

生物學試題

(限用答案本作答)

Choose the best answer (2% each)

1. Anabolic pathways
 - a) do not depend on enzymes
 - b) depend on enzymes.
 - c) Consume energy to build up polymers from monomers.
 - d) Release energy as they degrade polymers to monomers.
 - e) Both B and C are correct.
2. ATP generally energizes a cellular process by
 - a) Releasing heat upon hydrolysis.
 - b) Acting as a catalyst.
 - c) Direct chemical transfer of a phosphate group.
 - d) Releasing ribose electrons to drive reactions.
 - e) Emitting light flashes.
3. Which of the following I not found in a prokaryotic cell?
 - a) DNA
 - b) Cell wall
 - c) Plasma membrane
 - d) Ribosomes
 - e) Endoplasmic reticulum
4. Organelles that contain DNA include
 - a) Ribosomes
 - b) Mitochondria
 - c) Chloroplasts
 - d) Only B and C are correct
 - e) A, B, and C are correct
5. Cells would be unable to form cilia or flagella if they do not have
 - a) Ribosomes
 - b) Chloroplasts
 - c) Centrioles
 - d) Plastids
 - e) Actin
6. All of the following processes take material into cells except
 - a) Pinocytosis
 - b) Endocytosis
 - c) Exocytosis
 - d) Active transport
 - e) Carrier-facilitated diffusion
7. How many carbon atoms feed into the Krebs cycle?
 - a) 2
 - b) 4
 - c) 6
 - d) 8
 - e) 10
8. Carbon skeletons to be broken down during cellular respiration can be obtained from

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- a) Polysaccharides
 - b) Proteins
 - c) Lipids
 - d) A and B
 - e) A, B, and C
9. Pyruvate is formed
- a) On the inner mitochondrial membrane
 - b) In the mitochondrial matrix
 - c) On the outer mitochondrial membrane
 - d) In the nucleus
 - e) In the cytosol
10. The color of light least effective in driving photosynthesis is
- a) Blue
 - b) Red
 - c) Orange
 - d) Green
 - e) Yellow
11. Noncyclic photophosphorylation uses light energy to synthesize
- a) ADP and ATP
 - b) ATP and P700
 - c) ATP and NADPH
 - d) ADP and NADP
 - e) P700 and P680
12. Where does the Calvin cycle of photosynthesis take place?
- a) Stroma of the chloroplast
 - b) Thylakoid membrane
 - c) Cytoplasm surrounding the chloroplast
 - d) Chlorophyll molecule
 - e) Outer membrane of the chloroplast
13. Which of the following are widely used second messengers in signal-transduction pathways?
- a) Calcium ions
 - b) Cyclic AMP
 - c) Nitric oxide
 - d) A and B
 - e) A, B and C
14. The enzyme glycogen phosphorylase is directly activate by
- a) Cyclic AMP
 - b) GTP
 - c) IP3
 - d) Calcium ions
 - e) Protein kinases
15. All of the following occur during mitosis except
- a) The condensing of chromosomes
 - b) The uncoupling of chromatids at the centromere

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- c) The formation of a spindle
 - d) The synthesis of DNA
 - e) The disappearance of the nucleolus
16. Which of the following organisms does not reproduce cells by mitosis and cytokinesis?
- a) Cow
 - b) Bacterium
 - c) Mushroom
 - d) Cockroach
 - e) Banana tree
17. In animals, meiosis results in gametes, and fertilization results in
- a) Spores
 - b) Somatic cells
 - c) Zygotes
 - d) Sporophytes
 - e) Clones
18. Crossing-over occurs during which phase of meiosis?
- a) Prophase I
 - b) Anaphase I
 - c) Telophase I
 - d) Prophase II
 - e) Metaphase II
19. In a dihybrid cross, the expected proportion of offspring showing both recessive traits is
- a) 1/16
 - b) 3/16
 - c) 9/16
 - d) 1/4
 - e) 1/32
20. A 1:2:1 phenotypic ratio in the F₂ generation of a monohybrid cross is a sign of
- a) Complete dominance
 - b) Multiple alleles
 - c) Incomplete dominance
 - d) Polygenic inheritance
 - e) pleiotropy
21. A cell that has $2n+1$ chromosomes
- a) Is trisomic
 - b) Is monosomic
 - c) Is aneuploid
 - d) Is polyploidy
 - e) Is both A and C
22. Which of the following names is least related to the others
- a) Griffith
 - b) Avery
 - c) Meselson
 - d) Watson

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- e) Hershey
23. Which of the following is least related to the others in the list
- a) Transformation
 - b) Phage
 - c) DNA
 - d) Griffith
 - e) Avery
24. A particular triplet of bases in the coding sequence of DNA is AGT. The corresponding codon for the mRNA transcribed is
- a) AGT
 - b) UCA
 - c) TCA
 - d) AGU
 - e) Either UCA or TCA, depending on wobble in the first base
25. All of the following are transcribed from DNA except
- a) Protein
 - b) Exons
 - c) rRNA
 - d) tRNA
 - e) mRNA
26. Which of the following is not involved in transcription?
- a) Initiation factors
 - b) RNA polymerase
 - c) TATA box
 - d) Terminator
 - e) Promoter
27. Of the following, which is least related to the others?
- a) Viral envelope
 - b) Viroids
 - c) Provirus
 - d) Prophage
 - e) Prions
28. The *lac* operon governs the expression of genes concerned with
- a) Prophage integration
 - b) Provirus integration
 - c) Lactate production
 - d) Lactose production
 - e) Lactose utilization
29. Muscle cells and nerve cells in one species of animal owe their differences in structure to
- a) Having different genes
 - b) Having different chromosomes
 - c) Using different genetic codes
 - d) Expressing different genes
 - e) Having unique ribosomes

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30. A eukaryotic gene typically has all of the following features except
- Introns
 - A promoter
 - an operator
 - control elements
 - a terminator
31. Which of these is not a carcinogen?
- Testosterone
 - Cigarette smoke
 - UV light
 - Fat
 - All of the above are carcinogens
32. Specific DNA fragments of a genomic library are contained in
- Recombinant plasmids of bacteria
 - Recombinant viral DNA
 - Eukaryotic chromosomes
 - A and B
 - A, B, and C
33. What is the designation of the short arm of a chromosome?
- l
 - p
 - q
 - r
 - s
34. Catastrophism was Cuvier's attempt to explain
- Evolution
 - The fossil record
 - Uniformitarianism
 - The origin of new species
 - Natural selection
35. Which of the following is the unit of evolution? In other words, which of the following can evolve in the Darwinian sense?
- Gene
 - Chromosome
 - Individual
 - Population
 - Species
36. Most copies of harmful recessive alleles in a population are carried by individuals that are
- Haploid
 - Polymorphic
 - Homozygous for the allele
 - Heterozygous for the allele
 - Afflicted with the disorder caused by the allele
37. Natural selection is most closely related to

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- a) Diploidy
 - b) Gene flow
 - c) Genetic drift
 - d) Assortative mating
 - e) Differential reproductive success
38. How many half-lives should have elapsed if 12.5% of the parental radioisotope remains in a fossil at the time of analysis?
- a) One
 - b) Two
 - c) Three
 - d) Four
 - e) Five
39. The first genetic material was most likely a(n)
- a) DNA polymerase
 - b) DNA oligonucleotide
 - c) RNA polymerase
 - d) Protein
 - e) Protein enzyme
40. In an aerobic prokaryotic cell, the molecules of the respiration chain should be located in the
- a) Cytosol
 - b) Cristae
 - c) Cell wall
 - d) Plasma membrane
 - e) Mitochondrial matrix
41. Which structure is the outermost component of a bacterium?
- a) Nucleoid region
 - b) Capsule
 - c) Cell wall
 - d) Ribosome
 - e) Plasma membrane
42. All of the following might have arisen by endosymbiosis except
- a) Basal bodies and centrioles
 - b) Endoplasmic reticulum
 - c) Mitochondria
 - d) Cilia and flagella
 - e) Chloroplasts
43. The following characteristics all helped seedless plants evolve to be adapted to land except
- a) A dominant gametophyte
 - b) Vascular tissue
 - c) A waxy cuticle
 - d) Stomata
 - e) A branched sporophyte
44. Which of the following is not consistent with distinguishing an animal from other life forms?
- a) Multicellular, autotrophic, eukaryote

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- b) Structural proteins such as collagen
 - c) Impulse conduction and movement
 - d) Regulatory genes called Hox genes
 - e) Sexual reproduction
45. A lophophore is used by bryozoans, phoronids, and brachiopods
- a) For locomotion
 - b) As a larval stage
 - c) For feeding
 - d) For sensory reception
 - e) As a skeletal system
46. A unifying principle of cellular energetics is
- a) Active transport
 - b) Chemiosmosis
 - c) ATP hydrolysis
 - d) Water potential
 - e) Source-sink relationships
47. Where and by which process are sperm produced in plants?
- a) Meiosis in pollen grains
 - b) Meiosis in anthers
 - c) Mitosis in male gametophytes
 - d) Mitosis in the micropyle
 - e) Mitosis in the embryo sac
48. Average blood pressure is lowest in which structure?
- a) The aorta
 - b) Arteries
 - c) Arterioles
 - d) Capillaries
 - e) Vena cavae
49. What attracts helper T cells to macrophages?
- a) Lymphotoxins
 - b) Antibodies
 - c) Interferons
 - d) Interleukins
 - e) antigens
50. Cell-mediated immunity is mostly the function of
- a) T cells
 - b) B cells
 - c) Erythrocytes
 - d) Complement cells
 - e) Cytotoxic cells

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