類組：化學類　科目：生物化學(1006)　　共 10 頁 第 1 頁

單選題 (每題 2.5 分，共 100 分)

1. Which of the following is not true of the nucleus?
   (A) It is found in both eukaryotes and prokaryotes
   (B) It contains the cell's "genetic blueprint"
   (C) It exerts a profound influence over all cellular metabolic functions
   (D) It contains chromatin fibers
   (E) It is bounded by membrane

2. Pyruvate, the end product of glycolysis, enters the citric acid cycle after it has been converted to _____.
   (A) acetyl-CoA
   (B) acetaldehyde
   (C) glucose
   (D) acetic acid
   (E) lactic acid

3. The HIV virus infects primarily _____.
   (A) liver cells
   (B) skin cells
   (C) brain cells
   (D) red blood cells
   (E) cells in the immune system

4. Which of the following statements is not true of a spontaneous process?
   (A) The enthalpy value is negative
   (B) The entropy value is negative
   (C) The free energy value is positive
   (D) The work value is negative
   (E) The enthalpy value is positive

5. The characteristic enzymes of gluconeogensis are found in the cytosol, EXCEPT for _____.
   (A) pyruvate carboxlyase, which is in the mitrochondria
   (B) pyruvate carboxylase, which is in the glycogen granule
   (C) fructose-1,6-bisphosphatase, which is in the mitochondria
   (D) fructose-1,6-bisphosphatase, which is in the glycogen granule
   (E) None of the above

注意:背面有試題

6. Planarity of the peptide bond means that rotation is allowed about the bond linking the _____ and the carbon of the peptide bond, and also about the bond linking the _____ to the adjacent α-carbon.

(A) α-carbon, carbonyl carbon
(B) β-carbon, carbonyl carbon
(C) carbonyl carbon, nitrogen of the peptide bond
(D) α-carbon, nitrogen of the peptide bond
(E) none are true

7. The major production of ATP during aerobic metabolism occurs when electrons from _____ and _____ are transferred to_____.

(A) $FADH_2$, NADH, H_2O
(B) $FADH_2$, NADH, O_2
(C) O_2, $FADH_2$, NADH
(D) $FADH_2$, O_2, NADH
(E) NADH, O_2, $FADH_2$

8. The hormones, glucagon and epinephrine, stimulate glycogen breakdown to G-6-P _____.

(A) using ATP as the phosphoryl donor
(B) only in muscle cells
(C) only in the liver
(D) directly, by binding to glycogen phosphorylase
(E) indirectly, by first stimulating adenylate cyclase to make cAMP

9. All of the following disaccharides are reducing sugars EXCEPT:

(A) lactose.
(B) maltose.
(C) sucrose.
(D) cellulose.
(E) isomaltose.

10. Cholesterol is essential for normal membrane functions because it _____.

(A) cannot be made by higher organisms, e.g. mammals
(B) spans the thickness of the bilayer
(C) catalyzes lipid flip-flop in the bilayer
(D) keeps membranes fluid
(E) All of the above are correct

11. Alcohol dehydrogenase is an example of which of the following classes of enzymes?

(A) Oxidoreductases
(B) Transferase
(C) Hydrolase
(D) Lyase
(E) Isomerase

12. The glycerol phosphate shuttle functions in _____.

(A) anaerobic glycolysis for regeneration of NAD
(B) aerobic glycolysis to transport NADH equivalents resulting from glycolysis into mitochondria
(C) lipid catabolism
(D) triglyceride synthesis
(E) All of the above are correct

13. Membranes with unsaturated fatty acids in their components are more flexible and fluid because:

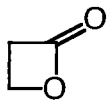
(A) Unsaturated fatty acids pack closely together to form ordered arrays.
(B) Unsaturated fatty acids bend at the double bond preventing close packing.
(C) Saturated fatty acids have a "kink" that produces more fluid aggregates.
(D) Unsaturated fatty acids have cis double bonds that prevent formation of the "kink."
(E) All of the above are correct.

14. In the absence of oxygen, the primary purpose of fermentation is to _____.

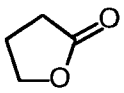
(A) oxidize glucose to generate reduce electron carriers
(B) generate a proton gradient for ATP synthesis
(C) regenerate NAD^+ from NADH allowing glycolysis to continue
(D) produce amino acids for protein synthesis
(E) generate alcohol for beverages

15. Which of the following is a δ-lactone?

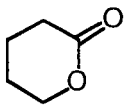
(A)



(B)

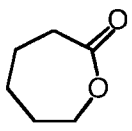


(C)



(D)

(E)



16. Which of the following statements correctly identifies a type II restriction endonuclease?

(A) They work on both DNA and RNA.
(B) They recognize a palindromic sequence and cut just before the palindromic sequence.
(C) The result of this endonuclease is blunt ends.
(D) They degrade DNA by subsequently removing bases from each end.
(E) They cut DNA only at sites in specific nucleotide sequences with a two-fold axis of symmetry.

17. Most of the ATP made during cellular respiration is generated by _____.

(A) glycolysis
(B) oxidative phosphorylation
(C) substrate-level phosphorylation
(D) photophosphorylation
(E) None of the above

18. A membrane's fluidity is largely determined by the percentage of

(A) Phosphatidylcholine
(B) Phosphatidylethanolamine
(C) Wax esters
(D) Cardiolipin
(E) Unsaturated fatty acids

19. All of the following are characteristics for in vitro DNA synthesis EXCEPT:

(A) DNA polymerase adds nucleotides in a 5' → 3' direction.
(B) The primer strand of DNA determines the nucleotides added.
(C) Correct hydrogen bonding is the primary check of the newly synthesized DNA.
(D) A primer strand must contain a free 3'-OH.
(E) DNA polymerase copies the complementary strand of DNA.

20. Which statement concerning the glycolytic and gluconeogenic pathways is correct?

(A) Gluconeogenesis is catabolic and glycolysis is anabolic
(B) Gluconeogenesis is anabolic and glycolysis is catabolic
(C) Both are catabolic
(D) Both are anabolics
(E) None of the above

21. D loops and variable loops are found in _____

(A) mRNA
(B) rRNA
(C) tRNA
(D) hnRNA
(E) snRNA

22. α-D-Glucose + ATP → _____ + _____ + H+

(A) α-D-fructose; ADP
(B) α-D-glucose-1-phosphate; AMP
(C) α-D-glucose-1-phosphate; ADP
(D) α-D-glucose-6-phosphate; ADP
(E) D-glucose-1,6-bisphosphate; AMP

23. Regulated metabolic pathways are _____.

(A) irreversible
(B) committed after the first step
(C) usually regulated at the first step
(D) compartmentalized in eukaryotes
(E) All of the above are correct

24. The acyl-CoA formed in the _____ is transported to the _____ for oxidation.

(A) mitochondrial matrix, cytosol
(B) cytosol, mitochondrial matrix

(C) mitochondrial matrix, inner-membrane
(D) endoplasmic reticulum, cytosol
(E) microsomes, mitochondrial matrix

25. When an individual breathes very rapidly, large amounts of carbon dioxide are exhaled. What effect does this have on blood pH?
(A) Acidosis
(B) Alkalosis
(C) No change
(D) First acidosis then rebounding alkalosis
(E) First alkalosis then rebounding acidosos

26. All of the information necessary for a protein to achieve its intricate architecture is contained within its _____ structure.
(A) primary
(B) secondary
(C) tertiary
(D) quaternary
(E) all are true

27. Coenzyme Q is involved in electron transport _____.

(A) directly to O_2
(B) as a lipid-soluble electron carrier
(C) as a water-soluble electron donor
(D) as a covalently attached cytochrome cofactor
(E) as a water-soluble electron acceptor

28. Weak forces that create constantly forming and breaking interactions at physiological temperatures, but cumulatively impart stability to biological structures generated by their collective activity include all EXCEPT:

(A) hydrogen bonds
(B) van der Waals forces
(C) covalent bonds
(D) ionic interactions
(E) hydrophobic interactions

29. In a eukaryotic cell, most of the enzymes of the electron transport chain are located in the _____.
(A) cytosol
(B) outer mitochondrial membrane
(C) inner mitochondrial membrane
(D) mitochondrial matrix
(E) intermembrane space

30. All of the statements about the classification of these amino acids are correct EXCEPT:
(A) Aspartic acid and asparagine are acidic amino acids.
(B) Alanine and valine are neutral, nonpolar amino acids.
(C) Serine and glutamine are polar, uncharged amino acids.
(D) Lysine and arginine are basic amino acids.
(E) Tyrosine and phenylalanine are aromatic amino acids.

31. What carbohydrates are reactants in glycolysis?
(A) Pyruvate only
(B) Glucose only
(C) Sucrose only
(D) All of the above are correct
(E) None of the above

32. Opposing degradative and biosynthetic pathways _____.
(A) use the same enzymes for many steps
(B) use different enzymes for steps that require large energy changes
(C) are coordinately regulated at the steps that use different enzymes
(D) are used in both directions in most organisms
(E) All of the above are correct

33. One of the principal methods that organisms use to obtain energy from chemical bonds is by _____.
(A) Substitution reactions
(B) Dehydration reactions
(C) Oxidation/reduction reactions
(D) Hydration reactions
(E) Addition reactions

34. Which of the following is a tricarboxylic acid?

(A) oxaloacetic acid
(B) citric acid
(C) acetic acid
(D) succinic acid
(E) pyruvic acid

35. In the eukaryotic cell cycle the M(itosis) phase occurs after the _____ phase.

(A) G0
(B) G1
(C) G2
(D) S
(E) None of the above is correct

36. For each molecule of glucose converted to pyruvate in the glycolytic pathway _____ molecules of ATP are used initially (Stage 1) and _____ molecules of ATP are produced (Stage 2) for an overall yield of _____ molecules of ATP/glucose. The "ATP math" is:

(A) -1 + 2 = 1
(C) -1 + 4 = 3
(B) -2 + 4 = 2
(D) -2 + 5 = 3
(E) 2 + 2 = 4

37. All of the following are referred to collectively as the branched chain amino acids except _____.

(A) Valine
(B) Glycine
(C) Leucine
(D) Isoleucine
(E) None of the above is correct

38. Which of the following are major sites for glycogen storage?

(A) Adipose tissue
(B) Muscle and liver
(C) Kidney and liver
(D) Bones
(E) None of the above

39. Detergents denature proteins by disrupting which of the following?

(A) Hydrogen bonds
(B) Disulfide bridges
(C) Hydrophobic interactions
(D) Salt bridges
(E) Both A and B are correct

40. The breakdown of glycogen to form glucose occurs _____.

(A) in the liver by phosphorolysis
(B) in the muscles by phosphorolysis
(C) Both (A) and (B) are correct
(D) in the liver by hydrolysis
(E) in the muscles by hydrolysis