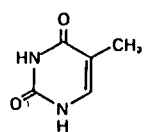


考生注意事項：所有考題務必在答案卷上作答。凡在問題卷上作答者無效。

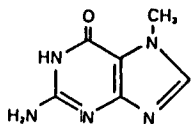
一、選擇題(均為單選，每題 1 分，答錯倒扣 0.25 分)

Select a correct name for each of the following compounds.

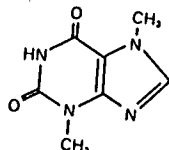
- A. Cytosine
 B. Uracil
 C. Thymine
 D. 5 - Methylpyrimidine
 E. 5 - Methylcytosine



- A. Adenine
 B. Xanthine
 C. Guanine
 D. N⁷- methylguanine
 E. Uracil



- A. 3,7 - dimethyl-xanthine
 B. 1,6 - dimethyl-xanthine
 C. 3,7 - dimethyl-hypoxanthine
 D. 1,6 - dimethyl-hypoxanthine
 E. Caffeine



- At neutral pH, what is the least soluble of the bases ?
 A. Adenine
 B. Guanine
 C. Xanthine
 D. Thymine
 E. Cytosine

二、選擇題(均為單選，每題 2 分，答錯倒扣 0.5 分)

- Inosinic acid is
 A. a precursor of all purine ribonucleotides synthesized de novo.
 B. deficient in the condition known as gout.
 C. a degradation product of cytidine.
 D. a competitive inhibitor of xanthine oxidase.
 E. an end product of purine catabolism.

- Which of the following statements about allopurinol (4 - hydroxypyrazolopyrimidine) is Incorrect ?
 Allopurinol is
 A. an inhibitor of xanthine oxidase
 B. used for the treatment of hyperuricemia.
 C. an inhibitor of de novo purine biosynthesis.
 D. effective in the local treatment of herpetic Keratitis
 E. used to treat chronic gout.

- What is the main product of purine in lower primates and other mammals ?
 A. Uric acid
 B. Allantoin
 C. Urea
 D. Guanine
 E. None of the above

- The severe combined immunodeficiency disease (SCID) is an inherited autosomal recessive disorder in which both T cells and B cells are sparse and dysfunctional.
 The defect is due to the deficiency of
 A. hypoxanthine - guanine phosphoribosyl transferase
 B. adenosine deaminase
 C. xanthine oxidase
 D. purine nucleoside phosphorylase
 E. hypoxanthine oxidase

考生注意事項：所有考題務必在答案卷上作答。凡在問題卷上作答者無效。

三選擇題(每題2分，答錯倒扣0.5分)

Answer question 9-12 according to the following key.

- A. If 1,2 and 3 are correct.
 - B. If 1 and 3 are correct.
 - C. If 2 and 4 are correct.
 - D. If only 4 is correct
 - E. If all are correct
9. The uptake of glucose in which of the following cells is insulin - independent.
- 1. red blood cells
 - 2. liver parenchymal cells
 - 3. brain cells
 - 4. heart cells
10. Fructose -2.6- bisphosphate
- 1. is an activator of fructose -1.6- diphosphatase.
 - 2. is increased when glucagon/insulin ratio is high.
 - 3. is an extracellular messenger.
 - 4. stimulates the conversion of fructose -6- phosphate to fructose-1.6- diphosphate.
11. The pyruvate dehydrogenase complex reaction includes the
- 1. reduction of FAD by oxidized lipoic acid.
 - 2. oxidation of FADH₂ by NAD⁺.
 - 3. formation of ATP.
 - 4. formation of acetyl CoA
12. Cyclic AMP mediates the stimulation of glycogenolysis in liver by which of the following hormones or compounds.
- 1. inositol triphosphate
 - 2. epinephrine
 - 3. insulin
 - 4. glucagon

四簡答題

13. (3%) How the triacylglycerol is formed from glycerol and fatty acids?
14. (4%) Cholesterol plays an important role in cellular function. How the cholesterol content of cells is regulated ?
15. (5%) Where the ketone bodies are formed ? Why they are formed ?
16. (8%) Triacylglycerol content in the blood of a diabetic patient is also higher than that of a normal person. Why ?
17. (10%) Compare the following aspects of fatty acid oxidation and synthesis.
- (a) Site of the process.
 - (b) Acyl carrier
 - (c) Reductants and oxidants
 - (d) Stereochemistry of the intermediates.
 - (e) Direction of synthesis or degradation.
18. (4%) Write the reactions and enzymes that catalyze substrate - level phosphorylation during glycolysis.
19. (8%) Discuss the regulation of glycogen synthase by covalent modification.
20. (6%) Oxaloacetate-4-¹⁴C ($\begin{matrix} \text{O}=\text{C}-\text{COOH} \\ | \\ \text{CH}_2-\text{*COOH} \end{matrix}$) is incubated with aetyl CoA and all the necessary enzymes and cofactors of the tricarboxylic acid cycle. Would the oxaloacetate be labeled after one turn of the cycle ? Give your explanation.

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21. (4%) Which enzyme deficiency in erythrocyte would produce drug - induced hemolytic anemia ? Why ?
22. (3%) 5 - Fluorodeoxyuridylate (FdUMP) is a potent antitumor agent, how can this drug inhibit growth of cancer cell ?
23. (2%) Give the name of the coenzyme which is essential in most aminotransferase catalytic activity.
24. (4%) Complete the following equation of the reaction catalyzed by glutamate dehydrogenase.



25. (4%) Complete the overall chemical balance of urea biosynthesis from ammonium.
- $$2\text{NH}_3 + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \longrightarrow \text{Urea} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + 2\text{Pi}$$
26. (3%) Name three amino acids which is involved in the biosynthesis of creatine.
 _____ , _____ , _____
27. (3%) Name the enzyme deficiency of the following genetic diseases.

Genetic disease	Name of the enzyme
Maple syrup urine disease	1. _____
Phenylketonuria	2. _____
Alkaptonuria	3. _____

28. (4%) Draw the structure of S-adenosylmethionine.
29. (5%) Describe the role of vitamine A in vision.