

本試題是否可以計算機： 可使用， 不可使用（請命題老師勾選）

SIMPLE-CHOICE QUESTIONS 單選題

(Identify the correct statement. Gain two points for each correct question. 每題 2 分)

1. You are working on sub-cloning a gene from plasmid A to plasmid B. Which of the following enzymes will not be used in this process?
(A) DNA ligase
(B) reverse transcriptase
(C) type II restriction endonuclease
(D) *Taq* (DNA polymerase)
2. In some experiments, you have to express your protein in another organism. Which of the following organisms is not commonly used to produce protein?
(A) *Escherichia coli*
(B) *Saccharomyces cerevisiae*
(C) *Trypanosoma cruzi*
(D) Chinese hamster ovary cell
3. Which of the following methods can not be utilized to diagnose human disease?
(A) Northern blot
(B) Eastern blot
(C) Western blot
(D) Southern blot
4. Which of the following immunoglobulins does not belong to mammals?
(A) IgG
(B) IgM
(C) IgD
(D) IgY
5. Which material is the target of Southern blotting?
(A) fatty acid
(B) DNA
(C) RNA
(D) protein
6. If you want to purify protein, your target protein is 54kDa, $pI = 7.5$, and your major impurities are 52kDa, $pI = 6.0$. Which of the following chromatographic methods is suitable to separate them?
(A) gel filtration
(B) ion exchange
(C) hydrophobic interaction
(D) affinity

(背面仍有題目,請繼續作答)

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7. In some experiments, you have to utilize filtration system to concentrate protein product. You understand your major product is 50kDa in molecular weight. Which molecular weight cutoff (MWCO) of filter membrane should you choose for this process?
- (A) 50 kDa
(B) 35 kDa
(C) 25 kDa
(D) 15 kDa
8. Avian influenza A virus H5N1 is an important disease in these years. What does H5N1 represent?
- (A) H5N1 is the serotype of its surface antigen hemagglutinin and neuraminidase.
(B) H5N1 is the DNA genotype of its H5 and N1 gene.
(C) H5N1 represents the test number that the virus was first identified.
(D) H5N1 represents the surface antigen structure that is composed of five H proteins and one N protein.
9. Which of the following methods can not be utilized to produce transgenic animal?
- (A) microinjection
(B) retrovirus infection
(C) intramuscular injection
(D) electroporation
10. Which factor can recognize the bacterial promoter consensus sequence and link to RNA polymerase?
- (A) θ
(B) ρ
(C) σ
(D) τ
11. Where is approximately the located site of TATA box upstream from the transcriptional start site in eukaryotic genes?
- (A) -10
(B) -35
(C) -25
(D) -20
12. Starch from corn is one of the carbon sources to produce ethanol by fermentation. However, the cost is still higher than crude oil. Which of the followings may be a good resource for future biofuel production from plants?
- (A) Starch from plant cell wall
(B) Sucrose from plant cell wall
(C) Cellulose from plant cell wall
(D) Glucose from plant cell wall

編號: 80
77

系所: 生物科技研究所甲組, 2

科目: 生物技術

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13. Which enzyme can remove the phosphate group present at the 5' terminus of a DNA molecule?
(A) alkaline phosphatase
(B) polynucleotide kinase
(C) deoxynucleotidyl transferase
(D) DNA polymerase
14. What is the maximum insert size (kb) for most plasmids?
(A) 6
(B) 7
(C) 8
(D) 9
15. Which type of DNA molecules has the least buoyant density in EtBr-CsCl gradient?
(A) linear
(B) open-circular
(C) supercoiled
(D) unwinding
16. Which class of laminar-flow hood is required when carrying out dissection and subsequent cultural work of tissues?
(A) class I
(B) class II
(C) class III
(D) class IV
17. Which of the following methods is not commonly used to separate cells?
(A) sedimentation velocity at 1000 g
(B) immune panning
(C) FACS
(D) limiting dilution
18. In which phase does the cell number increase quickly in cell cultural system?
(A) the lag phase
(B) the log phase
(C) the plateau phase
(D) G0 stage
19. DNA microarrays provide compact libraries for studying _____.
(A) gene functions and their expressions
(B) protein functions
(C) only one gene expression
(D) protein-protein interactions

(背面仍有題目, 請繼續作答)

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20. Which of the followings is less desirable to genetic engineering rapeseed (canola) for food industry?
- (A) Increase oil content in seeds.
 - (B) Change the lipid contents in seeds.
 - (C) Produce omega-3 fatty acids.
 - (D) Enhance plant resistant to cold stress.
21. Arabidopsis is a mustard grass and is used as a model plant in biotechnology research. Which of the followings is not correct?
- (A) The genome size is small.
 - (B) The generation time is short.
 - (C) The genome has not been completely sequenced yet.
 - (D) Its genetic engineering is easy.
22. What is the advantage to express Bt endotoxin gene in chloroplasts of plants?
- (A) Avoid allergic reaction.
 - (B) Codon usage does not have to be modified.
 - (C) Technology is easier.
 - (D) Enhance plant growth.
23. Round-up ready soybean accounts for the largest cultivated area in soybean fields. What is the particular trait for round-up ready soybean?
- (A) insect resistant
 - (B) fungi resistant
 - (C) nematode resistant
 - (D) herbicide resistant
24. Moth orchid is an important floral crop in Taiwan. Which of the following technologies is used for mass production of orchids?
- (A) transgenic plant technology
 - (B) plant breeding technology
 - (C) plant tissue culture technology
 - (D) plant photosynthetic technology
25. "Golden rice" is transgenic rice. Which of the following nutritional elements is enriched in the grain?
- (A) vitamin A
 - (B) vitamin B
 - (C) vitamin C
 - (D) β -carotene

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SHORT ESSAY 簡答題 (Five points for each question. 每題 5 分)

1. Please simply describe what monoclonal antibody is, and how to produce it.
2. What is DNA vaccine? Please simply describe its principle, property and application in human or animal.
3. What is tissue engineering? Please simply describe it.
4. Please explain blunt ends and sticky ends which are generated from cleaving by restriction endonucleases.
5. Please draw and briefly describe what the yeast two-hybrid system is.
6. If you got a 1.2 Kb cDNA clone from a zebrafish embryonic library (at 24 hpf), how do you use the zebrafish as a model system to assay its gene function?
7. If you want to select a GFP-contained stable cell line in a group of liver cell lines, explain why you need a drug selection marker?
8. Explain why it is needed to select plant tissues (or cells) under the medium with antibiotics or herbicide after a foreign gene was delivered into plant cells.
9. Explain why *Agrobacterium tumefaciens* is used to deliver foreign DNA into plant chromosome now although it can cause crown gall disease in plants.
10. From the result of field trial, transgenic cowpea with overexpression of α -amylase inhibitor was able to resist the attack of cowpea weevils (an insect pathogen) in Australia. However, the development of transgenic cowpea was terminated in Australia. What are the possible and logical reasons for Australian government to stop marketing the transgenic cowpea? Please explain.