高雄醫學大學 113 學年度學生轉系考試【普通生物學】試題

說明：
一、請一律以「答案卷」作答，作答時不得使用鉛筆，違者該科答案卷不予計分；限用黑色或藍色墨水的筆書寫。
二、考生應在答案卷上規定範圍內作答，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、答案卷以每人一張為限，不得要求增補；試題與答案卷必須繳回，不得攜出試場。

選擇題 50 題 (每題 2 分，共 100 分)

1. Which of the following ECM (extracellular matrix) molecules is the major one to provide tensile strength?

(A) fibronectin
(B) elastin
(C) laminin
(D) collagen

2. Which element(s) is common to all organic molecules?

(A) carbon
(B) nitrogen
(C) oxygen
(D) hydrogen

3. Amongst all others, which is the largest macromolecule?

(A) disaccharide
(B) polysaccharide
(C) monosaccharide
(D) glucose

4. If a specimen contains 30% adenine in its DNA then how much cytosine will there be?

(A) 80%
(B) 70%
(C) 20%
(D) 30%

5. The movement of sucrose and H+ into the cell by a common membrane protein reflects transport through a ____.

(A) mechanosensitive channel
(B) symporter
(C) uniporter
(D) voltage-gated channel

6. The release of insulin from pancreatic cells occurs by ____.

(A) exocytosis
(B) endocytosis
(C) phagocytosis
(D) pinocytosis

7. Which of the following is **NOT** a process of aerobic respiration?

(A) citric acid cycle
(B) oxidative phosphorylation
(C) lactate fermentation
(D) acetyl CoA formation

8. Cellular respiration produces the most chemical in the form of ATP from which of the following?

(A) oxidative phosphorylation
(B) the citric acid cycle
(C) the electron transport chain
(D) glycolysis

9. Where are the protein complexes associated with the electron transport chain located?

(A) mitochondrial matrix
(B) mitochondrial inner membrane
(C) mitochondrial intermembrane space
(D) mitochondrial membrane

10. In addition to ATP, what are the end products of glycolysis?

(A) CO_2 and NADH
(B) H_2O, NADH, and citrate
(C) CO_2 and pyruvate
(D) NADH and pyruvate

11. Which of the following is **NOT** considered a secondary metabolite?

(A) terpenoids
(B) flavonoids
(C) glucose
(D) alkoloids

12. The production of second messengers in signal transduction offers at least two advantages, speed and ____.

(A) specificity
(B) amplification
(C) affinity
(D) reversibility

13. The bones and cartilage in animals serve the same function as _____ in plants?

(A) wood
(B) phloem
(C) capillaries
(D) xylem

14. In DNA replication, how many replication forks are there at a replication origin?

(A) 1
(B) 2
(C) 3
(D) 4

15. _____ is directly produced from the transcription of a eukaryotic gene.

(A) rRNA
(B) Protein
(C) mRNA
(D) pre-mRNA

16. If a DNA template strand has a sequence of 3’ TACAATGTAGCC 5’, then the RNA produced from it will be which sequence?

(A) 3’ AUGUUACAUCGG 5’
(B) 3’ TACAATGTAGCC 5’
(C) 5’AUGUUACAUCGG 3’
(D) 5’ATGTTACATCGG 3’

17. Which of the following molecule(s) exhibits self-splicing?

(A) rRNA and tRNA
(B) tRNA
(C) mRNA
(D) rRNA and mRNA

18. The following codons and the amino acids they encode is as follows:
AUG = Start or Met; UUU, UUC = Phe; UUA, UUG = Leu; UCU, UCC = Ser; CCU, CCC = Pro; ACU, ACC = Thr; UGA = Stop.
The 5'ACU-UUC-ACU-AUG-UUU-UUA-UCC-UCC-ACU-CCU-UGA 3' mRNA transcript results in which of the following polypeptide sequences?

(A) Thr-Phe-Thr
(B) Phe-Leu-Ser-Ser-Thr-Pro
(C) Thr-Phe-Thr-Phe-Leu-Ser-Ser-Thr-Pro
(D) Met-Phe-Leu-Ser-Ser-Thr-Pro

19. According to the source of food, which of these is a heterotroph?

(A) a fish
(B) a moss plant
(C) an oak tree
(D) a corn plant

20. If primary production increases in an ecosystem, it would be reasonable to expect that _____.

(A) nutrients are a limiting factor
(B) the biomass of herbivores would increase
(C) cellular respiration would increase
(D) the trophic web has become more complex

21. The productivity and area hypotheses together suggest that a large, tropical continent would likely have _____ species richness.

(A) low
(B) mature
(C) poor
(D) high

22. Similar species can coexist in a community because of _____.

(A) resource partitioning
(B) allopatric competition and sympatric competition
(C) allopatric competition
(D) sympatric competition

23. Several butterfly species that are edible to birds have very similar color patterns to the generally inedible Monarch butterfly. This is best described as an example of

(A) Mullerian mimicry
(B) subterfuge
(C) Batesian mimicry
(D) crypsis

24. _____ is the observable response of organisms to external or internal stimuli.

(A) Ecology
(B) Behavior
(C) Allomonal mediation
(D) Pheromonal mediation

25. The Earth's surface releases _____ that is absorbed by the atmosphere, stabilizing or raising atmospheric temperature.

(A) long-wave infrared radiation
(B) ultraviolet radiation
(C) near-ultraviolet radiation
(D) activation energy

26. A common adaptation of coastal plants that grow on sand dunes is _____.

(A) secretion of proteinaceous threads
(B) broad leaves for enhanced photosynthesis
(C) deep roots to extract moisture
(D) increased transpiration of water

27. The process by which cells acquire specialized forms and functions is called

(A) cell growth
(B) cell differentiation
(C) cell communication
(D) cell elasticity

28. Which embryonic structure ultimately forms the digestive tract?

(A) archenteron
(B) blastopore
(C) blastocoel
(D) notochord

29. Maintenance of the uterine lining during pregnancy in mammals requires

(A) estradiol
(B) testosterone
(C) cortisol
(D) progesterone

30. An animal that can fertilize its own eggs is known as _____.

(A) producing asexually
(B) a synchronous hermaphrodite
(C) a sequential hermaphrodite
(D) a protrandous hermaphrodite

31. In mammals, gestation is defined physiologically as the time from _____ to birth.

(A) fertilization
(B) implantation
(C) blastocyst formation
(D) ovulation

32. Which of the following is an amine hormone important in the stress response in vertebrates?

(A) epinephrine
(B) melatonin
(C) cortisol
(D) dopamine

33. Which of the following gives the correct rank order for relative toxicity (most to least) of the primary nitrogenous wastes used by different animals?

(A) urea → uric acid → ammonia
(B) uric acid → ammonia → urea
(C) ammonia → urea → uric acid
(D) ammonia → uric acid → urea

34. The proportion of the total air pressure that is exerted by an individual gas in a gas mixture is referred to as the _____ of that gas.

(A) gas-specific gravity
(B) incomplete pressure
(C) partial pressure
(D) total pressure

35. "Hematocrit" is a measure of the total blood volume accounted for by _____.

(A) leukocytes
(B) plasma
(C) platelets
(D) erythrocytes

36. Which structure prevents blood flowing back into the heart from the aorta between heartbeats?

(A) mitral valve
(B) semilunar valve
(C) tricuspid valve
(D) atrioventricular valve

37. Essentially all exchange of gases and other materials between the circulatory system and tissues of the body or the outside world (e.g., in the lungs) occurs in the _____ .

(A) lymphatic system
(B) veins
(C) capillaries
(D) arteries heart

38. Which part of the neuron is responsible for receiving information?

(A) nucleus
(B) axon
(C) soma
(D) dendrite

39. What proportion of the brain (approximately) is made up of neurons?

(A) 100%
(B) 2%
(C) 30%
(D) 50%

40. Which of the following carry electrical signals AWAY from the CNS?

(A) motor neuron
(B) glial cell
(C) interneuron
(D) sensory neuron

41. Which of the following tissue types are attached to a basal lamina or basement membrane?

(A) muscular
(B) epithelial
(C) nervous
(D) connective

42. In plant, a flower could best be described as which of the following?

(A) modified stems
(B) modified petals
(C) modified leaves
(D) primary buds

43. In plant ovary, male gametophytes are produced by which of the following processes?

(A) mitosis
(B) gametogenesis
(C) meiosis
(D) neither mitosis nor meiosis

44. Two important plant hormones that lead to a successful germination of seeds is:

(A) auxin and cytokinin
(B) ethylene and auxin
(C) cytokinin and ABA
(D) ABA and GA

45. When scientists are attempting to breed for increased ability of a plant to utilize CO2 they must consider improvement of _____.

(A) bundle-sheath cells
(B) stomatal openings
(C) mesophyll air spaces
(D) chlorophyll production

46. In the carbon fixation process, C4 plant use which compound to fix CO_2?

(A) OAA
(B) Pyruvate
(C) Malate
(D) PEP

47. Regarding light-regulated plant morphogenesis, phytochrome (P), which statement is true?

(A) Pfr can promote the flowering of short-day plant
(B) Pfr and Pr are the same protein in their amino acid sequence
(C) Pr can be converted to Pfr under the dark condition
(D) Pr is abundantly generated at the day time

48. Which step is **NOT** the event can be observed in the double fertilization of angiosperm?

(A) 1 sperm fertilizes egg to become a diploid (2n) embryo
(B) The fertilized endosperm is triploid (3n)
(C) 2 sperm nuclei in the pollen grain
(D) an elongated pollen tube contains at least 2 nuclei

49. In plant photosynthesis, regarding the produced NADPH, which statement is **CORRECT** ?

(A) NAPDH can release solar energy by removing phosphor (P) element.
(B) NADPH is a hydrogen (H element) supplier in Calvin cycle.
(C) NADPH can be generated in a cyclic electron transport of photophosphorylation.
(D) NADPH and NADH are two different compounds with different chemical backbone.

50. In bacteria, the donor cell makes _____ whose function is to bring F-cells close enough to transfer a _____ to the recipient.

(A) an F factor, fertility plasmid
(B) an F factor, replicated F factor
(C) a sex pilus, double strand of DNA
(D) a sex pilus, single strand of DNA