准考證號碼：_____

嘉南藥理科技大學九十八學年度碩士在職專班甄試入學筆試

生物技術概論試題(生物科技系)　　本試題共 2 張 3 面

選擇題（60%）

1. DNA fragments and DNA probes are to Southern blotting as ___?___ are to Northern blotting.
   A. DNA fragments and RNA probes　B. protein fragments and antibodies
   C. RNA fragments and DNA probes　D. protein fragments and DNA probes

2. Why does one need to make replica plates when screening for a specific DNA sequence among a large number of recombinant bacterial colonies?
   A. It may take several tries to positively identify the specific sequence of interest.
   B. The screening process requires several different steps, each of which must be done on a new colony of recombinants.
   C. One wants a living culture of recombinant cells available after screening, a process that destroys some specific types of cells.
   D. It is good science to replicate all experimental results.

3. Why are heat-stable DNA polymerases from thermophilic bacteria required for the polymerase chain reaction?
   A. The heat-stable forms are the only ones that recognize all four deoxyribonucleotides.
   B. These enzymes amplify DNA in a reasonable amount of time.
   C. These enzymes are the most readily available forms of DNA polymerase in the world.
   D. These enzymes are stable enough to withstand the temperatures required to melt DNA.

4. What is the significance of the varying porosity of gel filtration media?
   A. It allows water to restrict solubility.
   B. It allows proteins or nucleic acids to diffuse in and out of the beads differentially.
   C. It causes the proteins or nucleic acids to denature.
   D. It causes the proteins or nucleotides to precipitate.

5. What are the two sequential techniques in two-dimension electrophoresis?
   A. affinity chromatography and ion exchanger
   B. isoelectric focusing and SDS-PAGE
   C. ion exchanger and SDS-PAGE　D. SDS-PAGE and isoelectric focusing

6. Treatment with what chemical or chemicals causes the deproteinization of the DNA extract in the DNA isolation procedure?
   A. NaOH　B. SDS　C. buffered salt solution　D. a phenol/chloroform mixture

7. How is RNA eliminated as a contaminant during the DNA isolation procedure?
   A. by heating the mixture　B. by changing the pH
   C. by adding ribonuclease (RNase)　D. by adding deoxyribonuclease

8. How can a researcher visualize all of the DNA fragments present in an electrophoresis gel?
   A. using a labeled probe with a sequence complementary to the desired DNA fragment
   B. staining with ethidium bromide　C. staining with coomassie blue
   D. using labeled antibodies

9. Which of the following is common to both E. coli and eukaryotic chromosomes?
   A. the DNA is circular　B. the DNA is packaged into nucleosomes
   C. the DNA contained in the nucleus　D. the DNA is negatively supercoiled

10. telomerase

A. exist in all eukaroyotic cells
B. exist only in tumor and stem cells
C. is an enzyme adds DNA to centromere
D. is a enzyme responsible for eukaryotic DNA replication

11. Transformation is

A. the take-up of a plasmid into a bacterium
B. the expression of a gene in a bacterium
C. the take-up of a bacteriophage into a bacterium
D. the isolation of a plasmid from a bacterium

12. In agarose gel electrophoresis

A. DNA migrates towards the negative electrode
B. supercoiled plasmids migrate slower than their nicked couterparts
C. larger molecules migrate faster than smaller molecules
D. ethidium bromide can be used to visualize the DNA

13. Blue-white selection is used

A. to test for the presence of a plasmid in a bacteria
B. to reveal the identity of a cloned DNA fragment
C. to express the product of a cloned gene
D. to test for the presence of a cloned insert in a plasmid

14. A multiple cloning site

A. contains many copies of a cloned gene
B. allows flexibility in the choice of restriction enzymes for cloning
C. allows flexibility in the choice of organism for cloning
D. contains many copies of the same restriction enzyme site

15. Which vector would be most appropriate for Human Genome Project

A. plasmid B. lamda phage C. Yeast artificial chromosome D. retroviral vector

16. Which one of the following statements about PCR is false?

A. the PCR cycle involves denaturation of the template, annealing of the primers and polymerization of nucleotides
B. PCR uses thermostable DNA polymerases
C. PCR optimization usually include varying the Mg^{++} concentration and the annealing temperature
D. if PCR was 100% efficient, one target molecule would amply to 2n after n cycles

17. What are the three amino acids that are positively charged at a neutral pH?

A. K, R, H B. K, R, W C. I, K, W D. M, K, W

18. When substrate concentration is much greater than Km, the rate of catalysis is almost equal to?

A. V_{max} B. K_m C. V_0 D. K_d

19. How big is the haploid human genome size?

A. 3×10^6 bp B. 3×10^7 bp C. 3×10^8 bp D. 3×10^9 bp

20. The structural difference between ATP and dATP lies in

A. the number of phosphate group
B. the base structure
C. the pentose structure
D. the dehydration level

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

問答題(40%)

1. 試說明中國不肖業者添加三聚氰胺(Melamine)的目的是什麼？現在國內檢測三聚氰胺的標準方法是什麼？為何早期政府公告的三聚氰胺容許含量較高？

2. 今年諾貝爾化學獎頒發給三位對 fluorescent protein 的發現及應用有傑出貢獻的三位科學家。請問(1) Osamu Shimomura 是從哪種生物裡分離純化出 green fluorescent protein? (2) Martin Chalfie 將 GFP gene 放到 *Caenorhabditis elegans* 去，主要的目的及貢獻是什麼？(3) Roger Y. Tsien 的貢獻是什麼？

3. The Nobel Prize in Physiology or Medicine for 2008 with one half to Harald zur Hausen for his discovery of "human papilloma viruses causing cervical cancer" and the other half jointly to Françoise Barré-Sinoussi and Luc Montagnier for their discovery of "human immunodeficiency virus".
   (1) What are the major discoveries for the Nobel Prize in Physiology or Medicine for 2008 ?
   (2) Who are the Nobelists for Medicine of 2008?
   (3) What is the genome composition of human immunodeficiency virus?
   (4) What is the disease caused by human immunodeficiency virus?
   (5) What is the most effective method to prevent cervical cancer?

4. 解釋名詞 (1) apoptosis (2) ELISA (3) reverse transcription (4) siRNA (5) knockout mice