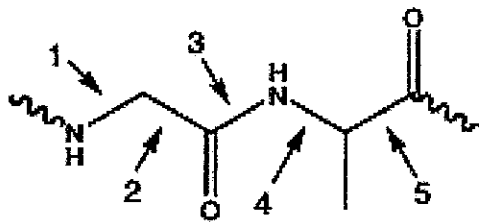


每題 2 分，請用 2B 鉛筆作答於答案卡，並先詳閱答案卡上之「畫記說明」。

1. What is a molecule that has two ionized group called?
A) Enantiomer
B) Zwitterion
C) Hydrophile
D) Cis-trans isomers
E) None of the above
2. What is the name given to the type of chemical bond that forms between the slightly electropositive hydrogen atom in a polar group and an electronegative atom?
A) Covalent bond
B) Electrostatic bond
C) Hydrogen bond
D) Disulfide bond
E) Van der Waals bond
3. Which of these proteins has a quaternary structure?
A) Carbonic anhydrase
B) Concanavalin A
C) Insulin
D) Hemoglobin
E) Myoglobin
4. Of the following amino acids, which will have a pI closest to 3?
A) Cys
B) His
C) Gly
D) Asp
E) Arg
5. Which of the following bonds has partial double bond character?



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

見背面

6. The GroEL/GroES complex is a type of what ?
 - A) Chaperones
 - B) Hsp 70 rotein
 - C) Molten globules
 - D) Motor proteins
 - E) Receptors

7. What following enzyme can generate adenosine monophosphate?
 - A) Adenylyl kinase
 - B) Adenylyl cyclase
 - C) Ribonucleotide reductase 1
 - D) Acyl-CoA synthetase
 - E) Fructose 1,6-bisphosphatase-1

8. What following compound can be found with a tyrosyl unit?
 - A) Glycosyl phosphatidyl inositol
 - B) Sphingosine 1-phosphate
 - C) Glycogen
 - D) Serotonin
 - E) S-glutathione

9. What is an important mediator for the biosynthesis from pyruvate to phosphoenolpyruvate?
 - A) Oxaloacetate
 - B) Alanine
 - C) Lactate
 - D) Acetyl-CoA
 - E) NADPH+H⁺

10. What enzyme can generate an ammonium ion (NH₄⁺)?
 - A) Transaminase
 - B) Uroporphyrinogen III synthase
 - C) Serine hydroxymethyltransferase
 - D) Glutamine synthetase
 - E) Cystathionine γ -lyase.

11. Which of the following genetic background can be induced by lactose to produce beta-galactosidase?
 - A) I⁺Z⁺Y⁺A⁺
 - B) I⁻Z⁺Y⁺A⁺
 - C) I⁺Z⁻Y⁺A⁺
 - D) I⁻Z⁻Y⁺A⁺
 - E) All of them

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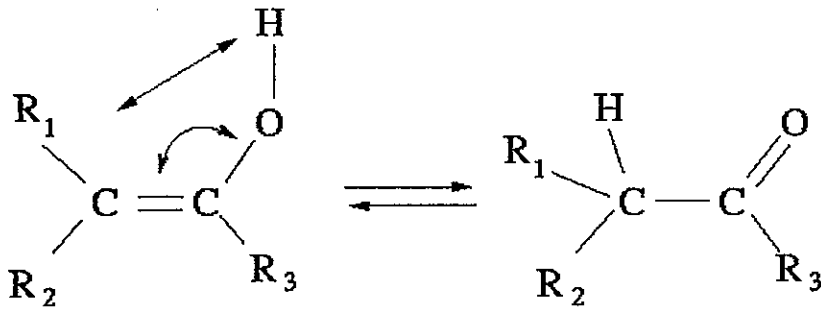
12. Which of the following *cis*-element can be bound by repressor?
- A) TATA box
 - B) GC box
 - C) Enhancer
 - D) Silencer
 - E) Transcription start site
13. Which of following gene rearrangement resulting in Philadelphia Chromosome that causes chronic myelogenous leukemia (CML)?
- A) Deletion
 - B) Gene loss
 - C) Translocation
 - D) Amplification
 - E) Insertion
14. Which of the following statement is correct for corticosteroid and its receptor (GR) to regulate gene transcription?
- A) GR is located on cell membrane in the absence of corticosteroid
 - B) GR is located in the cytoplasm in the absence of corticosteroid
 - C) GR is located in the nucleus in the absence of corticosteroid
 - D) Ligated GR trans-activates inflammatory genes
 - E) Ligated GR inhibits anti-inflammatory genes
15. Numerous *Xenopus* cells were exposed to various amounts of ultraviolet light. Some of the resulting cells were observed to lack nucleoli. As a result, one would expect that the cell could not
- A) synthesize rRNA.
 - B) replicate its DNA.
 - C) perform photosynthesis.
 - D) perform cellular respiration.
 - E) none of the above
16. Cyclins modulate the progression of cells through the cell cycle by
- A) directly activating G proteins.
 - B) inducing synthesis of constitutively active forms of growth cell receptors.
 - C) activating protein kinases that are critical regulators of cell division.
 - D) phosphorylating histones.
 - E) increasing the production of DNA polymerases.
17. A typical size for a viral genome is _____ nucleotides per haploid genome while a typical size for a bacterial genome is _____ nucleotides per haploid genome.
- A) 2×10^6 ; 4×10^8
 - B) 8×10^4 ; 5×10^7
 - C) 1×10^3 ; 9×10^4
 - D) 5×10^4 ; 4×10^6
 - E) 3×10^4 ; 5×10^9

見背面

18. The ABC excinuclease is essential in:
- A) base-excision repair.
 - B) methyl-directed repair.
 - C) mismatch repair.
 - D) nucleotide-excision repair.
 - E) SOS repair.
19. Enzymes may increase the rate of chemical reactions by.....
- A) binding tightly to product
 - B) binding tightly to reaction intermediates
 - C) binding tightly to transition state
 - D) binding tightly to substrate
 - E) binding tightly to coenzyme
20. Allosteric enzymes can switch between high and low activity states. What are the kinetic properties of a high activity state (or R-state)?
- A) high V_{max} and low K_M
 - B) high V_{max} and high K_M
 - C) low V_{max} and low K_M
 - D) low V_{max} and high K_M
 - E) low V_{max}/K_M
21. Which of the following statements regarding "competitive inhibition" is NOT correct?
- A) A competitive inhibitor binds tightly to the active site of an enzyme.
 - B) V_{max} of a reaction is NOT affected by competitive inhibitors.
 - C) " V_{max}/K_M " becomes smaller in the presence of competitive inhibitors.
 - D) Competitive inhibitors do not bind to ES (enzyme-substrate) complex.
 - E) Many drugs are competitive inhibitors.
22. Which of the following is NOT used as a "chemical group donor" by a transferase?
- A) S-adenosyl methionine (SAM)
 - B) adenosine triphosphate (ATP)
 - C) acetyl-CoA
 - D) alanine
 - E) heme group
23. Which of the phospholipid is it mostly found in the outer layer of plasma membrane under normal conditions?
- A) phosphatidylcholine
 - B) phosphatidylethanolamine
 - C) phosphatidylinositol
 - D) phosphatidylserine
 - E) phosphatic acid

24. Which of the membrane protein is it that can work against electrochemical gradient?
- A) channel
 - B) ion transporter
 - C) symporter
 - D) antiporter
 - E) pump
25. Which of the amino acid is it that produces the highest unity amount of acetyl-CoA when catabolized?
- A) serine
 - B) isoleucine
 - C) tryptophan
 - D) leucine
 - E) histidine
26. Homocitrulline is produced when ornithine transcarbamylase uses lysine, instead of ornithine, to react with carbamoyl phosphate. Which of the following defect is it that could result in the above reaction?
- A) carbamoyl phosphate synthase I
 - B) argininosuccinate synthetase
 - C) ornithine permease
 - D) argininosuccinase
 - E) arginase.
27. Which of the following lipids is found only in mitochondria and is essential for the mitochondrial function?
- A) Cardiolipin
 - B) Sphingosine
 - C) Diphosphatidylglycerol
 - D) Lecithin
 - E) None of them.
28. Which one of the following enzyme deficiency is responsible for von Gierke Disease?
- A) Hypoxanthine-guanine phosphoribosyl transferase
 - B) Fructose 1,6-bisphosphatase
 - C) Glucose-6-phosphatase
 - D) Purine nucleoside phosphorylase.
 - E) Xanthine oxidase.
29. Fructose 1,6-bisphosphatase is the main enzyme that regulates the rate of glucose regeneration. Which of the following can activate this enzyme?
- A) Adenosine monophosphate
 - B) Citrate
 - C) Fructose 2,6-bisphosphate
 - D) All are right
 - E) None of them.

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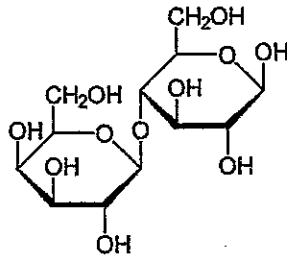
30. The chemical reaction above is
- Amide-imidic acid tautomerization
 - Amine-imine tautomerization
 - Lactam-lactim tautomerization
 - Keto-enol tautomerization
 - None of them.
31. In an *in vitro* kinase assay, the protein substrate will be phosphorylated, and a phosphate group from ^{32}P -labeled Adenosine triphosphate (ATP) will be covalently bound to the protein substrate. For this kind of assay, which kind of isotope-labeled ATP do you need?
- ATP, [γ - ^{32}P]
 - ATP, [β - ^{32}P]
 - ATP, [α - ^{32}P]
 - ATP, [2,8- ^3H]
 - All of above
32. To track the amount of cyclic adenosine monophosphate (cAMP) synthesized after certain hormone binding to its receptor in the cell, which kind of isotope-labeled nucleotides should be used in the assay?
- ATP, [γ - ^{32}P]
 - dATP, [γ - ^{32}P]
 - ATP, [α - ^{32}P]
 - dATP, [α - ^{32}P]
 - All of above
33. Cyclic GMP (cGMP) is used as a second messenger by:
- Insulin
 - Glucagon
 - Epinephrine
 - Atrial natriuretic factor
 - Thyroxine
34. Which of the following descriptions is correct?
- Hormones derived from tyrosine could be lipophilic or hydrophilic
 - Arachidonic acids can only be generated from phospholipid cleaved by phospholipase A
 - Peptide hormones are mature and biological functional once the peptide is translated.
 - Vitamin D binds to its receptor on the plasma membrane.
 - None of the descriptions above (A-D) is correct.

35. Which description about cell death process is correct?
- A) Caspase 9 is involved in activating caspase 3.
 - B) Mitochondria membrane leaking is required.
 - C) Mitochondria cytochrome C release is involved in the following Caspase 3 activation.
 - D) The main executioner is Caspase 3.
 - E) All of the above are correct.
36. Which description about N-link glycosylation is correct?
- A) Ser/Thr is the attached site.
 - B) Containing Gal-Gal-Xyl tri saccharides.
 - C) Asn is the attached site.
 - D) N-acetyl galactosamine is the core sugar for attachment.
 - E) Lysosomal protein sorting pathway is involved.
37. Which following protein is involved in type IV collagen synthesis?
- A) Lysyloxidase
 - B) HSP47
 - C) Telopeptidase
 - D) HSP60
 - E) A.B.C. all involved in.
38. Which enzyme is involved in the Cis Golgi oligosaccharides processing?
- A) Oligosaccharide:protein transferase
 - B) N-acetyl galactosaminyltransferase
 - C) Fucosyltransferase
 - D) Galactose transferase
 - E) Mannosidase
39. Smallest carbohydrates are trioses. Which of the following is a triose?
- A) Glucose
 - B) Ribulose
 - C) Ribose
 - D) Fructose
 - E) none of the above
40. The general formula of carbohydrate is
- A) $(CH_2O)_n$
 - B) $(C_4H_2O)_n$
 - C) $(C_6H_2O)_n$
 - D) $(C_2H_2O)_n-COOH$
 - E) none of the above

見背面

41. In lactose, the linkage is

- A) β -1-4 linkage
- B) β -1-2 linkage
- C) α -1-4 linkage
- D) α -1-2 linkage
- E) none of the above



42. Which of the following substrates is **not** coupled to the production of NADH?

- A) Malate
- B) Pyruvate
- C) alpha-Ketoglutarate
- D) Succinate
- E) none of the above

43. In translation initiation, Shine-Dalgarno sequence is recognized by:

- A) eIF-4E
- B) EF-Ts.
- C) IF-2.
- D) fMet-tRNA^{fMet}
- E) 16S rRNA.

44. In translation elongation, which molecule functions as a guanine nucleotide exchange factor:

- A) EF-Tu.
- B) EF-Ts.
- C) EF-G.
- D) aminoacyl-tRNA.
- E) IF-2.

45. A frameshift mutation is caused by:

- A) a "G" to "A" mutation in coding region.
- B) a nonsense mutation in exon.
- C) one nucleotide insertion in coding region.
- D) a "C" to "T" mutation in promoter region.
- E) none of above.

46. N-terminal signal sequence is required for?

- A) nuclear import.
- B) targeting to mitochondria.
- C) sorting in Golgi.
- D) translocation into ER.
- E) endocytosis from the plasma membrane.

47. Which size is the cloning (insert) size of a plasmid vector?
- A) 500-3000 kb
 - B) <10 kb
 - C) 10-20 kb
 - D) 35-50 kb
 - E) 50-250 kb
48. Which lipoprotein is responsible for cholesterol transport from extra-hepatic tissue to the liver?
- A) HDL
 - B) IDL
 - C) VLDL
 - D) Chylomicron
 - E) HDL₂
49. Which description of the difference between DNA and RNA is wrong?
- A) DNA consists of double-strands.
 - B) The sugar in RNA is ribose.
 - C) The bases in DNA are adenine, guanine, cytosine, and uracil.
 - D) RNA forms in the nucleus.
 - E) The sugar in DNA is deoxyribose.
50. Which step of PCR (polymerase chain reaction) is to synthesize new DNA from single-strand template DNA.?
- A) Initiation
 - B) Denaturing
 - C) Extension
 - D) Annealing
 - E) Promoter clearance

試題隨卷繳回