准考證號碼：_____

※注意事項	請確實核對准考證號碼是否正確

嘉南藥理科技大學九十九學年度碩士班暨碩士在職專班招生

生物技術概論試題（生物科技系碩士班及碩士在職專班不分組）

本試題共 1 張 2 面

一、選擇題 60 %（答案請填入答案欄，每題 3 分）

1. A plant cell that lacks a cell wall is called a(n) _____.
(A) chloroplast (B) mitochondria (C) protoplast (D) spheroplast (E) epiblast

2. What is the name of the procedure in which proteins separated on a polyacrylamide gel are transferred with the application of a current to a nitrocellulose filter placed against the gel and subsequently identified by their interaction with specific antibodies?
(A) Southern blot (B) Northern blot (C) Eastern blot (D) Western blot (E) PCR

3. What is the name of the procedure in which single-stranded DNA molecules are separated by electrophoresis, immobilized on a nitrocellulose filter and then hybridized with labeled, single-stranded DNA probes?
(A) Southern blot (B) Northern blot (C) Western blot (D) Southwestern blot (E) Eastern blot

4. What is the wavelength of light at which tyrosine and phenylalanine absorb light maximally?
(A) about 280 nm (B) about 350 nm (C) about 450 nm (D) about 380 nm (E) about 595 nm

5. Nucleic acid hybridization techniques are based on the observation that _____.
(A) DNA structure is double helix (B) two single-stranded nucleic acid molecules of complementary base sequence can form a double-stranded hybrid (C) DNA molecules are very hydrophobic. (D) two single-stranded nucleic acid molecules of any base sequence can form a double-stranded hybrid (E) two double-stranded nucleic acid molecules of any base sequence can form a double-stranded hybrid

6. A small, circular, double-stranded DNA molecule that is separate from the main bacterial chromosome is called a(n) _____.
(A) ribosome (B) nucleoid (C) mitochondria (D) nucleosome (E) plasmid

7. What is defined as a technique for producing large quantities of a specific DNA sequence? One can make millions of copies of recombinant DNA in a short period of time from one or a few initial copies.
(A) DNA reproduction (B) DNA cloning (C) DNA mutation (D) DNA transcription (E) DNA denature

8. Genetically engineered animals whose chromosomes carry foreign genes are called _____.
(A) gene knock-out animals (B) gene silence animals (C) gene null animals (D) inbreed animals (E) transgenic animals

9. The name of the process in which foreign DNA is linked to the Ti plasmid from bacteria followed by the altered plasmid's uptake in culture by undifferentiated dicotyledonous plant cells, like carrots and tobacco, is called _____.
(A) T-cell transformation (B) cotyledonous transfer (C) T-DNA transformation (D) siRNA transduction (E) electroporation

10. An antibody molecule preparation made by a single colony or clone of antibody-producing cells would consist of large quantities of antibodies that all had exactly the same antigen-combining site. Such antibodies would be called _____ antibodies.
(A) monoclonal (B) polyclonal (C) polyvalent (D) p53 (E) immune

11. _____ are specific sequences of nucleotides that allow RNA polymerase to bind at specific locations before initiating transcription site.
(A) terminator (B) operator (C) promoter (D) exon (E) intron

12. An siRNA directed against a particular target mRNA is introduced into a cell. Which of the following things happens as a result of this event?
(A) The target mRNA is degraded. (B)The cell is unable to produce additional proteins encoded by the target mRNA and the gene from which it was transcribed. (C) The cell continues to produce proteins from the targeted mRNA, but at higher efficiency. (D) The cell continues to produce proteins from the targeted mRNA, but at lower efficiency. (E) A and B

13. 下列關於病毒被使用來當作選殖載體的敘述何者為非？
(A）病毒的感染率低（B）需先把重組 DNA 包裝至病毒微粒中（C）經由病毒感染而將 DNA 送入宿主細胞（D）利用病毒可將重組 DNA 送至細菌、植物或動物細胞（E）可利用反轉錄病毒當載體來感染動物細胞。

＜背面尚有題目＞

14. 下列關於螢光原位雜交法(fluorescence in situ hybridization)的描述何者為非？
（A）可以用來決定待測基因在染色體上的位置（B）利用抗體來辨識並結合特定 DNA 序列 （C）利用核酸探針與待測基因互補鹼基配對結合而偵測 （D）也可用來辨識失去或額外得到的染色體片段 （E）A 與 C。

15. 層析法（chromatography）可以依據哪些原理來分離不同的蛋白質？
（A）蛋白質的尺寸大小 （B）蛋白質的正負電荷特徵 （C）標的蛋白質與配位子的專一性結合 （D）蛋白質的疏水性特徵 （E）以上皆是。

16. 質譜法(Mass spectrometry)的特點為何？
（A）用來辨識微量元素的高靈敏性方法 （B）將樣品分子懸浮成氣態，再依據質荷比分離、偵測 （C）可以分辨出大多數蛋白質碎片的種類及大小 （D）可用於蛋白質身份鑑定 （E）以上皆是。

17. 關於離子交換層析法中，下列敘述何者錯誤？
（A）依賴靜電荷而將蛋白黏附在凝膠珠粒上 （B）帶正電荷的蛋白會黏附在帶負電荷的凝膠珠粒（ C）可用高濃度鹽類溶液將黏附的蛋白沖下 （D）依據蛋白質的疏水性特徵而將結合在凝膠珠粒上的蛋白沖下（E）可用來純化蛋白質。

18. 關於動物基因轉殖技術，下列敘述何者正確？
（A）可利用同源重組(homologous recombination)方法將基因送入胚胎幹細胞，再將其殖入囊胚 （B）顯微注射法是直接將基因送入受經卵早期的融前核(pronucleae)，再殖入代理孕母 （C）盡可能在發育愈早期的胚胎進行（D）也可利用反轉錄病毒將基因送入動物細胞 （E）利用此技術已成功製造出複製羊。

19. 為何質體通常都會具備對抗生素的抗藥性基因？
（A）作為選擇性的標記 （B）當此質體進入宿主細胞後，此宿主細胞便具有抗藥性 （C）可以讓不帶有此質體的細胞被抗生素殺死 （D）如果質體帶有兩個抗藥性基因，可在其中一個基因中插入外來 DNA，再進行抗生素篩選 （E）以上皆是。

20. 等電點聚焦法(iso-electric focusing, IEF)是利用何種原理分離蛋白質？
（A）依據每一種蛋白質所具有的獨特電荷特徵 （B）以電泳方式，將不同電荷特性的蛋白質分離 （C）依據蛋白質分子量大小不同分離 （D）A 與 B （E）以上皆是。

答案欄

1( )	2( )	3( )	4( )	5( )	6( )	7( )	8( )	9( )	10( )
11( )	12( )	13( )	14( )	15( )	16( )	17( )	18( )	19( )	20( )

二、問答題

1. 請簡述 Western blot 與 ELISA 的原理，並舉出兩點比較其相似與相異處。(10 %)

2. 請簡述 RT-PCR 與 cDNA microarray 的原理，並比較其應用性。(10 %)

3.問答下列問題

(1).如果想利用 DNA 重組的技術，大量表現並取得酵素 keratinase，可利用大腸桿菌來表現 keratinase 蛋白。實驗設計一開始想要將 keratinase 與 green fluorescent protein (GFP)接在一起，並送入大腸桿菌表現。請敘述實驗該如何進行？(5 %)

(2).假設今挑選得到可能有表現 keratinase 的大腸桿菌，請舉出一種方法來確認此菌的確有表現 GFP-keratinase 融合蛋白? (5 %)

(3).經過大量培養表現 GFP-keratinase 的大腸桿菌，接下來想純化取得 GFP-keratinase 蛋白，請舉出一種純化方法。已知 GFP-keratinase 融合蛋白的分子量約為 40kDa。(5 %)

(4).GFP 是一種會發出綠色螢光的蛋白，在生物科技的應用方面以被廣泛使用。請舉出二個例子說明 GFP 的應用性。(5 %)