

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Briefly describe the following terms. (25%)
 - a. Signal sequence
 - b. MicroRNA
 - c. Polymerase chain reaction
 - d. Western blotting
 - e. Induced pluripotent stem cells (iPS cells)

2. Compare the following terms. (30%)
 - a. N-linked vs. O-linked oligosaccharides of glycoproteins
 - b. Heterochromatin vs. Euchromatin
 - c. Phosphatidylinositol 4,5-bisphosphate vs. Inositol 1,4,5-trisphosphate
 - d. Telomere vs. Telomerase
 - e. Glycoproteins vs. Proteoglycans

3. What is the Warburg effect? (5%) How does it benefit cancer cells? (5%)

4. What is RNAi (RNA interference) and how it works? (10%)

5. (A) Rank a series of 18-carbon fatty acids: stearic acid (18:0), oleic acid (18:1), α -linoleic acid (18:2), and linolenic acid (18:3) in order of increasing melting point (5%). (B) Provide a molecular explanation for the trend of these 18-carbon fatty acids can be correlated with the melting point. (5%) (C) Draw all the possible triacylglycerols that can be constructed from glycerol, palmitic acid (16:1), and oleic acid. Rank them in order of increasing melting point. (5%)

6. Two polypeptides, A and B, have similar tertiary structures, but A normally exists as a monomer, whereas B exists as a tetramer. What differences might be expected in the amino acid composition of A versus B? (10%)