Part I. 選擇題（單選；40分）※ 注意：請於試卷上「選擇題作答區」依序作答。

1. Microsporocytes divide by _____, forming _____.
   A) mitosis; haploid microsporocytes
   B) mitosis; diploid microsporocytes
   C) meiosis; haploid microspores
   D) mitosis; diploid microspores
   E) meiosis; haploid megaspores
2. The _____ is usually the first structure to emerge from a germinating seed.
   A) epicotyl B) hypocotyl C) cotyledon D) radicle E) coleoptile
3. _____ are recently discovered chemical signals that are related to animal steroids.
   A) Systemins B) Auxins C) Brassinolides D) Salicylic acids E) Jasmonates
4. Which of the following statements about fungi is FALSE?
   A) They are heterotrophic organisms.
   B) Most are multicellular.
   C) They are more closely related to plants than to animals.
   D) The largest living organism may be a fungus.
   E) Only the insects have a greater number of species.
5. In the oomycetes, one or more eggs are produced in a(n):
   A) antheridium. B) zoospore. C) zygospore. D) oospore. E) oogonium.
6. In etiolated pea seedlings, ethylene causes _____ longitudinal growth, _____ radial expansion of epicotyls, and _____ growth of epicotyls.
   A) increased; increased; horizontal
   B) increased; decreased; horizontal
   C) decreased; increased; horizontal
   D) decreased; increased; angular
   E) increased; decreased; angular
7. When tobacco pith callus is treated with equal concentrations of auxin and kinetin, _____ is(are) formed.
   A) more callus B) roots C) buds D) leaves E) vascular tissue
8. The primary function of _____ is as an anti-oxidant.
   A) chlorophyll *a*
   B) carotenoids
   C) phycobilins
   D) bacteriochlorophyll
   E) chlorobium chlorophyll
9. Within the plant cell, glycolysis occurs in:
   A) mitochondria.
   B) the cytosol.
   C) chloroplasts.
   D) the endoplasmic reticulum.
   E) the nucleus.
10. Which of following lists the correct developmental sequence in eudicots, where I is the globular stage; II, the heart stage; III, the proembryo; IV, the torpedo stage; and V, the zygote?
    A) V, III, I, II, IV
    B) I, V, IV, II, III
    C) III, V, II, IV, I
    D) V, I, III, II, IV
    E) V, III, II, I, IV
11. In germinating barley seeds, the _____ releases gibberellins, which then diffuse to the _____ where they stimulate the synthesis of hydrolytic enzymes.
    A) endosperm; aleurone layer
    B) embryo; aleurone layer
    C) aleurone layer; embryo
    D) aleurone layer; endosperm
    E) embryo; seed coat
12. In seed plants, the _____ is called the nucellus.
    A) young sporophyte
    B) megagametophyte
    C) megaspore
    D) megasporangium
    E) embryo
13. Which of the following lists the taxonomic categories in the correct hierarchy, from most to least inclusive, under kingdom?
    A) class, phylum, order, family, genus, species
    B) order, class, phylum, family, genus, species
    C) phylum, class, order, family, genus, species
    D) phylum, order, class, family, genus, species
    E) order, phylum, family, class, genus, species

接背面

14. In plants, necrosis is the:
A) localized death of tissues.
B) yellowing of leaves.
C) loss of chlorophyll.
D) development of tumors.
E) healing of wounds.

15. Which of the following indicates the correct sequence of tissues through which water moves from the soil into the root?
A) root hairs, endodermis, exodermis, cortical cells, vascular cylinder
B) root hairs, endodermis, cortical cells, vascular cylinder, exodermis
C) exodermis, endodermis, epidermis, vascular cylinder, cortical cells
D) epidermis, exodermis, cortical cells, endodermis, vascular cylinder
E) epidermis, endodermis, exodermis, cortical cells, vascular cylinder

16. Cytokinins are synthesized in ____ and transported from there to all other parts of the plant.
A) stems **B)** shoot apical meristems **C)** leaves **D)** roots **E)** fruits

17. In contrast to the starch-statolith and the plasmalemma central control hypotheses, the hydrostatic pressure hypothesis proposes that gravity is sensed by:
A) statoliths.
B) amyloplasts.
C) the pressure of the protoplast on the cell wall.
D) tension exerted on the plasma membrane by the cytoskeleton.
E) tension exerted on the plasma membrane by the protoplast.

18. In studies of leaf senescence, when an excised leaf containing radioactive amino acids is spotted with a kinetin-containing solution, the spot:
A) turns yellow and becomes nonradioactive.
B) turns yellow and becomes more radioactive.
C) remains green and becomes nonradioactive.
D) remains green and becomes more radioactive.
E) turns brown and becomes nonradioactive.

19. Which of the following statements about abscisic acid is FALSE?
A) It is a growth inhibitor.
B) It induces the closing of stomata.
C) It prevents premature seed germination.
D) It inhibits the production of seed storage proteins.
E) It stimulates the yellowing of leaves.

20. Which of the following is characteristic of Photosystem I but NOT Photosystem II?
A) It contains chlorophylls but not carotenoids.
B) It can function only in association with the other photosystem.
C) It donates electrons to an electron transport chain.
D) It contains P_{700} at the reaction center.
E) It splits water to release oxygen.

Part II. 選擇題（單選；40分） ※ 注意：請於試卷上「選擇題作答區」依序作答。

21. Blood samples taken from an individual who went on diet for 24 hours should have
(A) low levels of insulin
(B) Low levels of glucagon
(C) high levels of thyroxin
(D) high levels of epinephrine

22. All of the following statements about hormones are correct except
(A) They are produced by endocrine glands.
(B) They travel to different areas of the body.
(C) They are transported by the circulatory system.
(D) They are used to communicate between different individuals.

接次頁

23. After sperm cells are produced, they are mainly stored in the
(A) urethra. (C) epididymis.
(B) seminal vesicles. (D) bulbourethral gland.

24. Ovulation is triggered by
(A) high levels of LH. (C) low levels of LH.
(B) high levels of estrogen. (D) high levels of progesterone.

25. The sodium-potassium pump of neurons pumps
(A) Na^+ and K^+ into the cell.
(B) Na^+ and K^+ out of the cell.
(C) Na^+ into the cell and K^+ out of the cell.
(D) Na^+ out of the cell and K^+ into the cell.

26. Which developmental sequence is correct?
(A) cleavage, morula, blastula, and gastrula
(B) cleavage, gastrula, morula, and blastula
(C) cleavage, blastula, gastrula, and morula
(D). morula, cleavage, gastrula, and blastula

27. The threshold potential of a membrane
(A) is equal to about 35 mV.
(B) closes K^+ channels to recover potential.
(C) opens voltage-sensitive gates that results in the rapid outflow of Na^+
(D) is the depolarization that is needed to generate an action potential.

28. Which of the following RNA sequences is transcribed from
5'-ATCCCCCATGTATCT-3'
(A) TAGGGGGTACATAGA (C) UAGGGGGUACAUAGA.
(B) ATCCCCCATGTATCT (D) UACCCCCUACAUACA

29. In a DNA sequence, the base-pairing analysis would show
(A) A+T=G+C. (C) A=G or T=C.
(B) A+G=C+T. (D) A/C=G/T

30. Urea is produced in the
(A) liver from glycogen. (C) kidney from glucose.
(B) liver from NH_3 and CO_2. (D) kidney from glycerol and fatty acid.

31. Which of the following structures does <u>not</u> belong to epithelial tissues?
(A) stratified columnar. (C) stratified squamous.
(B) pseudostratified cuboidal. (D) pseudostratified ciliated columnar.

32. Which of the following tissues does <u>not</u> provide an exchange surface?
(A) lung. (C) muscle.
(B) kidney. (D) intestine.

33. Which of the following structures is the inmost layer of blood vessels?
(A) nerve cells. (C) connective tissue.
(B) smooth muscle. (D) endothelial cells.

34. What are essential amino acids?
(A) Those that are absent in fruits and vegetables.
(B) The only amino acids found in human proteins.
(C) The amino acids can not be synthesized by the most animals.
(D) Those amino acids are more abundant in vegetables than in meat.

接背面

35. Which of the following vitamin is incorrectly associated with its function?
(A) Vitamin K - production of RBCs.
(B) Vitamin C - synthesis of connective tissue.
(C) Vitamin D - calcium absorption and bone formation.
(D) Vitamin E - protection of membrane phospholipid from oxidation.

36. Each cardiac cycle in human is
(A) 0.1 second.
(B) 0.4 second.
(C) 0.3 second.
(D) 0.8 second.

37. Which of the following chambers or vessels carry oxygenated blood?
(A) left atrium, left ventricle, and aorta.
(B) right atrium, left ventricle, and vena cava.
(C) left atrium, left ventricle, and pulmonary artery.
(D) right atrium, right ventricle, and pulmonary vein.

38. A digestive enzyme, pepsinogen is secreted from the
(A) liver.
(B) large intestine.
(C) stomach.
(D) small intestine.

39. Which of the following sequences is the correct pathway in mammalian circulation?
(A) right ventricle → aorta.
(B) pulmonary vein → left atrium.
(C) vena cava → right ventricle.
(D) left ventricle → pulmonary vein.

40. The structure between esophagus and stomach in human GI tract is
(A) rectum.
(B) cardiac orifice.
(C) duodenum.
(D) pyloric sphincter.

III. 問答題（20 分）※ 注意：請於試卷上「非選擇題作答區」依序作答，並應註明作答之題號。

1. 請畫出細胞週期(cell cycle)的 4 個主要時期，並標出 G_0 期。再依此區分胚胎細胞、成人神經細胞及行減數分裂的卵細胞。
2. 請舉例說明外來種生物對原生種生物的影響。

試題隨卷繳回