

單選(每題 2 分)

- 1 Which of the following promotes similarity among living things? a) Inheritance from a common ancestor b) environmental homogeneity c) Linnaeus binomial classification d) the second law of thermodynamics
- 2 The most common monomer of carbohydrates is a) water b) glucose c) amino acids d) fructose e) phospholipid
- 3 DNA is unique in that it can a) form bilayer b) come apart and reform c) mutate under UV d) replicate itself e) denature under high temperature
- 4 The shape of an enzyme, and its activity, can be reversibly altered by a) allosteric subunits b) amino acid substitution c) HCl d) high temperature e) staining
- 5 How many membranes comprises the nuclear envelopes? a) 4 b) 3 c) 2 d) 1 e) 0
- 6 Mitochondria are found in a) all cells b) plant cells c) animal cells d) fungus cells e) eukaryotic cells
- 7 Which of the following substances does not pass across cell membranes by simple diffusion? a) water b) CO₂ c) H⁺ d) NH₃
- 8 The proton pump in cells creates a negative membrane potential by transporting which ion out of a cell? a) H⁺ b) K⁺ c) Na⁺ d) Ca⁺⁺ e) Ba⁺
- 9 Which of the following is NOT true of glycolysis? a) substrate-level phosphorylation takes place b) ATP is used c) the end products are carbon dioxide and water d) ATP is formed e) it happens in all living cells
- 10 Within the mitochondrion, the proton gradient develops across the a) inner membrane b) outer membrane c) matrix d) intermembrane space e) nuclear membrane
- 11 Chemosynthetic autotrophs get their energy from a) heat b) light c) inorganic molecule d) organic molecule e) statics
- 12 Which of the following organisms is not an autotroph? a) fern b) fungus c) mites d) maize e) moss
- 13 Production of NADPH in a chloroplast takes place during a) cyclic photophosphorylation b) noncyclic photophosphorylation c) series photophosphorylation d) substrate-level photophosphorylation
- 14 In most plants, carbohydrate is transported from the leaves to other parts, where they are used, in the form of a) fructose b) sucrose c) maltose d) starch e) pentose
- 15 As mitosis begins, a condensed chromosome consists of two a) nuclei b) centromeres c) centrioles d) chromatids e) Golgi bodies
- 16 In DNA replication, the helix is unwound by which type of enzyme? a) transferase b) primase c) transcriptase d) helicase e) DNA polymerase
- 17 The signal to start translation is the initiator codon, usually AUG, the codon for a) methionine b) alanine c) leucine d) tryptophan e) tyrosine
- 18 Of the 64 codons, how many code for amino acids? a) 20 b) 4 c) 61 d) 64 e) 40
- 19 The wobble effect happens between a) codon and anticodon b) anticodon and amino acid c) GTP and UTP d) DNA and RNA e) nucleus and cytoplasm
- 20 About how much of the DNA in a eukaryotic cell is expressed at any one time? a) 80% b) 50% c) 10% d) 1% e) 0%
- 21 The assembly of a virus from already formed polymers occurs a) spontaneously b) by a series of enzyme-catalyzed reactions c) rapidly and consuming a large amount of ATP from the host cells d) outside the cell e) in the nucleus of the host cells
- 22 In the lytic cycle of a bacteriophage, the host DNA is a) replicated b) turned off c) turned on d) digested

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23. The trp operon is regulated in a different way from the lac operon; it is transcribed when
cell a) trypsin is needed by the cell b) trypsinogen is available to the cell c) there is not much tryptophan in the cell d) there is a lot of tryptophan in the cell
24. Restriction enzymes are synthesized by a) bacteria only b) yeast and bacteria only c) eukaryotic cells only d) plant cells only e) all kinds of cells
25. In recombinant DNA technology, a plasmid vector must be cleaved by a) 3 separate enzymes b) modified DNA ligase c) a heated alkaline solution d) the same enzyme that cleaves the donor genes.
26. Resistance to antibiotics is a genetic trait that spreads naturally from one type of bacterium to
of bacteria a) almost any other type of bacteria b) another bacteria of the same strain c) eukaryotic cells of all types d) any other cell containing copy DNA
27. The "sticky" ends of a fragmented DNA molecule are made of a) calcium salts b) endonuclease c) unpaired bases d) methyl groups e) phosphates
28. The somatic cells of each diploid organism all originated from a single a) gamete b) zygote c) autosome d) chiasma e) gene
29. In oogenesis, when a diploid cell in the ovary undergoes meiosis, how many ova result? a) 1 b) 2 c) 3 d) 4
30. How many different genotypes of gametes can an organism of genotype A/a, B/B, C/c produce? a) 3 b) 4 c) 9 d) 16 e) 6
31. The genetic basis of hemophilia, so common within European royal families, was revealed by studies of a) DNA sequences b) protein electrophoresis c) chromosome aberrations d) family pedigrees e) gene products of offspring
32. In a mating between two people of intermediate skin color, each heterozygous at all three gene loci for skin color, what is the chance their child will have very light skin? a) 1/64 b) 1/4 c) 3/8 d) 9/64 e) 3/4
33. The probability of a crossover occurring between two gene loci is proportional to a) the activity of the two loci b) how far the loci are from the centromere c) the distance between the two loci d) how tightly the chromosomes are packed in the nucleus e) number of chromosomes in the genome
34. The condition in which there are more than two complete sets of chromosomes is called a) aneuploidy b) polytene c) polysaccharide d) polyploidy e) aploidy
35. The wings of a bird and the wings of an insect are a) analogous b) homologous c) vestigial d) phylogenetic e) phyletic structures.
36. The unit of natural selection is the a) individual b) family c) population d) species e) community
37. Genetic drift occurs in populations that are very a) isolated b) small in number c) mobile d) adapted to local environment e) high in mutation rate
38. Natural selection acts on an organism's a) dominant alleles b) recessive, homozygous alleles c) phenotype d) combined genotype
39. Australia has unusual organisms because their evolution for the past 38 million years has been a) rapid b) slow c) isolated from other continent d) punctuated e) static
40. Surface appendages used by bacteria to attach to one another, and to host organisms, are called a) pili b) spirilla c) mesosomes d) thylakoids e) actinogen
41. The first eukaryotes appeared a) 800 million b) 1.5 billion c) 3 billion d) 4.5 billion e) 10 billion years ago.
42. Earthworms are in the phylum a) Platyhelminthes b) Annelida c) Arthropoda d) Pogonophora e) Mollusc
43. A hydra has the simplest form of nervous system for integrating the functions of the body, It is called a a) ladder system b) nerve net system c) ganglionic system d) ventral solid cord system e) window system

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- 44 The first organisms to give off oxygen gas were probably the
anaerobic chemoautotrophs a) methanogens b) cyanobacteria c)
d) Euglena e) oxen
- 45 Bryophytes and ferns need free water for a) fertilization b) mitosis c) meiosis d) cytokinesis
- 46 Which type of tissue forms glands? a) epithelial b) connective c) nervous d) muscle
- 47 Interstitial fluid closely resembles a) lake water b) pond water c) rainwater d) seawater
- 48 A lubricant, mucin, in saliva is made of a) polyunsaturated fats b) actin and myosin c) glycoprotein
d) phospholipids
- 49 Antibodies are synthesized by a) phagocytes b) B lymphocytes c) helper T lymphocytes d) killer
lymphocytes
- 50 The hormone adrenalin is the same as the neurotransmitter a) epinephrine b) norepinephrine c) GABA
d) Ach

請詳細閱讀下面的文章 (Sea Life) 後，以簡略的方式以中文寫出每一段的主要內容。盡可能表達出原來的意義，但不必逐句及逐字翻譯。若干比較專門的名詞請使用已知之相對中文俗名，請勿臨場自創新詞，有困難的名詞可以以原文代替，但相對分數上會略有影響。評分方式主要根據你對於原文的理解、表達通順的程度和完成的比率等。

(總分 100 分)

(不得使用紙本或電子字典)

SEA LIFE

Many of the Micronesian reef-dwelling fish are diurnal, which means that they are active during the day. The largest group of these diurnal species spend most of their active hours a short distance above the coral reef. These fishes are the colorful and flamboyant species that people generally associate with the coral reef habitat. Included in this conspicuous group are wrasses, damselfish, fairyfish, basslets, groupers, butterfly fish, surgeon fish, parrotfish, snappers, angelfish, triggerfish, hawkfish, and some goatfish.

On the other hand, cryptic (hidden) species of fish are usually small, and hide within the reef or rely on camouflage to prevent detection. Some of the region's more cryptic fishes are morays, gobies, blennies, pipefish, and most scorpionfish. Many of these fish live in the reef by day and emerge at night to feed. Soldierfish, squirrel fish, cardinal fish, bigeyes, morays, and scorpionfish are some of the cryptic species that are active at night.

There are also many species of fish that live on or in the sand, mud, and debris of the shore area. Most members of this group eat small invertebrates. On or just beneath the mud or sand, snake eels, lizard fish, flatfish, sandperches, and many types of gobies can be found. Just above the mud and sand live sanddivers, wormfish, and some wrasses.

Among the species of fish that inhabit the reef area, there are a few that are potentially dangerous to human beings.

Some larger species of reef-inhabiting fishes have been known to bite people. Sharks are included in this group. Two of the most dangerous types of reef sharks are the tiger sharks and the grey reef sharks.

Tiger sharks are one of the world's most dangerous sharks. They can be recognized by their large size and tiger-like stripes. Tiger sharks are usually

found in the deeper water along the outer coral reef areas. The grey reef shark is more commonly encountered by divers. This shark is very aggressive and territorial, and may mistake a diver for a competitor.

Barracudas and moray eels are the other types of reef fishes that are capable of severely biting a human being. Moray eels live within the coral reef. A diver who thrusts his hand into a hole that is occupied by a moray eel is likely to be perceived as an intruder and, therefore, bitten.

Even more dangerous than the biting fishes are the fishes that possess venomous spines. Scorpionfish and rabbitfish are the most dangerous members of this group. The stonefish, which is a type of scorpionfish, has even caused human deaths. The scorpionfish's spines are capable of penetrating tennis shoes! Many people fear the rabbitfish's sting as much as that of the stonefish.

Being attacked by an eel or stung by a scorpionfish may make the reef waters seem frightening, but the most dangerous of the reef fishes are not those that attack man, but those that man eats.

Puffers and boxfish should never be eaten because they contain a deadly poison called Tetrodotoxin. Ciguatera is another substance that is dangerous for humans to eat. This poison is produced by small organisms that live in algae.

When a fish eats this algae, the poison collects in the fish's flesh. When the smaller fish with the poisoned flesh is eaten by a larger fish, the larger fish's flesh also becomes contaminated. When the larger fish is caught and eaten by people, the poison can cause tingling in the lips, reversal of the sensations of hot and cold, weakness, vomiting, diarrhea, and cardiac arrest.

It is important to realize the Micronesia does not include the territories that are included in this issue. However, the sea life of Micronesia is the same as the sea life of the United States territory of American Samoa.

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Source: Monkeyshines on America, Jan98 Territories Issue: Oceania, p28, 3p
Item: 3652546