



Course No:  
Course Title: هندسة وراثية  
Date: 26/5/2018  
No. of Questions: (4)  
Time: 2 hours  
Using Calculator (No)

Final Exam for 2<sup>nd</sup>  
Semester.  
2017/2018

Instructor Name: روان المدھون  
Student No.: \_\_\_\_\_  
Student Name: \_\_\_\_\_  
College Name: \_\_\_\_\_  
Dep. / Specialist: \_\_\_\_\_  
Using Dictionary (No)

Total Grade:

### Question One:

Choose the correct answer from the followings:

- 1. Nitrogen bases linked together by ..... while nucleotides linked by .....**
  - a) H-Bond, Phosphodiester Bond
  - b) Peptide Bond, Phosphodiester Bond
  - c) Phosphodiester Bond, H-Bond
  - d) Phosphodiester Bond, Peptide Bond
- 2. The enzyme that known as molecular glue called ..... while that known as molecular scissors called .....**
  - a) Nuclease, polymerase
  - b) Nuclease, ligase
  - c) Ligase, helicase
  - d) Ligase, nuclease
- 3. The enzyme that remove the nucleotides from the end of DNA is**
  - a) Ribonuclease
  - b) Exonuclease
  - c) RNase
  - d) Endonuclease
- 4. Transformation method in which a very fine needle is used to inject the DNA directly into the nucleus.**
  - a) Biolistic transformations
  - b) Co-precipitation
  - c) Microinjection
  - d) Electroporation
- 5. All the followings vectors accept large insert size Except**
  - a) Yeast Artificial Chromosome
  - b) Plasmid
  - c) Cosmid
  - d) BAC
- 6. PCR is**
  - a) DNA visualization technique
  - b) DNA amplification technique
  - c) DNA modification technique
  - d) DNA degradation technique



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**7. The Genetic Engineering known as**

- a) The Art of Cutting and Pasting genes
- b) Recombinant-DNA Technology
- c) A Course in Pharmacy and Biotechnology collage ☺
- d) All of them

**8. All of the followings are true about the primer except**

- a) Two primers (Forward and Reverse) are required for each PCR reaction
- b) Primers are not necessary for the selective amplification
- c) Primers attached to the Template at temperature range 45-60 C
- d) Synthesized to be complementary with the desired gene

**9. Internal complementary sequence in primer design must be avoided to prevent**

- a) Self-annealing structure
- b) Hairpin structure
- c) Primer- dimer formation
- d) All of them

**10. All the followings are necessary for PCR reaction except**

- a) DNA polymerase
- b) DNA nuclease
- c) Template and primer
- d) dNTPs

**11. Marker Rescue involve**

- a) Cloning of non-essential gene
- b) Using a Normal strain for transformation
- c) Making use of mutant strain as a host
- d) All of them

**12. Which of the following is correct?**

- a) Any two single-stranded nucleic acid molecules have the potential to form base pairs with one another.
- b) Uncomplimentary DNA hybrid stay stable for long time
- c) Short non-complementary rejoins will affect the overall stability of dsDNA molecules
- d) DNA single strand cannot base pair with RNA single strand

**13. All the followings are true about Nucleic Acid Hybridization Except**

- a) Used to identify a particular recombinant clone
- b) Non-specific method of selection
- c) Based on DNA or RNA probe
- d) Based on complementation between the desired gene and the nucleic acid probe



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**14. Which of the followings consider a non-Radioactive labeling method?**

- a) Nick translation
- b) Biotin-streptavidin method
- c) End filling labeling
- d) Random-priming method

**15. Which of the statements is incorrect about Random priming?**

- a) Non-radioactive labeling method
- b) Radioactive labeling method
- c) Result in highly activity probe
- d) able to detect smaller amounts of membrane-bound DNA

**16. Sanger Sequencing is**

- a) Chain termination sequencing
- b) Pyrosequencing
- c) Sequence as DNA strand synthesise
- d) All of them

**17. Polyacrylamide gel electrophoresis**

- a) Separate DNA molecules that differ in length by single nucleotide
- b) Used in pyrosequencing
- c) Not necessary in dideoxynucleotides sequencing
- d) None of them

**18. dideoxynucleotides**

- a) consider a key molecule in chain termination sequencing
- b) as it incorporated into the DNA molecule the synthesis cannot complete
- c) lacks the 3'-hydroxyl group
- d) all of them

**19. which of the followings is correct about deoxynucleotides and dideoxynucleotides?**

- a) DNA polymerase cannot discriminate between them
- b) Both used in pyrosequencing
- c) deoxynucleotides lacks the 3'-hydroxyl group while dideoxynucleotides lacks the 2'-hydroxyl group
- d) deoxynucleotides can form phosphodiester bond while dideoxynucleotides cannot

**20. All the followings are correct about Thermal cycle sequencing except**

- a) Involve the use of PCR
- b) Based on chain termination sequencing
- c) Required forward and reverse primer
- d) Required deoxy and dideoxy nucleotides



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**21. Pyrosequencing involve**

- a) a series of successive pyrosequencing reactions
- b) sequential enzymatic reaction
- c) recording the DNA sequence as it is synthesized.
- d) All of them

**22. CRISPAR-CAS9**

- a) DNA-Editing tool
- b) Part of bacterial immunosystem
- c) Clustered regularly inter spaced palindromic repeats
- d) All of them

**23. CAS9 is**

- a) Nuclease
- b) Polymerase
- c) Helicase
- d) None of them

**24. Gene function can be inactivated by all the followings ways except**

- a) DNA sequence Disruption
- b) mRNA inactivation
- c) protein Denaturation
- d) all of the followings are correct

**25. Post-transcriptional Gene Silencing**

- a) Involve inactivation of gene expression by affecting the protein
- b) based on anti-sense RNA
- c) achieve complete inactivation
- d) all of them



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## Question Two:

### Complete

- .....is where some sort of pressure is applied during the growth of host cells containing recombinant DNA.
- .....is a procedure by which a population of viable cells is subjected to some sort of analysis that enables the desired sequences to be identified.
- .....is a collection of clones sufficient in number to be likely to contain every single gene present in a particular organism.
- A DNA molecule is usually Radioactively labeled by incorporating nucleotides that carry .....
- Radioactive labeling drawbacks are
  - a)
  - b)
- ..... The process by which the precise order of nucleotides in a piece of DNA can be determined.
- Mention the **two functions** of the adaptor that used in massively Parallel sequencing
  - a)
  - b)
- gene inactivation could be useful in
  - a)
  - b)
- Any heritable change in the genome called.....
- How mRNA and anti-sense RNA hybrid inactivate gene expression
  - a)
  - b)



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### Question Three:

#### True or False

1. ( ) Most of bacterial cells that undergo cloning will contain the desired gene
2. ( ) All genes are expressed at the same time in all cells
3. ( ) Nick translation can be used to label any DNA molecule but might under some circumstances also cause DNA cleavage.
4. ( ) Non-radioactive probing is less sensitive than radioactive probing but more safe.
5. ( ) Pyrosequencing can discriminate the sequence by labels with different fluorescent marker attached to each nucleotide
6. ( ) In pyrosequencing the individual dNTPs are provided in order while in dideoxysequencing mix of dNTPs is already present in reaction mixture.
7. ( ) In massively parallel sequencing The ratio of DNA fragments to beads is designed to allow one fragment only becomes attached to each bead.
8. ( ) Genetic material exchange between two homologous sequence called homologous recombination
9. ( ) ultraviolet radiation causes mutations that are desirable and precise
10. ( ) The clone contig sequencing approach involves a pre-sequencing phase during which a series of overlapping clones is identified.

### Question Four:

- a) Outline the Enzymatic Reaction in Pyrosequencing

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- b) Assume that Bacterial culture undergo transformation process with plasmid contain the gene of interest in addition to Ampicillin resistance gene. Design a method for identify the bacterial cells that gain the plasmid.

End of Questions  
*Good Luck*