

國立成功大學

112學年度碩士班招生考試試題

編 號：298

系 所：醫學檢驗生物技術學系

科 目：檢驗醫學

日 期：0207

節 次：第 1 節

備 註：不可使用計算機

※ 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. Light scattering is a detection technique in the clinical laboratory. Please describe: (20 points)
 - (1) What is the light scattering method?
 - (2) List the two analytical techniques utilizing light scattering in the clinical laboratory.
 - (3) Which assays typically utilize the light scattering method for detection? (Please give two examples)
 - (4) List the factors that influence light scattering.

2. A 15-year-old male with diabetes mellitus presented to the emergency room with abdominal pain. Routine chemistry investigations were performed on a plasma sample with the following results: (15 points)

Na: 125 mmol/L (133-143)
 K: 5.3 mmol/L (3.4-5.1)
 Cl: 99 mmol/L (98-110)
 Glucose: 650 mg/dL (65-97)

 - (1) What is the most likely cause of hyponatremia in this patient?
 A. Hyperkalemia B. Uremia
 C. Hyperglycemia D. Metabolic alkalosis
 - (2) Following the above question, what is the possible reason for hyponatremia?
 - (3) You expect that the patient would have:
 A. isosmotic hyponatremia
 B. hyperosmotic hyponatremia
 C. hypoosmotic hyponatremia

3. You are a scientific clinical consultant for an in vitro diagnostic company, you are assigned to evaluate several ovarian tumor markers for possible commercial explorations. The following data were obtained from multi-site retrospective studies.

	A	B	C	D
Sensitivity (%)	95	95	85	97
Specificity (%)	90	96	93	99
Present in non-malignant cohort	yes	no	yes	no
Present in malignant cohort	yes	yes	no	no

 - (1) Please describe how to calculate sensitivity and specificity. (by using TP, TF, TN, FN) (10 points)
 - (2) Which marker has the highest positive predictive value? And which marker has the lowest negative predictive value? (5 points)

4. Protein K is a metalloprotease which participates in cell migration and remodeling. Compound A and B are competition and non-competition inhibitors for protein K, respectively. Please write draw the double reciprocal plots (Lineweaver-Burk plot) of the two mechanisms which must include four concentration of inhibitors (0, low, medium, and high) (10 points).

5. Bioimaging is one of the powerful tools for visualizing molecules in clinical diagnosis. Please briefly introduce the principle of two techniques which can be used for human body visualization. (10 points)
6. Please describe how Prof. Shinya Yamanaka produces induced pluripotent stem cells (iPS cells) and briefly describe the potential application of iPS cells in human diseases. (10 points)
7. A pre-surgical patient has been tested to determine the blood group in case a transfusion is necessary during surgery. The results of the ABO grouping is as follows: (4 points)
- | Anti-A | Anti-B | Anti-A,B | A1 cells | B cells |
|--------|--------|----------|----------|---------|
| 3+ | 4+ | 4+ | 1+ | 0 |
- What is the cause of this "discrepancy?"
- (a) B (A) phenomenon
 - (b) hypogammaglobulinemia
 - (c) Anti-A1 in A2 individual
 - (d) sepsis resulting in acquired antigen
8. The laboratory is very hot due to a malfunction in the heating system. How will this affect the ABO forward and reverse grouping? (4 points)
- (a) no affect
 - (b) both forward and reverse may have decreased reactions due to warm temperatures
 - (c) both forward and reverse may have increased reactions due to warm temperatures
 - (d) only reverse grouping may be affected but it is unclear how the temperature will impact the testing
9. An anti-P is suspected when an immediate spin antibody screen is positive in one cell. The ideal temperature for identification is: (4 points)
- (a) 17 °C
 - (b) 25 °C
 - (c) 37 °C
 - (d) 42 °C
10. The Weiner notation R1R2 translates to Fisher-Race as: (4 points)
- (a) CDe/cDE
 - (b) CDe/CDE
 - (c) CDE/cDE
 - (d) CDe/cDe
11. The cell surface charge of RBC is: (4 points)
- (a) Positive
 - (b) Negative
 - (c) Neutral
 - (d) Variable