



考生注意：答案必須寫在答案卷上，否則不予計分。

I. 選擇題（單選；每題 3 分，共 60 分）。

- 1) When yeast extracts act on $[1-^{14}\text{C}]$ glucose, the radioactive label will end up in
(a) $[^{14}\text{C}]$ carbon dioxide (b) $[1-^{14}\text{C}]$ ethanol (c) $[2-^{14}\text{C}]$ ethanol
(d) $[^{14}\text{C}]$ carbon dioxide and $[1-^{14}\text{C}]$ ethanol
- 2) Gel filtration chromatography is used to separate molecules by
(a) ionic charge (b) size (c) binding specificity (d) isoelectric pH
- 3) The water-soluble cytochrome in the respiratory chain is called
(a) cytochrome a (b) cytochrome a₃ (c) cytochrome b (d) cytochrome c
- 4) Helicase
(a) stabilizes single-stranded DNA.
(b) can use the energy in ATP to unwind double-stranded DNA.
(c) hydrolyzes double-stranded DNA.
(d) can use the energy stored in phosphodiester bonds to melt DNA.
- 5) The reduction of 3-hydroxy-3-methylglutaryl-CoA with two NADPH molecules produces
(a) acetoacetate (b) mevalonyl-CoA (c) isopentenyl pyrophosphate (d) mevalonate
- 6) The two strands of DNA
(a) are antiparallel.
(b) run in the same direction.
(c) are held together by ionic bonds.
(d) are covalently linked to each other.
- 7) Each of the following is a glucogenic amino acid except
(a) alanine (b) proline (c) leucine (d) threonine
- 8) The amino acids that absorb light in the region of 260-280 nm are
(a) Leu, Val, Ile (b) Glu, Asp (c) Tyr, Trp, Phe (d) Lys, His
- 9) To convert 5'-IMP to 5'-GMP, cell free extracts require
(a) ATP, NAD^+ , and glutamine (b) ATP and aspartate
(c) GTP and aspartate (d) GTP and glutamate
- 10) The vitamins that are converted into coenzymes that participate in oxidation-reductions are
(a) biotin and nicotinamide (b) thiamine and riboflavin
(c) vitamin C and biotin (d) nicotinamide and riboflavin
- 11) When DNA is exposed to sunlight,
(a) cytosine is deaminated (b) thymine-thymine dimers form
(c) adenine is deaminated (d) guanine is deaminated
- 12) Each of the following amino acids has three acid dissociation constants except
(a) aspartic acid (b) lysine (c) phenylalanine (d) histidine
- 13) Each of the following is a biological compartment surrounded by a membrane except
(a) ribosomes (b) Golgi apparatus (c) mitochondria (d) lysosomes
- 14) An enzyme that catalyzes the joining of two molecules by coupling the reaction to the hydrolysis of a pyrophosphate group in a nucleoside triphosphate is called
(a) a hydrolase (b) a ligase (c) a synthase (d) a transferase

考生注意：答案必須寫在答案卷上，否則不予計分。

- 15) The amino acid that carries the ammonium ion from muscle to liver is
(a) alanine (b) aspartate (c) glutamate (d) serine
- 16) The first purine nucleotide to be synthesized by the de novo pathway is
(a) adenosine-5'-monophosphate (b) inosine-5'-monophosphate
(c) guanosine-5'-monophosphate (d) adenylosuccinate
- 17) Each of the following enzymes is present as a soluble enzyme in the mitochondrial matrix except
(a) malate dehydrogenase (b) succinate dehydrogenase
(c) pyruvate carboxylase (d) pyruvate dehydrogenase
- 18) A cell-free protein synthetic system requires each of the following except
(a) ribosomes and aminoacyl-tRNAs (b) mRNA (c) DNA (d) ATP and GTP
- 19) The eukaryotic enzyme that is responsible for the formation of pre-mRNA is called
(a) RNA polymerase I (b) RNA polymerase II
(c) RNA polymerase III (d) reverse transcriptase
- 20) Okazaki fragments are linked together to form
(a) both the leading and lagging strands
(b) only the leading strand
(c) only the lagging strand
(d) the Klenow fragment

II 簡答題 (每題 10 分，共 40 分)

- 1) Please describe the biological activity of insulin and glucagon.
- 2) Please explain simple enzymes and allosteric enzymes. What are their differences?
- 3) Which processes in protein synthesis require hydrolysis of GTP?
- 4) How to isolate and purify eukaryotic mRNA from total RNA?