1. Glutamic acid contains two carboxylic acid groups ($pK_a = 2.2$ and 4.2) and an amine group ($pK_a = 9.7$). What is the pI for glutamic acid? What is glutamic acid's net charge in a solution with $pH = 7.4$?
 - A) 3.2, negative charge
 - B) 6.0, negative charge
 - C) 6.5, no charge
 - D) 7.0, positive charge
 - E) none of the above
2. Which is the description about an allosteric interaction between a ligand and a protein?
 - A) binding of a molecule to a binding site affects binding of additional molecules to the same site
 - B) binding of a molecule to a binding site affects binding properties of another site on the protein
 - C) binding of the ligand to the protein is covalent
 - D) multiple molecules of the same ligand can bind to the same binding site
 - E) two different ligands can bind to the same binding site
3. Which of the following is an irreversible form of inhibition?
 - A) suicide inhibitor
 - B) competitive inhibitor
 - C) noncompetitive inhibitor
 - D) uncompetitive inhibitor
 - E) none of the above
4. Amphetamine and mescaline cause hallucinogenic effect by stimulating the central nervous system. They are the agonist of
 - A) acetylcholine
 - B) GABA
 - C) NMDA
 - D) glutamate
 - E) dopamine
5. Steroid hormones, such as glucocorticoids, affect their action by:
 - A) binding to a plasma membrane receptor and then activating the kinases cascade.
 - B) binding the plasma membrane receptor, which stimulates the receptor to enter the cell.
 - C) entering into the cell and affecting the production of secondary messengers.
 - D) entering into the cell and then acting as transcription regulators.
 - E) none of the above.

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6. Which of the following, when paired with its complementary strand, would have the highest T_m ?
- A) AAGTTCCAGTAA
 - B) ATTACGAGCTAT
 - C) GCAGCAGCATTT
 - D) GCGAAATCAATA
 - E) TGACCTTGAATT
7. Diphtheria toxin kills cells by inactivating EF-2 proteins. Which process is inhibited by the diphtheria toxin?
- A) Movement of DNA polymerase on the template DNA
 - B) Promoter clearance of the RNAPII
 - C) Movement of RNAPII on the template DNA
 - D) Ribosome assembling on the mRNA
 - E) Ribosome translocation
8. Glycerol generated from hydrolysis of triacylglycerols enters which one of the following intermediates in glycolysis?
- A) glyceraldehyde-3-phosphate.
 - B) 2-phosphoglycerate.
 - C) 3-phosphoglycerate.
 - D) dihydroxyacetone phosphate.
 - E) 1,3-bisphosphoglycerate.
9. The common product produced by Complex I and Complex II in the electron transport chain is:
- A) NAD^+ .
 - B) FAD.
 - C) reduced O_2 .
 - D) reduced cyt c.
 - E) reduced coenzyme Q.
10. Which one of the following factors is NOT an antioxidant to cope with oxidative stress?
- A) catalase.
 - B) uric acid.
 - C) vitamin B6.
 - D) vitamin C.
 - E) SOD.
11. The coenzymes used by acetyl-CoA carboxylase is/are:
- A) biotin.
 - B) pyridoxal phosphate and TPP.
 - C) folic acid and TPP.
 - D) NADH.
 - E) FAD.

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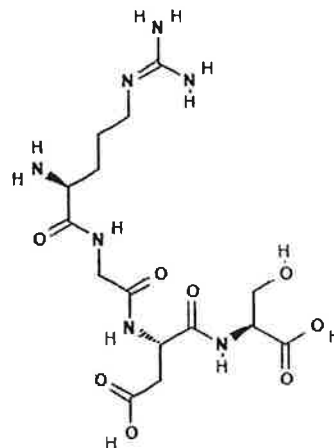
12. How are glutamic acid, arginine, and proline related in the process of amino acid biosynthesis?
- A) All are derived from acetyl CoA.
 - B) All are derivatives of α -KG.
 - C) All are derivatives of pyruvate.
 - D) All are derived from aspartate.
 - E) All are derivatives of 3-phosphoglycerate.
13. Which one of the following is NOT the substrate of carbamoyl phosphate synthetase II (CPS-II)?
- A) ATP.
 - B) H_2O .
 - C) HCO_3^- .
 - D) glutamine.
 - E) NH_4^+ .
14. What is the coenzyme responsible for the addition of two single carbon in purine biosynthesis?
- A) biotin.
 - B) SAM.
 - C) THF.
 - D) TPP.
 - E) none of the above.
15. During the fasting or starvation, the brain will
- A) convert endogenous fatty acids into β -hydroxybutyrate.
 - B) utilize β -hydroxybutyrate from the blood stream.
 - C) utilize its glycogen stores as a first responding source of fuel.
 - D) utilize amino acids for fuel from degradation of brain protein.
 - E) all of the above.
16. The pH of a blood sample is 7.4, while gastric juice is pH 1.4. Which of the following is *true*?
- 1) the $[\text{H}^+]$ in the blood sample is higher than in the gastric juice
 - 2) the difference of $[\text{H}^+]$ between the gastric juice and the blood sample is one million times
 - 3) the $[\text{H}^+]$ in a blood sample is lower than in the gastric juice
 - 4) the difference of $[\text{H}^+]$ between the gastric juice and the blood sample is 5.29 times
 - 5) the difference of $[\text{H}^+]$ between the gastric juice and the blood sample is 6000 times
- A) 1, 4
 - B) 3, 5
 - C) 2, 3
 - D) 1, 2
 - E) 3, 4

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17. What is the amino acid sequence of the following peptide starting from the N-terminal end?

- A) KDS
- B) RDT
- C) SDGR
- D) RGDS
- E) KGDS



18. Which of the following type of mutations is correctly defined?

- A) silent: change of a single base in the non-coding region of a gene
- B) missense: substitution of a single base results in a premature stop codon
- C) nonsense: substitution of a single base results in a complete change of amino acid sequence
- D) frameshift: deletion of a single base results in a single amino acid change
- E) none of the above

19. An enzyme-catalyzed reaction was carried out with the substrate concentration initially a thousand times greater than the K_m for that substrate. After 12 minutes, 1% of the substrate had been converted to product, and the amount of product formed in the reaction mixture was $20 \mu\text{mol}$. If, in a separate experiment, 30 % as much enzyme and twice as much substrate had been combined, how long would it take for the same amount of product to be formed?

- A) 6 min
- B) 12 min
- C) 40 min
- D) 18 min
- E) 4 min

20. About DNA replication in eukaryotic cells, which of the following statement is correct?

- 1) There are multiple replication origins.
- 2) Two strands of the DNA are replicated independently
- 3) DNA could only be synthesized in a 5' to 3' direction
- 4) Semi-conservative replication describes that two DNA copies in diploid cells are replicated separately.
- 5) Misincorporation of ribonucleotides during replication is possible.

- A) 1, 3, 5
- B) 2, 3, 4
- C) 1, 2, 3
- D) 1, 3
- E) All of the above

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21. Post-translational modifications are critical for the regulation of biological processes. Which of the followings are the examples of post-translational modifications of proteins?

- 1) activation of pro-caspase 3 to caspase 3
- 2) converting PIP2 to PIP3 by PI3 kinase
- 3) activation of protein kinase A by cAMP
- 4) activating NF- κ b through I κ b kinase
- 5) epigenetic regulation by histone codes

- A) 1, 3, 4, 5
- B) 1, 2, 4, 5
- C) 1, 4, 5
- D) 2, 3, 4
- E) All of the above

22. The Crispr/Cas9 is the approach using DNA damage and repair to modify the genomic DNA. Select the type of DNA damage and the type of repair mechanism involved in this approach.

1) single-strand breakage, 2) double-strand breakage, 3) DNA adduct, 4) inter-strand crosslinking, 5) gap-filling, 6) homologous recombination, 7) nucleotide excision repair, 8) base excision repair, 9) non-homologous end joining

- A) 1, 6
- B) 2, 5
- C) 3, 7
- D) 4, 9
- E) None of the above

23. Which of the following is known to be involved in transcription initiation by eukaryotic RNA polymerase II?

- 1) DNA helicase activity
- 2) DNA polymerase activity
- 3) Formation of an open complex
- 4) Protein binding to specific DNA sequences
- 5) Protein phosphorylation

- A) 1, 2, 3, 4
- B) 2, 3, 4, 5
- C) 1, 3, 4
- D) 1, 3, 4, 5
- E) All of the above

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24. In transforming the Michaelis-Menten equation into a straight-line equation, $y = mx + b$, the Lineweaver-Burk double reciprocal plot, which of the following is a true representation?
- 1) slope = K_m/V_{max}
 - 2) y-intercept is $1/V_{max}$
 - 3) $x = [S]$
 - 4) $y = 1/V$
 - 5) x-intercept is $1/K_m$
- A) 1, 2, 3
B) 1, 2, 4
C) 2, 3, 5
D) 3, 4, 5
E) All of the above
25. Transcription initiation requires the formation of pre-initiation complex (PIC). Which of followings are NOT required for the formation of PIC on the TATA box? 1) enhancer, 2) TAF, 3) RNAPII, 4) TBP, 5) TFIIF, 6) TFIIC
- A) 1, 2, 5
B) 1, 6
C) 4, 5
D) 1, 3, 6
E) All of the above are required
26. Which of the following antibiotics function by interfering with the translational process?
1) Chloramphenicol, 2) Vancomycin, 3) Penicillin, 4) Puromycin, 5) Streptomycin
- A) 1, 4, 5
B) 2, 4, 5
C) 1, 2, 3
D) 2, 3, 4
E) All of the above
27. Which of the following is true of the lac operon?
- 1) It is negatively controlled via the lac repressor
 - 2) Lactose is an allosteric regulator of lac repressor
 - 3) Lactose represses the lac operon
 - 4) It is positively controlled via cAMP activator protein (CAP)
 - 5) Glucose has no effect on the regulation of lac operon
- A) 1, 3, 4
B) 1, 2, 4
C) 1, 3, 5
D) 1, 2, 3
E) All of the above

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28. Which of the following is NOT an example of epigenetic regulation?

- 1) X chromosome inactivation
- 2) Genomic imprinting
- 3) Somatic recombination in B cells
- 4) RNA interference
- 5) chromatin remodeling

- A) 1, 5
- B) 2, 4
- C) 4
- D) 3, 4
- E) All of the above are the examples of epigenetic regulation

29. Which one of the following descriptions about the electron number that can be transferred by one FAD or one NAD^+ is correct?

- A) 2 for NAD^+ ; 1 for FAD.
- B) 1 or 2 for NAD^+ ; 2 for FAD.
- C) 1 or 2 for NAD^+ ; 1 for FAD.
- D) 2 for NAD^+ ; 1 or 2 for FAD.
- E) 1 for NAD^+ ; 1 or 2 for FAD.

30. Which one of the following enzymes catalyzes a reversible reaction that is an equilibrium control step of glycolysis?

- A) pyruvate kinase
- B) glucokinase
- C) phosphofructokinase-1
- D) aldolase
- E) none of the above

31. Please order the following coenzymes according to their sequential involvement in the pyruvate dehydrogenase complex.

- I. NAD^+
- II. CoA-SH
- III. TPP
- IV. Lipoate (lipoamide)
- V. [FAD]

- A) III, II, I, IV, V
- B) III, II, I, V, IV
- C) III, IV, II, V, I
- D) II, IV, V, I, III
- E) III, V, IV, II, I

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32. Which three reactions catalyzed by the enzymes in the citric acid cycle have large negative ΔG values?

- I. succinyl-CoA synthetase.
- II. fumarase.
- III. α -ketoglutarate dehydrogenase.
- IV. isocitrate dehydrogenase.
- V. citrate synthase.
- VI. malate dehydrogenase.
- VII. aconitase.
- VIII. succinyl-CoA dehydrogenase.

- A) I, III, V
- B) III, IV, V
- C) IV, VI, VIII
- D) I, III, VI
- E) IV, V, VIII

33. Which one of the following descriptions about the property of uncouplers such as the uncoupling protein-1 is correct?

- I. They were briefly used as weight-loss drugs.
- II. ATP/ADP ratio increases.
- III. Electron transport continues.
- IV. They dissipate the proton gradient.
- V. Heat is produced.

- A) I, II, III, IV
- B) I, II, III, V
- C) I, III, IV, V
- D) II, III, IV, V
- E) I, III, IV

34. Which one of the following is the characteristic of the glycerophosphate shuttle?

- A) It only operates efficiently when the [NADH] in the cytoplasm is higher than in the matrix.
- B) It shuttles "NADH electron equivalents" across the mitochondrial membrane to yield 1.5 ATP/NADH.
- C) It shuttles NADH across the mitochondrial membrane to yield 2.5 ATP/NADH
- D) Aspartate is a key component in the shuttle process.
- E) Malate is a key component in the shuttle process.

35. Please order the following components of malate-aspartate shuttle into an appropriate sequence.

- I. OAA trans-aminated to aspartate
- II. OAA reduced to malate
- III. Malate oxidized to OAA
- IV. Malate translocated to matrix
- V. Aspartate translocated to cytosol
- VI. Aspartate trans-aminated to OAA

- A) I, VI, III, II, IV, V
B) II, I, IV, VI, III, V
C) II, V, IV, III, VI, I
D) III, IV, VI, V, I, II
E) II, IV, III, I, V, VI
36. Which of the following reactions is/are catalyzed by a transketolase in the pentose phosphate pathway?
- I. sedoheptulose-7-P + glyceraldehyde-3-P $\leftrightarrow$ ribose-5-P + xyulose-5-P
II. erythrose-4-P + fructose-6-P $\leftrightarrow$ sedoheptulose-7-P + glyceraldehyde-3-P
III. fructose-6-P + glyceraldehyde-3-P $\leftrightarrow$ xylulose-5-P + erythrose-4-P
- A) I only
B) II and III
C) II only
D) I and III
E) I and II
37. The first three reactions of β -oxidation of saturated fatty acids are analogous to which sequence of the following metabolic reactions?
- A) succinate $\rightarrow$ fumarate $\rightarrow$ malate $\rightarrow$ oxaloacetate
B) oxaloacetate $\rightarrow$ citrate $\rightarrow$ isocitrate $\rightarrow$ α -ketoglutarate
C) isocitrate $\rightarrow$ α -ketoglutarate $\rightarrow$ succinate $\rightarrow$ fumarate
D) phosphoenolpyruvate $\rightarrow$ pyruvate $\rightarrow$ acetyl-CoA $\rightarrow$ citrate
E) α -ketoglutarate $\rightarrow$ succinyl-CoA $\rightarrow$ succinate $\rightarrow$ fumarate
38. The HMG-CoA lyase in ketone body biosynthesis is mechanistically the reverse of the first half of the reaction catalyzed by:
- A) aconitase.
B) β -hydroxybutyrate dehydrogenase.
C) pyruvate dehydrogenase.
D) citrate synthase.
E) succinyl-CoA synthase.
39. CDP-diacylglycerols are NOT the precursors for the synthesis of:
- A) phosphatidylethanolamine.
B) phosphatidyl glycerol.
C) phosphatidylinositol.
D) cardiolipins.
E) all of the above are false.

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40. The correct sequence of enzyme activity being used to catalyze reactions in fatty acid synthase is:
- β -ketoacyl-ACP synthase
 - β -ketoacyl reductase
 - β -hydroxyacyl dehydratase
 - enoyl reductase
 - acetyl transferase
- A) I, II, III, IV, V
B) III, II, IV, V, I
C) II, I, III, IV, V
D) I, III, II, V, IV
E) IV, V, I, II, III
41. The appropriate sequence for the intermediates generated from mevalonate to the synthesis of squalene are:
- geranyl pyrophosphate
 - isopentenyl pyrophosphate
 - 5-phosphomevalonate
 - farnesyl pyrophosphate
 - dimethylallyl pyrophosphate
- A) I, III, IV, II, V
B) III, II, V, I, IV
C) III, V, I, IV, II
D) V, III, II, IV, I
E) II, III, IV, I, V
42. Which one of the following is directly served as one of the nitrogen atoms of a urea molecule in the Urea cycle?
- A) the amide N of Asn
B) the amide N of Gln
C) the R-group N of Lys
D) the N of glucosamine
E) none of the above
43. Which of the following statements of transamination are CORRECT?
- It is characterized by the transfer of an α -amino group from an amino acid to the α -keto position of an α -keto acid.
 - The amino donor becomes an α -keto acid.
 - The coenzyme needed is thiamin pyrophosphate (TPP).
 - Humans are capable of synthesizing the α -keto acid analog of nonessential amino acids and using transamination to form the amino acids, but are not able to construct carbon skeletons of the essential amino acids.
 - The α -keto acid acceptor becomes an α -amino acid.

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- A) I, II, III
B) I, II, IV
C) I, II, III, IV
D) II, III, IV, V
E) I, II, IV, V
44. During the de novo biosynthesis of the purine ring, the generation of AICAR is accompany with the formation of
- A) Asp
B) malate
C) fumarate
D) CO₂
E) H₂O
45. Which of the following comments regarding resveratrol is CORRECT?
- I. activates SIRT1 NAD⁺-dependent deacetylase activity
II. produced in plants, particularly in grape skins, in response to stress
III. inhibits AMPK in the brain
IV. has many of the same effects as caloric restriction
- A) I, II, III, IV
B) I, II, III
C) I, III, IV
D) I, II, IV
E) II, III, IV
46. What types of cells carry out ATP synthesis by chemiosmosis?
- A) all cells, exclusively using oxygen as the electron acceptor
B) only eukaryotic cells, exclusively using oxygen as the electron acceptor
C) only eukaryotic cells, using either oxygen or other electron acceptors such as elemental sulfur
D) all respiring cells, using either oxygen or other electron acceptors such as elemental sulfur
47. In which cellular structure are the enzymes of the Calvin cycle localized?
- A) chloroplast stroma
B) thylakoid space
C) mitochondrial intermembrane space
D) mitochondrial matrix

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48. Assuming independent assortment at all loci, what is the probability that a cross between the following parents, $AABbCc \times AaBbCc$, will produce an $AaBbCC$ offspring?
- A) $1/2$
 - B) $1/8$
 - C) $1/16$
 - D) $3/4$
49. Why are males more often affected by X-linked traits than females?
- A) Genomic imprinting
 - B) X-chromosome inactivation
 - C) Aneuploidy of sex chromosome
 - D) Hemizyosity of the X chromosome
50. Which of the following statements correctly describes the difference between the leading strand and the lagging strand in DNA replication?
- A) Both of the leading strand and lagging strand require an DNA primer.
 - B) The leading strand is synthesized continuously in the $5' \rightarrow 3'$ direction, while the lagging strand is synthesized discontinuously in the $5' \rightarrow 3'$ direction.
 - C) The leading strand is synthesized in the $3' \rightarrow 5'$ direction in a discontinuous fashion, while the lagging strand is synthesized in the $5' \rightarrow 3'$ direction in a continuous fashion.
 - D) There are different DNA polymerases involved in elongation of the leading strand and the lagging strand.
51. Gene expression is often assayed by measuring the level of mRNA produced from a gene. Which of the following levels of the control of gene expression can be analyzed by this type of assay?
- A) DNA replication control
 - B) transcriptional control
 - C) translational control
 - D) post-translational control
52. Which of the following enzymes is required to make complementary DNA (cDNA) from RNA?
- A) RNA replicase
 - B) RNA-dependent RNA polymerase
 - C) Reverse transcriptase
 - D) RNA ligase

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53. What is believed to be the most significant result of the evolution of the amniotic egg?
- A) Tetrapods are no longer tied to the water for reproduction.
 - B) Tetrapods can now function with just lungs.
 - C) Newborns are much less dependent on their parents.
 - D) Embryos are protected from predators.
54. In humans, the follicular cells that remain behind in the ovary following ovulation become ____.
- A) the ovarian endometrium that is shed at the time of the menses
 - B) a steroid-hormone synthesizing structure called the corpus luteum
 - C) the thickened portion of the uterine wall
 - D) the placenta, which secretes cervical mucus
55. The outer-to-inner sequence of tissue layers in a post-gastrulation vertebrate embryo is ____.
- A) endoderm → ectoderm → mesoderm
 - B) mesoderm → endoderm → ectoderm
 - C) ectoderm → mesoderm → endoderm
 - D) ectoderm → endoderm → mesoderm
56. A common feature of action potentials is that they
- A) cause the membrane to hyperpolarize and then depolarize.
 - B) can undergo temporal and spatial summation.
 - C) are triggered by a depolarization that reaches threshold.
 - D) move at the same speed along all axons.
57. The following description about plants emitting volatile signals is incorrect.
- A) Volatile signals may have evolved for intra-plant communication
 - B) Having defensive neighbors can enhance the emitter's fitness
 - C) Some volatiles are also inhibitory allelochemicals that reduce competition
 - D) Volatile hormones (ethylene) and possibly derivatives (jasmonate and salicylate) contribute to the systemic response
58. Most of the ATP supplies for a skeletal muscle undergoing one hour of sustained exercise come from ____.
- A) creatine phosphate
 - B) glycolysis
 - C) substrate phosphorylation
 - D) oxidative phosphorylation

59. What is the biological significance of genetic diversity between populations?
- A) Genes for traits conferring an advantage to local conditions are unlikely.
 - B) The population that is most fit would survive by competitive exclusion.
 - C) Genetic diversity reduces the probability of extinction.
 - D) Diseases and parasites are not spread between separated populations.
60. What, approximately, is the fraction of genetic variation in the nuclear genome is that is expected to have a harmful effect on gene function?
- A) 50%.
 - B) 25%.
 - C) 10%.
 - D) 1%.
61. Mutations are important because they bring about _____.
- A) death of the organism in which they develop
 - B) genetic variation needed for a population to evolve
 - C) benefits for the individual, not for the population
 - D) Hardey-Weinberg equilibrium within a population
62. When organisms with disadvantageous traits die out early before much, if any reproduction, this is called?
- A) speciation
 - B) macroevolution
 - C) gene flow
 - D) natural selection
63. Which fundamental tissue types are included in all three basic vascular plant organs?
- A) Dermal, vascular, and ground
 - B) Mesophyll, chlorophyll, and microphylls
 - C) Sclerenchyma, collenchyma, and parenchyma
 - D) Xylem, Xylene, and phloem
64. The group of molluscs, which possess eyes similar to vertebrates
- A) cephalopoda
 - B) gastropoda
 - C) bivalvia
 - D) pelecypoda

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65. Plant cell with a Ψ_s of -0.5 MPa maintains a constant volume when bathed in a solution that has a Ψ_s of -0.3 MPa and is in an open container. The cell has a:
- A) Ψ_p of +0.5 MPa
 - B) Ψ_p of +0.2 MPa
 - C) Ψ_p of 0 MPa
 - D) Ψ of -0.5 MPa
66. What would be the most effective method of reducing the incidence of blood flukes in a human population?
- A) Reduce the mosquito population.
 - B) Reduce the freshwater snail population.
 - C) Purify all drinking water.
 - D) Avoid contact with rodent droppings.
67. Which animal has a complete digestive system?
- A) jellyfish
 - B) roundworm
 - C) sponge
 - D) coral
68. Which of the following shows the correct direction of blood flow through the chambers of the heart?
- A) left atrium $\rightarrow$ left ventricle $\rightarrow$ right ventricle $\rightarrow$ right atrium
 - B) left atrium $\rightarrow$ right atrium $\rightarrow$ left ventricle $\rightarrow$ right ventricle
 - C) right atrium $\rightarrow$ right ventricle $\rightarrow$ left atrium $\rightarrow$ left ventricle
 - D) right atrium $\rightarrow$ left atrium $\rightarrow$ left ventricle $\rightarrow$ right ventricle
69. Put the step of the life cycle of a mushroom-forming basidiomycete in the order.
1. Karyogamy in each basidium produces a diploid nucleus
 2. Two haploid mycelia of different mating types undergo plasmogamy
 3. Environmental cues induce the dikaryotic mycelium to form basidiocarps
 4. The basidiospores germinate and grow into short-lived haploid mycelia
 5. When mature, the basidiospores are ejected and dispersed
- A) 4,2,3,5,1
 - B) 1,2,3,4,5
 - C) 2,3,1,5,4
 - D) 2,3,4,1,5

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70. The following description about the apoptosis in the *Caenorhabditis elegans* is incorrect.
- A) Three proteins, Ced-3, Ced-4, and Ced-9, are critical to apoptosis and its regulation in the nematode.
 - B) As long as Ced-9, located in the outer mitochondrial membrane.
 - C) When a cell receives a death signal, Ced-9 is activated, relieving its inhibition of Ced-4.
 - D) Active Ced-4 activates Ced-3, a protease, which triggers a cascade of reactions leading to the activation of nucleases and other proteases.

國立中興大學111學年度
醫學院學士後醫學系招生考試選擇題參考答案

科目：英文

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	D	2.	C	3.	E	4.	E	5.	A
6.	B	7.	C	8.	B	9.	B	10.	C
11.	C	12.	A	13.	E	14.	C	15.	A
16.	D	17.	A	18.	E	19.	C	20.	A
21.	A	22.	C	23.	A	24.	B	25.	A
26.	D	27.	C	28.	C	29.	D	30.	A
31.	C	32.	D	33.	D	34.	A	35.	C
36.	D	37.	C	38.	E	39.	E	40.	E
41.	C	42.	B	43.	E	44.	C	45.	C
46.	B	47.	D	48.	D	49.	B	50.	D
51.	E	52.	C	53.	B	54.	B	55.	B
56.	E	57.	C	58.	B	59.		60.	

科目：物理

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	E	2.	B	3.	B	4.	B	5.	E
6.	B	7.	D	8.	C	9.	B	10.	D
11.	D	12.	C	13.	B	14.	B	15.	C
16.	B	17.	D	18.	C	19.	D	20.	B
21.	B	22.	C	23.	D	24.	E	25.	A
26.	C	27.	D	28.	A	29.	D	30.	B
31.	A	32.	D	33.	A	34.	A	35.	C
36.	A	37.	C	38.	A	39.	C	40.	D
41.	B	42.	D	43.	B	44.	C	45.	A
46.	D	47.	A	48.	D	49.	D	50.	A

科目：化學

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	B	2.	B	3.	A	4.	A	5.	D
6.	E	7.	D	8.	A	9.	A	10.	B
11.	B	12.	C	13.	A	14.	D	15.	A
16.	B	17.	D	18.	D	19.	C	20.	A
21.	C	22.	B	23.	D	24.	E	25.	E
26.	B	27.	D	28.	B	29.	C	30.	A
31.	C	32.	D	33.	C	34.	C	35.	A
36.	C	37.	B	38.	C	39.	B	40.	D
41.	C	42.	D	43.	A	44.	B	45.	C
46.	D	47.	A	48.	B	49.	B	50.	B

科目：普通生物及生化概論

題號	答案	題號	答案	題號	答案	題號	答案	題號	答案
1.	A	2.	B	3.	A	4.	E	5.	D
6.	C	7.	E	8.	D	9.	E	10.	C
11.	A	12.	B	13.	E	14.	C	15.	B
16.	C	17.	D	18.	E	19.	C	20.	A
21.	C	22.	E	23.	D	24.	B	25.	B
26.	A	27.	B	28.	D	29.	D	30.	A
31.	C	32.	B	33.	C	34.	B	35.	E
36.	D	37.	A	38.	D	39.	A	40.	A
41.	B	42.	E	43.	E	44.	C	45.	D
46.	D	47.	A	48.	C	49.	D	50.	B
51.	B	52.	C	53.	A	54.	B	55.	C
56.	C	57.	D	58.	D	59.	C	60.	D
61.	B	62.	D	63.	A	64.	A	65.	A
66.	C	67.	B	68.	C	69.	C	70.	C

國立中興大學 111 學年度學士後醫學系招生考試試題參考答案疑義釋疑公告

科目	題號	疑義答覆	釋疑結果
英文	15	1. 本題題幹第一句提到「科學家已指出飢餓不僅僅是某種狀況」(“Scientists have shown that hunger isn’t just something _____.”)。句中「飢餓不僅僅是…」一語透露下一句關於飢餓狀況的訊息，將與第一句相對。針對飢餓狀況，題幹第二句進一步指出「童年時期經歷之飢餓狀況具有漣漪效應，我們也才正開始理解。」(“Hunger during childhood can have a ripple effect that we are only just beginning to understand.”)，句中「漣漪效應」正是與第一句意思相對的主要關鍵訊息。「漣漪效應」(a ripple effect)意指“a spreading, pervasive, and usually unintentional effect or influence”，亦即童年時期經歷之飢餓狀況會延伸、擴大。透過第二句回頭理解第一句，顯示飢餓狀況不僅僅是短暫的、一時的。 2. 本題為單選選擇題，作答者需按題幹文意，從選項中挑出最適切者，(A) transient 為其中最適切選項。 本題及公布之答案均無誤，維持原公布之答案。	維持原答案 (A)
	49	本題為考卷印製問題，無法判斷此題答案，本題送分。	本題送分
	56	根據閱讀測驗 Passage C 第二段敘述：The most famous feat was that he was willing to cut partial skin of his wife (née Marjorie Learner 連瑪玉), another missionary to Taiwan, under her suggestion, to graft onto an adolescent patient Chou Chin-Yao to prevent his skin ulcers around his knee from deterioration and eventual amputation.文中 under her suggestion 文意乃連接 he was willing to cut partial skin of his wife 而來，即 he was willing to cut partial skin of his wife under her suggestion；意指蘭醫師為進行該次手術，割下其妻連瑪玉皮膚，乃經連瑪玉建議，但此建議僅針對該手術。文章他處並未提及連瑪玉鼓勵蘭醫師從事異體移植手術。 本題及公布之答案均無誤，維持原公布之答案。	維持原答案 (E)

科目	題號	疑義答覆	釋疑結果
物理	16	本題因題目數字誤植，故沒有答案，本題送分。	本題送分
	21	本題雖可以理解題意來計算，但為顧及考試公平性，本題送分。	本題送分
	30	本題為正確答案誤植，答案更正為(D)。	答案更正為(D)
	35	本題因正確答案不在選項中，本題送分。	本題送分

科目	題號	疑義答覆	釋疑結果
化學	5	確實在題意上及圖形上可能造成誤解，雖然在假設一定情況下，正確答案應為(D)。不過此題答(D)或(E)可給分。	答案更改為(D)或(E)
	4	此題目主要是判斷何者化合物可以溶於水(soluble)， PbCl_2 在加熱狀態下雖然可部分溶於水，但在加熱狀態下許多化合物皆可部分溶於水，所以此題維持答案(A) CaS 可完全溶於水	維持原答案(A)
	6	此題因為(B)選項打字錯誤，可能造成無法判斷，因此此題送分。	本題送分
	10	由於考生是根據實際熔點去做答案判斷，但此題目是詢問若根據離子鍵理論(離子之間作用力越強則有較高熔點及沸點)何者應有較高熔點？則 MgF_2 應為正確答案，因此決定此題目答案可以為(B)或(D)。	答案更改為(B)或(D)
	15	若是從沸點思考確實答案應為(E)，不過若是從分子間作用力思考， NH_3 還是有氫鍵作用力，在某個溫度下可能蒸氣壓會比 BCl_3 高，因此決定此題目答案可以為(A)或(E)。	答案更改為(A)或(E)
	23	氫標準電極確實是在定義上為零，故本題答案(C)也算對，因此答案更改為(C)或(D)	答案更改為(C)或(D)
	28	因最右下第8個化合物答案上可能有所爭議，故決定答案(A)(4個)或(B)(5個)皆給對。	答案更改為(A)或(B)
	37	因第5個步驟之反應得到的產物可能為(A)或(B)，但因爭議較大，經討論過後此題送分。	本題送分

科目	題號	疑義答覆	釋疑結果
普通生物及生化概論	8	因為 glyceraldehyde-3-phosphate/ dihydroxyacetone phosphate 可藉 isomerase 轉換所以選項(A)亦可。	答案更改為 (A)或(D)
	10	此題依據期刊論文提出 Vitiman B6 亦有抗氧化之功能，惟該期刊結果乃依據老鼠之動物實驗結果所下之結論，因此 Vitiman B6 於抗氧化之功能仍有待最後確認，基於此一疑義，因此本題送分。	本題送分
	13	本題為正確答案誤植，答案更正為(B)。	答案更正為 (B)
	18	此題釋疑點在於”change of a single base in the non-coding region of a gene “是否符合 silent mutation 的定義。但實際上還是必須確保產生的蛋白質沒有產生改變，例如 splicing site 的 mutation 是有可能發生 exon skipping 和氨基酸序列缺失。	維持原答案 (E)
	22	此題依據 Principles of Biochemistry Leininger 8 edition 內容，認為 Crispr/Cas9 利用 single strand break (SSB)引起 Homologous recombination (HR)來進行基因編輯。該課本的圖以及文字描述省略了細節部分，實際上利用修改過 Cas9 蛋白(Cas9 Nickase) 能夠產生 single strand break，但必須利用 2 個在不同鏈且距離不能太遠的 SSB 來引起 Double strand break (DSB)。SSB 一般是無法引發 HR 的。因此，即使是利用 Cas9 nickase 依然是透過 DSB 所引起 NHEJ 或是 HR 來進行基因組編輯。	維持原答案 (E)
	27	此題釋疑點在於 lactose 不會直接與 lac repressor 結合，必須先轉換為 allolactose，是否能夠認為是 allosteric regulator。本題出題老師採用對 regulator 的廣義解釋：lactose 具有對 lac repressor 進行 allosteric regulation 能力，亦可視為 regulator。採用狹義解釋 regulator 專指結合在蛋白上的分子，在本題中不會產生答案，且針對該分子的名稱並不統一(modulator, effector, regulator)，因此維持原答案	維持原答案 (B)
	28	此題釋疑點在於 RNA interference 是不是 epigenetic regulation Epigenetic regulation 是指 DNA 序列不變的情況下調控基因表現，但基因表現指的是從 DNA 到 RNA 過程。RNA interference 則是利用影響 RNA 來調控蛋白質或是 RNA 其他 RNA 功能。容易產生誤解的地方在於有一小部分 non-coding	維持原答案 (D)

	RNA 被認為具有調控基因表現的能力，但一般不會認為是 RNA interference。	
30	本題為正確答案誤植，答案更正為(D)。	答案更正為(D)
39	本題為正確答案誤植，答案更正為(E)。	答案更正為(E)
40	步驟 V 為 translocation step to start a new fatty acid synthesis cycle. 因此(A)是本題適合的答案。	維持原答案(A)
42	在 urea cycle 中並無 Gln 直接參與。	維持原答案(E)
65	$\psi_p + \psi_s = -0.3 \text{ MPa}$ $-0.5 \text{ MPa} (\psi_s) + (\psi_p) = -0.3 \text{ MPa}$ $\psi_p = +0.2 \text{ MPa}$ 調整答案為(B)	答案更正為(B)
66	減少中間宿主 Freshwater snail 的數量，可有效降低 blood flukes 的感染率 調整答案為(B)	答案更正為(B)