大葉大學九十三學年度碩士班甄試試題紙					
所　別	組別	考試科目（中文名稱）	考試日期	考試時間	備註
分子生物科技所	甲	生物化學	**12** 月 **8** 日	9:00—10:30	P2-1

註：備註欄若未註明可攜帶計算機或其他輔助工具作答時，考生一律不准攜帶。

1. Which have phosphorylated compounds other than ATP large free energies of hydrolysis? (2 pts)
   (A) Phosphoenolpyruvate
   (B) 1,3-bisphosphoglycerate
   (C) Phosphocreatine
   (D) Acetyl-CoA

2. Which are soluble electron carriers? (2 pts)
   (A) NADPH
   (B) NADH
   (C) $FADH_2$
   (D) Quinone
   (E) Iron-sulfur protein

3. Please indicate cofactor(s) of each enzyme and location it belongs to. (11 pts)
   (A) Glycolysis (B) TCA (C) β-oxidation (D) Pentose phosphate pathway (E) Fermentation
   (I) NAD^+ (II) NADPH (III) FAD^+ (IV) FMN (V) TPP
   a、 isocitrate dehydrogenase
   b、 α-ketoglutarate dehydrogenase
   c、 glucose-6-phosphate dehydrogenase
   d、 malate dehydrogenase
   e、 glyceraldehyde-3- phosphate dehydrogenase
   f、 lactate dehydrogenase
   g、 alcohol dehydrogenase
   h、 fatty acyl-CoA dehydrogenase
   i、 dihydrolipoyl dehydrogenase
   j、 succinate dehydrogenase
   k、 pyruvate decarboxylase

4. Indicate oxidation steps of glycolysis. (2 pts)
   (A) glucose → glucose-6-phosphate
   (B) fructose 6- phosphate → fructose 1,6-bisphosphate
   (C) glyceraldehyde 3- phosphate → 1,3-bisphosphoglycerate
   (D) 1,3-bisphosphoglycerate → 3-phosphoglycerate

5. Indicate oxidative steps in TCA cycle. (3 pts)
   Acetyl-CoA + oxaloacetate → citrate → isocitrate → α-ketoglutarate → succinyl-CoA → succinate → fumarate → malate → oxaloacetate

6. Indicate products of each pathway or cycles. (4 pts)
   (a) NADH (b) FADH (c) $FMNH_2$ (d) NADPH (e) pyruvate (f) acetyl CoA
   (g) ATP (h) GTP (i) ribose-5-phosphate (j) succinate (k) glycerate

   (A) Pentose phosphate pathway
   (B) Glycolysis
   (C) TCA
   (D) Glyoxylate cycle

※背面有試題

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7. Feeder pathways for Glycolysis. Indicate the entry point of each carbohydrate listed. (6 pts)
   - i. Trehalose
   - ii. Sucrose
   - iii. Lactose
   - iv. Galactose
   - v. Glycogen
   - vi. Glycerol

→ Glucose-1-phosphate → Glucose-6-phosphate → Fructose-6-phophate
(A) (B) (C) (D)

→ Fructose 1,6-bisphosphate → Glyceraldehyde 3-phosphate
(E) (F)

8. Give three examples of substrate channeling. (3 pts)

9. Explain the first and the second law of thermodynamics. (4 pts)

10. Explain the chemical basis for the large free-energy change associated with ATP hydrolysis? (3 pts)

11. Indicate five fates of pyruvate. (5 pts)

12. List regulation steps in TCA cycle. (4 pts)

13. Explain "Citrate：A symmetrical molecule that reacts asymmetrically". (4 pts)

14. Explain the characters and functions of chylomicron, LDL, HDL, VHDL (4 pts).

15. Describe the β-oxidation. (4 pts)

16. If a C3 plant and a C4 plant are placed together in a sealed illuminated box with sufficient moisture, the C4 plant thrives while the C3 plant sickens and eventually dies. Please explain. (4 pts)

17. Explain the interactions between penicillin and β-lactamase. (4 pts)

18. Give two examples of TPP-dependent reaction. (4 pts)

19. Human blood groups (A, B, and O) are determined in part by the oligosaccharide head groups of glycoshingolipid. Please explain. (3 pts)

20. Explain the following terms: (3 pts each)
   - (1) Hill reaction
   - (2) shuttle systems
   - (3) the function of aspirin
   - (4) how ATP is synthesized in mitochondria
   - (5) structures of arginine and cystein
   - (6) LDL receptors
   - (7) name three ketone bodies
   - (8) Q cycle

※背面有試題