

准考證號碼： \_\_\_\_\_

※注意事項

請確實核對准考證號碼是否正確

## 嘉南藥理科技大學九十七學年度碩士班暨碩士在職專班考試入學招生

### 生物技術概論試題(生物科技系碩士班一般生不分組、生物科技系碩士在職專班在職生不分組)

#### 本試題共 1 張 2 面

一、選擇題 30% (答案請填入答案欄，每題 2 分)

1. Which of the following methods are commonly used in analyzing gene expression in RNA level? (複選) (A) Southern blotting (B) PCR (C) RT-PCR (D) Northern blotting (E) finger printing.
2. Which of the following gene is the “endogenous control” in gene expression analysis? (A) Reporter gene (B) inducible gene (C) housekeeping gene (D) luciferase gene.
3. Which of the following method is commonly used in analyzing the binding between transcription factor and responsive DNA element? (A) SDS-PAGE (B) Electrophoretic Mobility Shift Assay (C) DNA finger printing (D) agarose gel electrophoresis.
4. What is the function of  $\beta$ -mercaptoethanol in the sample dye of protein? (A) overwhelming the negative charge on proteins (B) reducing disulfide bond of proteins (C) giving proteins blue tracing color (D) providing free radicals for gel formation.
5. Ammonium sulfate is used in protein purification for (A) ion exchange chromatography (B) affinity chromatography (C) salting out for fractionation (D) gel filtration chromatography
6. When performing ELISA to detect rabbit's HO-1 protein level, which of the following primary Ab is suitable (A) monoclonal anti-mouse HO-1 Ab (B) monoclonal anti-rabbit HO-1 Ab (C) sheep anti-mouse HO-1 Ab (D) rabbit anti-mouse HO-1 Ab.
7. After you select the correct primary Ab from one of the above 4 choices, which of the Ab can be used as secondary Ab for this purpose (A) Biotinylated donkey anti-rabbit IgG (B) Biotinylated donkey anti-mouse IgG (C) Biotinylated rabbit anti-sheep IgG (D) Biotinylated labeled sheep anti-rabbit IgG
8. Which of the following systems is the most suitable for eukaryotic protein expression? (A) baculovirus system (B)  $\lambda$  phage system (C) cosmid system (D) plasmid system.
9. Mitochondria (A) chromosome is a linear DNA molecule (B) genome is inherited maternally (C) genome is translated using universal genetic code (D) DNA is packed into chromatin.
10. The addition of antibiotics such as ampicillin in the medium for recombinant *E. coli* culture is (A) to kill possible contamination of other bacteria (B) to induce recombinant gene expression in *E. coli* (C) to kill *E. coli* which does not bear plasmid (D) to kill *E. coli* which does not have recombinant plasmid.
11. 利用 SDS - PAGE 進行蛋白質分離後，將 polyacrylamide gel 轉漬至消化纖維膜，最後以抗體偵測特定蛋白質的實驗方法稱為 (A)Southern blot (B) Northern blot (C)Western blot (D)ELISA
12. 下列關於 DNA microarray 的描述何者為非？(A)可以快速的偵測出組織細胞中表現的大部分基因 (B)晶片上可設計有幾千個點以上，每一個點黏有一種特殊抗體 (C)通常以螢光染劑標記待測樣本 (D)可利用待測細胞所製備的 cDNA 與晶片上的探針進行互補鹼基配對雜交
13. 關於單株抗體的敘述何者正確？ (A)可廣泛結合到多個的 epitope (B)將 B 淋巴細胞與骨髓瘤細胞融合後的融合瘤細胞，分離出單一細胞株，其產生的抗體稱之 (C)目前大多由兔子取得 (D)將抗原注射到動物體內，產生的多種抗體混合液稱之。
14. 何謂治療性複製(therapeutic cloning)？(A)利用體細胞核轉移(somatic cell nuclear transfer)的複製技術取得自身的胚胎幹細胞來醫治疾病 (B)利用醫療方法製造複製動物 (C)利用胚胎分裂來複製器官 (D)以上皆是。
15. 關於基因治療的進行，下列敘述何者錯誤？(A) ex vivo 方式是將人體的細胞取出，利用載體將治療用基因送入，再將這些細胞送回體內 (B)將遺傳物質送入病人之特定細胞內，以治療疾病的方法 (C)in vivo 方式是利用載體將治療用基因直接送入人體組織內 (D)用藥物來刺激治療基因的表現。

1)	2)	3)	4)	5)	6)	7)	8)
9)	10)	11)	12)	13)	14)	15)	

<背面尚有題目>

二、配合題 30% (答案請填入空格 ( )，每題 2 分)

A.

名詞	解釋
1. Epogen ( )	(A) Genetically engineered crops to be tolerant to glyphosate herbicide.
2. Roundup ready ( )	(B) The causal agent of Crown Gall disease by the insertion of T-DNA into the plant cells.
3. BLAST ( )	(C) A recombinant protein to treat anemia (low red blood cell count).
4. Agrobacterium ( )	(D) An enzyme commonly used in PCR.
5. Taq polymerase ( )	(E) An algorithm for comparing primary biological sequence information, such as the amino-acid sequences of different proteins or the nucleotides of DNA sequences.

B.

1. Immunofluorescence ( )	(A)蛋白質在轉譯後的修飾過程
2. cDNA ( )	(B)在水溶液中，由脂類所形成的中空球狀結構
3. hybridization ( )	(C)根據 pI 值與分子量大小來測定蛋白質的電泳方法
4. liposome ( )	(D)mRNA 經由 reverse transcription 而得之
5. oncogene ( )	(E)利用抗原與抗體的專一性結合，與黏結酵素之二級抗體的作用來進行偵測抗體或抗原的技術
6. posttranslational modification ( )	(F)藉由互補鹼基配對而使兩股核酸分子結合在一起
7. reporter gene ( )	(G)導致癌症發生的基因
8. 2D electrophoresis ( )	(H)細胞將外界刺激傳遞至細胞內的訊號傳遞過程
9. ELISA ( )	(I)利用標示螢光物質之抗體來辨識特殊蛋白在細胞內的位置
10. signal transduction ( )	(J)能被使用來追蹤或顯示 promoter activity

三、問答題 40%

1. (A) Identify the ORF for the following nuclear encoded gene. (B)How many amino acids does this gene encode?

5'AAAGGCCACCAUGAACAAAGAUUGCAAACUAAUAGCCUCGUGACGAUG...3' (10%)

2. The *E. coli* genome is approximately 4600 kb in size and contains about 4000 genes. The average *E. coli* gene size is 1000 bp.

(A)When you use a 6-cutter restriction enzyme (such as *EcoRI*) to fully digest *E. coli* genomes, approximately how many fragments will you expect to get? And how many bp for each fragment in average?

(B)Calculate the percentage of *E. coli* DNA that is not transcribed. (10%)

3. 在一項最新發表的研究中，發現甘胺酸甲基轉移酵素(glycine N-methyltransferase, GNMT)基因可能與肝癌的發生有關。研究人員發現 GNMT 基因轉殖小鼠得到肝癌的機率比正常小鼠低；在 GNMT 基因缺陷小鼠中，則發現其得到肝癌的機率比正常小鼠高。

(1) 如果想取得 GNMT 基因，可以用哪些實驗方法？請舉出兩種方法，並簡要說明過程。(5%)

(2) 取得 GNMT 基因後，如何將其建構入表現載體，篩選並大量製備 GNMT 表現載體？請簡要描述過程。(3%)

(3) 如果想將 GNMT 表現載體在體外送入人類肝細胞，請問可用哪幾種 transfection 方法？請舉出兩種方法。(2%)

(4) 請問如何建立 GNMT 基因轉殖小鼠，請簡述實驗流程。(5%)

(5) 請問如何建立 GNMT 基因缺陷小鼠，請簡述實驗流程。(5%)