

國立台灣海洋大學九十五學年度研究所博士班招生考試試題

考試科目：水產養殖學綜論

系所名稱：養殖系博士班（養殖系博士班）

1.答案以橫式由左至右書寫。2.請依題號順序作答。

（單選題，共 100 題，每題一分；答案請依題號順序書寫於答案紙上）

- ( ) 1. 下列那一個細胞不屬於對蝦肝胰臟的細胞？  
(A) R 細胞 (B) E 細胞 (C) C 細胞 (D) F 細胞
- ( ) 2. 甲殼類的血球細胞中，哪一種不具吞噬作用？  
(A) 白血球 (B) 大顆粒血球 (C) 小顆粒血球 (D) 無顆粒血球
- ( ) 3. 對蝦類 intracellular 的滲透壓調節是靠何種物質調節？  
(A) Cl<sup>-</sup> (B) K<sup>+</sup> (C) Na<sup>+</sup> (D) free amino acid
- ( ) 4. 下列哪一種不是蝦類的必需胺基酸？  
(A) Arginine (B) Alanine (C) Valine (D) Lysine
- ( ) 5. 對蝦類自孵化後何一變態期可完全靠體內卵黃提供所有營養及能量？  
(A) Zoea (B) Mysis (C) Nauplius (D) 以上皆非
- ( ) 6. 下列何者會影響對蝦類脫殼？  
(A) 溫度 (B) 鹽度 (C) 營養 (D) 以上皆是
- ( ) 7. What bacterium is the causative agent of red-fin disease in freshwater fish (like eel)?  
(A) *Mycobacterium sp.* (B) *Nocardia sp.* (C) *Aeromonas hydrophila*  
(D) *Pseudomonas anguilliseptica*
- ( ) 8. Which of the following pathogen is only found in salmonids?  
(A) sea louse (B) *Renibacterium salmoninarum* (C) *Nocardia sp.*  
(D) *Pseudomonas fluorescens*
- ( ) 9. *Photobacterium damsela* subsp. *piscicida* is a pathogen found in  
(A) cobia (B) milk fish (C) grouper (D) tilapia, in Taiwan.
- ( ) 10. Fish possesses antibodies in blood stream while  
(A) frog (B) prawn (C) whale (D) soft-shell turtle  
does not possess it in blood stream.
- ( ) 11. Which of the following component is most important in the isolation of bacterium causing BKD ?  
(A) antibiotics (B) sodium chloride (C) L-cysteine (D) tryptone
- ( ) 12. Recently, the successful salmon farming in Norway is due to the use of  
(A) vaccines (B) probiotics (C) drugs (D) chemicals.

- ( ) 13. For the isomerization reaction in which glucose-6-phosphate is converted to fructose-6-phosphate, which of the following statements is incorrect?  
This is an aldose to ketose isomerization.
- (A) Movement of the carbonyl group from the C-1 to the C-2 activates the C-3
  - (B) carbon for cleavage in a subsequent reaction.
  - (C) The reaction goes through an enediol intermediate.
  - (D) The isomerase acts on the ring forms of the phosphorylated sugars.
- ( ) 14. Glycolysis
- (A) requires molecular O<sub>2</sub> to generate energy
  - (B) does not require molecular O<sub>2</sub> to generate energy
  - (C) is inhibited by O<sub>2</sub>
  - (D) rate is not directly increased in the presence of O<sub>2</sub>
- ( ) 15. ATP is consumed in all these cellular activities. Which activity consumes the least amount of ATP?
- (A) muscle contraction
  - (B) metabolic signal transduction
  - (C) biosynthesis of macromolecules
  - (D) cell motility
- ( ) 16. The power stroke in muscle contraction is associated with
- (A) binding of myosin to actin
  - (B) the dissociation of ADP from the ATPase
  - (C) the hydrolysis of ATP
  - (D) the binding of ATP to ATPase
- ( ) 17. Under aerobic conditions, where is NAD primarily regenerated from NADH?
- (A) cytoplasm
  - (B) mitochondrion
  - (C) lysosome
  - (D) endoplasmic reticulum
- ( ) 18. What is the net yield of ATP per mole of glycerol converted to pyruvate? Consider only the ATP formed by substrate level phosphorylation.
- (A) 0 mole
  - (B) 1 moles
  - (C) 2 moles
  - (D) 3 moles
- ( ) 19. Formation of multinucleate giant cell or syncytium is the typical cytopathic effect of
- (A) IPNV
  - (B) MBV
  - (C) CCV
  - (D) VHSV.
- ( ) 20. Viral erythrocytic necrosis (VNE) is an infection of fish erythrocytes caused by ENVs of
- (A) *Birnaviridae*
  - (B) *Rhabdoviridae*
  - (C) *Herpesviridae*
  - (D) *Iridoviridae*.
- ( ) 21. (A) VHSV (B) SVCV (C) CHV (D) WSSV is the agent of Egtved disease, the most serious disease of farmed rainbow trout in the European Union member states.
- ( ) 22. Grass carp hemorrhage is a serious condition of fingerling grass carp in China for many years, and the causative virus has been placed in the family,
- (A) *Birnaviridae*
  - (B) *Reoviridae*
  - (C) *Nodaviridae*
  - (D) *Togaviridae*.

- ( ) 23. The genome of Taura syndrome virus, the causative agent of a devastating disease affecting shrimp farming industry worldwide is  
 (A) double stranded DNA (B) double stranded RNA (C) single stranded DNA  
 (D) single stranded RNA
- ( ) 24. *Myxobolus cerebralis* as the causative agent of whirling disease is found in  
 (A) brain (B) skin (C) muscle (D) cartilage
- ( ) 25. A key intermediate at the branch point in the synthesis of tryptophan, phenylalanine and tyrosine is  
 (A) shikimate (B) ornithine (C) phosphoenolpyruvate (D) chorismate
- ( ) 26. The synthesis of AMP is inhibited in bacteria but not in humans by a class of drugs called sulfonamides. This is because sulfonamides  
 (A) allosterically inhibit ribose phosphate pyrophosphokinase  
 (B) allosterically inhibit one or more synthetases  
 (C) inhibit the formation of 5' phosphoribosylamine  
 (D) inhibit the synthesis of tetrahydrofolate
- ( ) 27. Most coenzymes are derived from, or are  
 (A) metal ions (B) carbohydrates (C) amino acids (D) vitamins
- ( ) 28. The primary control in the clotting of blood is  
 (A) induction  
 (B) post-translational modification  
 (C) association of subunits to form different isozymes  
 (D) proteolytic cleavage of proenzymes
- ( ) 29. The first three reactions in the  $\beta$ -oxidation of saturated fatty acids produce?  
 (A) 2 moles of NADH (B) 2 moles of FADH<sub>2</sub>  
 (C) 2 moles of ATP (D) 1 moles of both NADH and FADH<sub>2</sub>
- ( ) 30. Cholesterol enters most extrahepatic tissues  
 (A) as cholesterol esters found in HDL.  
 (B) as part of chylomicron remnants which are taken up by endocytosis.  
 (C) as unesterified cholesterol from serum.  
 (D) as part of LDL which is taken up endocytosis.
- ( ) 31. For hemoglobin (Hb), a high  $P_{50}$  value  
 (A) means that the Hb has a high affinity for O<sub>2</sub>  
 (B) would likely be found in species adapted to living at high altitudes  
 (C) makes it more difficult to unload affinity for O<sub>2</sub>  
 (D) means that the Hb has a reduced affinity for O<sub>2</sub>

- ( ) 32. The majority of CO<sub>2</sub> in both invertebrates and vertebrates is transported as  
 (A) a dissolved gas  
 (B) carbonic acid  
 (C) CO<sub>2</sub> gas bound to the heme group of hemoglobin  
 (D) carbonic anhydrase
- ( ) 33. When a B-cell binds with an antigen, it is induced to differentiate into  
 (A) a plasma cell (B) a T-cell (C) a stem cell (D) an antibody
- ( ) 34. In protogynous hermaphroditism,  
 (A) some individuals may change from a male to female,  
 (B) some individuals may change from a female to male,  
 (C) monosex female,  
 (D) monosex male °
- ( ) 35. Dendrites carry signals  
 (A) toward the cell body (B) away from the cell body  
 (C) away from the axon hillock (D) from the axon to the cell body
- ( ) 36. The branch of genetics concerned with analyzing how genes are passed from generation to generation and how they recombine is  
 (A) population genetics (B) genetics. (C) transmission genetics.  
 (D) molecular genetics.
- ( ) 37. In spermatogenesis, \_\_\_ sperm cells are produced from \_\_\_ spermatogonia.  
 (A) one diploid; four haploid (B) four haploid; one diploid  
 (C) four diploid; one haploid (D) two diploid; one diploid
- ( ) 38. The observable characteristic that results from the expression of genes is the  
 (A) genotype (B) phenocopy (C) karyotype (D) phenotype
- ( ) 39. Gregor Mendel performed his now famous breeding experiments with which organism?  
 (A) mice (B) garden peas (C) bacteria (D) corn (E) all of the above
- ( ) 40. In human males, the genes found on the X chromosome are always expressed  
 (A) heterozygous (B) homozygous (C) hemizygous (D) heterogeneous
- ( ) 41. In a cross between white-eyed male *Drosophila* and red-eyed female flies, Morgan noted that the F-1 progeny all had red eyes. He concluded that the  
 (A) red-eyed trait was dominant. (B) white-eyed trait was hemizygous.  
 (C) white-eyed trait was recessive. (D) all of the above
- ( ) 42. When 25 % of hemoglobin is turned to methemoglobin, the color of gill turns to  
 (A) red (B) brown (C) green (D) chocolate-brown.

- ( ) 43. The disinfection powder of  $\text{HClO}$  is  
(A) 2 times (B) 10 times (C) twenty times (D) 100 times higher than that of  $\text{ClO}^-$ .
- ( ) 44. Primary productivity means  
(A) zooplankton production (B) fish production (C) phytoplankton production  
(D) turtle production.
- ( ) 45. The origin of acid-sulfate soil is  
(A)  $\text{H}_2\text{SO}_4$  (B)  $\text{FeS}$  (C)  $\text{FeS}_2$  (D)  $\text{Fe}(\text{OH})_3$ .
- ( ) 46. In natural water, there are four compounds:  $\text{CO}_2$ ,  $\text{H}_2\text{CO}_3$ ,  $\text{HCO}_3^-$  and  $\text{CO}_3^{2-}$ . Mr. Wu collected this water and found pH is 9. Which of the following statement is correct?  
(A) the concentration of  $\text{CO}_2$  is larger than the concentration of  $\text{CO}_3^{2-}$   
(B) the concentration of  $\text{HCO}_3^-$  is larger than the concentration of  $\text{CO}_3^{2-}$   
(C) the concentration of  $\text{CO}_3^{2-}$  is larger than the concentration of  $\text{HCO}_3^-$   
(D) the concentration of  $\text{H}_2\text{CO}_3$  is larger than the concentration of  $\text{CO}_3^{2-}$
- ( ) 47. The pond water which has alkalinity of  
(A) 5 mg/l (B) 80 mg/l (C) 125 mg/l (D) 400 mg/l  
usually has the highest productivity.
- ( ) 48. Mitosis and cytoplasmic division function in \_\_\_\_\_.  
(A) asexual reproduction of single-celled eukaryotes  
(B) growth, tissue repair, often asexual reproduction  
(C) gamete formation in prokaryotes  
(D) both A and B
- ( ) 49. Meiosis is a division mechanism that produces \_\_\_\_\_.  
(A) two cells (B) two nuclei (C) eight cells (D) four nuclei
- ( ) 50. Genes on the same chromosome are said to be \_\_\_\_\_.  
(A) linked (B) alleles (C) homologous (D) autosomes
- ( ) 51. When DNA replication begins, \_\_\_\_\_.  
(A) the two DNA strands unwind from each other  
(B) the two DNA strands condense for base transfers  
(C) two DNA molecules bond  
(D) old strands move to find new strands
- ( ) 52. Anticodons pair with \_\_\_\_\_.  
(A) mRNA codons (B) DNA codons (C) RNA anticodons (D) Amino acids

- ( ) 53. Homeotic genes \_\_\_\_\_.
- (A) are part of a bacterial operon (B) control eukaryotic body plans  
(C) control X chromosome inactivation (D) governs DNA replication
- ( ) 54. Pit plugs are the distinct structures between the cells of:
- (A) Chlorophyta (B) Cyanophyta (C) Rhodophyta (D) Chromophyta.
- ( ) 55. Phycobiliprotein are the photosynthetic pigments of:
- (A) Chlorophyta (B) Cyanophyta (C) Chromophyta (D) Haptophyta.
- ( ) 56. When an algal cell divided, its mitotic spindle assemblage parallel to plane of cell division, this structure of microtubules is:
- (A) plakea (B) phycoplast (C) phragmoplast (D) periplast.
- ( ) 57. The resistant stage that members of the *Chrysophyceae* and *Synurophyceae* form is:
- (A) stephanokontous (B) rhizoplast (C) akinete (D) statocyst.
- ( ) 58. Osmium tetra oxide is applied for the material preparing of electron microscopy studies in which it is used as:
- (A) fixative (B) auxiliary staining (C) dehydrate (D) A and B are correct.
- ( ) 59. How to distinguish alga from other plant:
- (A) morphology (B) reproductive structure (C) pigments (D) DNA sequence.
- ( ) 60. Which one of the followings is not true.
- (A) PCR is used for in vitro DNA synthesis.  
(B) plasmid is only found in procaryotics.  
(C) restriction recognize palindrome sequence.  
(D) all nucleic acid synthesis will follow the 5 → 3 direction.
- ( ) 61. Which one of the followings is not true to describe "DNA"
- (A) most of DNA is basic tolerant.  
(B) all DNA are double stranded.  
(C) the triphosphate is chemically link with base.  
(D) consisting of ribose + triphosphate + base, the 2' of ribose is - H group.
- ( ) 62. Which one of the followings is not true to describe the term of "genomics"
- (A) to study the whole genome gene expression profile.  
(B) different from genetics.  
(C) functional genomics is to study the whole genome gene structure.  
(D) to study the gene expression related with specific physiological condition.

- ( ) 63. Which one of the followings is not true to describe the final fate of “transgenic DNA”
- (A) can integrate into host chromosome.
  - (B) can be destroyed by host methylation system.
  - (C) can probably exist as partial diploid cell.
  - (D) can form as partial diploid clone.
- ( ) 64. Which one of the followings is not true to describe “blotting and detection of gene”
- (A) southern blot is used for DNA detection.
  - (B) northern blot is used for RNA detection.
  - (C) eastern blot is used for detect protein in gene translation
  - (D) western blot is used for protein detection.
- ( ) 65. Which one of the followings is not true to describe “transcription”
- (A) carry out by RNA polymerase.
  - (B) to synthesis mRNA.
  - (C) a transcription unit is called gene.
  - (D) transcription and translation coupled together only found in prokaryotic.
- ( ) 66. Under which condition the pond sediment loses its nitrogen the most?
- (A) The sediment is flooded or submerged constantly.
  - (B) The sediment is alternately submerged and drained a couple of times.
  - (C) The sediment is sun-dried until crack.
  - (D) The sediment is kept moist but not submerged all the time.
- ( ) 67. Which one of the following statements is correct about the relationship between carbon/nitrogen (C/N) ratio of organic matter in the moist soil and its assimilation/dissimilation processes?
- (A) High C/N ratio favors its dissimilation.
  - (B) C/N ratio only affects its assimilation.
  - (C) High C/N ratio favors its assimilation.
  - (D) C/N ratio only affects its dissimilation.
- ( ) 68. Which factor is least related to the thickness of oxidized layer of submerged sediment?
- (A) Microbial activity in the sediment
  - (B) Oxygen concentration of overlying water
  - (C) The pH of the sediment
  - (D) Organic content in the sediment.
- ( ) 69. Which action can most effectively reduce the sulfide in the submerged sediment in a fish pond?
- (A) Application of ferric oxide
  - (B) Intensive aeration by paddlewheel
  - (C) Bottom water exchange
  - (D) Application of zeolite

- ( ) 70. Which factor contributes the most for the fluctuation of diurnal dissolved oxygen in a fish pond?
- (A) high biological and chemical oxygen demand in the water  
 (B) cloudy during daytime  
 (C) big difference of water temperature between day and night  
 (D) windy in the night and stagnant in the daytime.
- ( ) 71. Which one of the following statements is correct about the difference of the development stage and mature stage of an ecosystem?
- (A) The former has a higher ratio of gross production to standing crop biomass than the latter.  
 (B) The former has a higher ratio of biomass supported to unit energy flow than the latter.  
 (C) The former has a lower net community production (yield) than the latter.  
 (D) The former has a higher resilience than the latter.
- ( ) 72. 進口飼養觀賞魚中的多鰭魚 bichirs 屬於哪一綱(class)
- (A) Actinopterygii (B) Chondrichthyes (C) Myxini (D) Sarcopterygii
- ( ) 73. 水生昆蟲中的石蠅，可作為溪流魚類的餌料生物，在分類上屬於哪一個目(order)
- (A) Diptera (B) Ephemera (C) Isoptera (D) Plecoptera
- ( ) 74. 報載食用黃金鯛等珊瑚礁魚類的雪卡毒素中毒事件。請問熱帶海魚毒素中的 Ciguatoxin，多採自哪一科的魚類?
- (A) Lutjanidae (B) Muraenidae (C) Scaridae (D) Serranidae
- ( ) 75. 養殖或海洋水體中哪一屬的藻類最可能會釋放毒素毒殺魚類
- (A) Chaetoceros (B) *Coscinodiscus* (C) *Gymnodinium* (D) *Urochordata*
- ( ) 76. 可製造海洋魚類餌料的浮游動物 *Oikopleura* 屬於哪一綱
- (A) Ascidiacea (B) Copepoda (C) Larvacea (D) Thaliacea
- ( ) 77. 世界魚類的種數約為
- (A) 三千種 (B) 三萬種 (C) 三十萬種 (D) 三百萬種
- ( ) 78. \_\_\_\_\_ and \_\_\_\_\_ are a small family of universal biomolecules mediating the flow of energy from exergonic reactions to the energy requiring processes of life.
- (A) High-energy phosphate compounds, caffeine  
 (B) Chlorophyll, caffeine  
 (C) Hemoglobin, chlorophyll  
 (D) Reduced coenzymes, high-energy phosphate compounds
- ( ) 79. Nucleosides are relatively stable to \_\_\_\_\_ hydrolysis, and pyrimidine nucleotides are stable to \_\_\_\_\_ hydrolysis, but purine nucleotides are unstable to \_\_\_\_\_ hydrolysis.
- (A) base; acid; acid (B) base; base; acid (C) acid; base; base (D) acid; acid; base

- ( ) 80. The  $pK_a$  of the cysteine side chain \_\_\_\_\_ group is 8.32, so it is about 12% dissociated at pH \_\_\_\_\_.  
 (A) acid, 3.2 (B) amino, 8.5 (C) hydroxyl, 10.2 (D) sulfhydryl, 7
- ( ) 81. All of the following are terpenes EXCEPT:  
 (A) squalene (B)  $\alpha$ -tocopherol (vitamin E)  
 (C) coenzyme Q (UQ) (D) cetyl palmitate (spermaceti)
- ( ) 82. Lipid bilayers differ from micelles in that micelles are:  
 (A) self limiting structures (B) formed spontaneously  
 (C) stable in aqueous solution (D) often transformed into vesicles
- ( ) 83. How many ATPs could be produced through  $\beta$ -oxidation when a C18:2n6 molecule been completely oxidized:  
 (A) 132 (B) 142 (C) 152 (D) 162
- ( ) 84. C18:0 stands for:  
 (A) Stearic acid (B) Palmitic acid (C) Oleic acid (D) Arachidic acid
- ( ) 85. Please arrange the size of the following molecules from large to small  
 (1) Sphingomyelin (2) Sphingosine (3) Ceramide (4) Phosphocholine:  
 (A) 1234 (B) 4321 (C) 1324 (D) 4231
- ( ) 86. Which of the following molecules contains cholesterol:  
 (A) chylomicron (B) HMG CoA reductase (C) ACAT (D) LCAT
- ( ) 87. Which of the following statements is not true about the nature of lipids:  
 (A) More Nonpolar than other biological molecules  
 (B) In any biomembrane, the fluidity will not be influenced by any other protein molecules  
 (C) They all have amphiphilic character  
 (D) Lipids are diverse in their structure and properties
- ( ) 88. Which of the following membrane protein(s) is(are) belonged to the group of integral protein:  
 (A) Ankyrin (B) Anion carrier protein (C) Glycophorin A  
 (D) All of the above three proteins
- ( ) 89. 一般魚類麻醉生理分爲六期：[1] Light sedation、[2] Deep sedation、[3] Partial loss of equilibrium、[4] Total loss of equilibrium、[5] Loss of reflex reactivity 及 [6] Medullary collapse。爲進行魚體注射試驗麻醉生理控制在那一期較佳？  
 (A) 1 或 2 期 (B) 5 或 6 期 (C) 3 或 4 期 (D) 4 或 5 期
- ( ) 90. 下列何種藥物不屬於抗生素  
 (A) Tetracycline (B) Sulfadimethoxine (C) Ormetoprim (D) Benzocaine

- ( ) 91. 下列何種藥物為雌性藥物  
(A) Testosterone (B) estradiol (C) Thyroid hormones  
(D) Chorionic gonadotrophin
- ( ) 92. 某些細菌先天性對青黴素或頭孢子黴素有抗藥性，其作用機序是該些菌具有下列那一種酵素破壞  $\beta$ -lactam  
(A) Cystein (B) Penicillinase (C) Metallo-protease (D) Papinnase
- ( ) 93. 下列何種可將  $\text{NO}_2^- \rightarrow \text{NO}_3^-$  當處理水質用途  
(A) *Nitrobacter* sp. (B) *Thiocapsa* sp. (C) *Pseudomonas* spp.  
(D) *Nitrosomonas* sp.
- ( ) 94. 蝦苗在孵化過程中，常發生鐘形蟲感染鰓部或體表，該症狀常用下列何種藥物處理  
(A) Nalidixic acid (B) Flumequine (C) Mebendazole (D) Formaline
- ( ) 95. 飼料添加維他命 E 可以防止何種營養素變質?  
(A) 脂質 (B) 蛋白質 (C) 礦物質 (D) 醣類
- ( ) 96. 海水魚的餌料生物，其營養價值最重要決定因素為  
(A) 必須胺基酸含量 (B) 礦物質含量 (C) n3 脂肪酸含量 (D) 鐵質含量
- ( ) 97. 下列魚種那個不屬於鯉科?  
(A) 金魚 (B) 草魚 (C) 鱸魚 (D) 鯉魚
- ( ) 98. 水中含某物質 1ppm 指下列何者?  
(A) 1 噸升水中 1 公斤 (B) 1 升水中 1 克 (C) 1 公斤水中 1 克  
(D) 1 噸水中 1 克
- ( ) 99. 下列何種魚的能量需求會較低?  
(A) 鮭魚 (B) 鮪魚 (C) 石斑 (D) 海鱸
- ( ) 100. 甲魚呼吸靠下列何器官?  
(A) 肺 (B) 鰓 (C) 皮膚 (D) 腸