Course: LS 3105 **Total marks 20** **Date: 20.11.2018**

Name of the student: **Roll No:**

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1. PCR is a DNA amplifying technique in vivo,

   True or False

2. How many DNA duplex is obtained from one DNA duplex after 4 cycles of PCR?
   a. 4 b. 8 c. 16 d. 32

3. PCR can be useful in forensic laboratories as
   A. only a tiny amount of original DNA is required
   B. it can detect mutations that occur in genetic diseases
   C. can provide information on a patient's prognosis
   D. can analyze clinical specimens for the presence of infectious agents
4. Which of the following is a typical component of a PCR reaction,
   A. $CaCl_2$ B. $MgCl_2$ c. SDS d. Tween 20

5. Which of the following is a likely temperature for annealing between template and primer?
   a. 94 b. 72 c. 42 d. 57
6. From which organism is the enzyme reverse transcriptase isolated?
   a. Fungi b. Bacteria c. Human d. Virus
7. Primer used in the process of polymerase chain reaction are
   a. Single stranded DNA oligonucleotide
   b. Double stranded DNA oligonucleotide
   c. Single stranded RNA oligonucleotide
   d. Double stranded RNA oligonucleotide

8. What would the expected effect be on a PCR reaction if the primers used were slightly shorter and more variable than the intended oligonucleotide sequences?
   a. The PCR reaction will not commence
   b. The reaction would end after a few cycles
   c. The reaction would generate a single short PCR product
   d. The reaction would yield a mixture of non-specific products.

9. Role of a primer in PCR is to
   a. Copy the DNA b. Frame the beginning and end of the target sequence c. Separate the DNA d. All of the above

10. What is special about Taq DNA polymerase?
    a. Can heat samples quickly b. It can separate strands quickly c. Can withstand high temperatures needed for PCR d. Not special as all types of cells makes Taq Polymerase

11. You are asked to clone a mice gene (X) in E. coli and you only know the length of the gene encoding the protein X. The size of the gene is 400bp. Answer the following questions:

    To amplify the gene encoding protein X following genetic material will be used as template for PCR (1)

    a. DNA b. mRNA c. cDNA d. all of them

12. After amplifying and cloning of the gene, you are asked to express and purify the Protein X followed by generating antibodies against the protein in Rabbit. Immunization of rabbit will generate (1)

    a. Monoclonal Antibody b. Polyclonal antibody c. Mixture of both

13. Following raising the antibody you are asked to perform Western Blotting. For Western blotting following is the correct sequence (1)
    a. Protein transfer, SDS-PAGE, Primary antibody incubation, Addition of substrate, Enzyme conjugated Secondary Ab incubation
    b. Protein transfer, SDS-PAGE, Primary antibody incubation, Enzyme conjugated Secondary Ab incubation, Addition of substrate.
    c. SDS-PAGE, Protein transfer, Primary antibody incubation, Enzyme conjugated Secondary Ab incubation, Addition of substrate.
14. For the above case, you will need which of the following antibody as secondary antibody (1)

    a. Goat anti Rabbit secondary antibody
    b. Mice anti-rabbit secondary antibody
    c. Sheep anti-rabbit secondary antibody
    d. All of the above.
15. Mention the following statement whether True or False (4)
    a. Western blot and ELISA both rely on use of antigens and antibodies in the reaction.
    b. ELISA is a semi quantitative technique while western blot is a quantitative technique
    c. In WB, Nitrocellulose is easily wetted avoiding the use of methanol
    d. PVDF is hydrophobic and so fits well to the analysis of hydrophobic proteins.
16. Which of the following does NOT describe advantages of ELISA tests? (1)

    a) They can demonstrate the presence of multiple antigens
    b) They can detect either antigens or antibodies.
    c) They can quantify the amounts of antigen or antibody in a sample

17. In SDS-PAGE protein fragments are separated on basis of (1)

    a) Size
    b) Charge
    c) Both A and B
    d) Temperature sensitivity

Signature of the student with date: