

Answer all the following questions :

- (1) Amino acids are basic structure of all proteins. (12%)
  - a) Describe the different types of the 20 amino acids.
  - b) Explain how do amino acids involve in the determination of secondary and tertiary structure of proteins.
  - c) Describe how the technique site-directed mutagenesis apply in the prediction of functional amino acid residue in proteins.
- (2) There are two different types of covalent modification, reversible and irreversible form in the regulation of enzyme activity. (12%)
  - a) By using glycogen phosphorylase, describe the basic principles of reversible covalent modification.
  - b) By using pancreatic proteases, describe the basic principles of irreversible covalent modification.
- (3)
  - a) Compare briefly the different structures of the polysaccharides, amylose, amylopectin and glycogen. (6%)
  - b) State the differences and advantages between hydrolysis and phosphorolysis of glucose polymer. (4%)
  - c) Describe the metabolic pathways of glucose polymers (starch and glycogen) in intestinal digestion and glycogen mobilization in liver. (4%)
- (4)
  - a) Compare the metabolic differences between glycolysis and gluconeogenesis. (4%)
  - b) Describe the different pathways of major precursors for gluconeogenesis. (6%)
  - c) Explain how fructose-1,6-bisphosphate involve in the regulation of glycolysis and gluconeogenesis. (4%)

- (5) Prostaglandins are a class of lipids having potent physiological properties in animals. (12%)
- Describe the basic structure of prostaglandins and their related compounds, thromboxane A<sub>2</sub> and prostacyclin.
  - Summarize the biosynthetic pathway of the 2-series prostaglandins from arachidonic acid.
- (6) a) Compare briefly the differences between de novo pathway of the synthesis of purine and pyrimidine nucleotide. (6%)
- Draw a diagram to show the urea cycle for the formation of urea in liver cells. (6%)
- (7) a) Define the following terms : (6%)
- agonists and antagonists
  - second messengers
  - tumor promoters
- What are G proteins and describe how the dissociation and reassociation of G proteins involve in the signal transduction in cell membrane. (6%)
- (8) Distinguish the following substances between prokaryotes and eukaryotes. (12%)
- RNA polymerase
  - promoter
  - mRNA
  - initiator tRNA