

Write the following information in the first page of Answer Script before starting answer

**ODD SEMESTER EXAMINATION: 2020-21**

Exam ID Number \_\_\_\_\_

Course \_\_\_\_\_ Semester \_\_\_\_\_

Paper Code \_\_\_\_\_ Paper Title \_\_\_\_\_

Type of Exam: \_\_\_\_\_ (Regular/Back/Improvement)

**Important Instruction for students:**

1. Student should write objective and descriptive answer on plain white paper.
2. Give page number in each page starting from 1<sup>st</sup> page.
3. After completion of examination, Scan all pages, convert into a single PDF, rename the file with Class Roll No. (2019MBA15) and upload to the Google classroom as attachment.
4. Exam timing from 10am – 1pm (for morning shift).
5. Question Paper will be uploaded before 10 mins from the schedule time.
6. Additional 20 mins time will be given for scanning and uploading the single PDF file.
7. Student will be marked as ABSENT if failed to upload the PDF answer script due to any reason.

**B.Sc. BIOTECHNOLOGY  
FIFTH SEMESTER  
RECOMBINANT DNA TECHNOLOGY  
BBT - 502**

Duration : 3 hrs.

Full Marks : 70

**PART-A: Objective**

Time : 20 min.

Marks : 20

***Choose the correct answer from the following:***

***1 × 20 = 20***

1. If right border in Ti plasmid is absent, then (choose the right option)
  - a. foreign DNA will be expressed in the host
  - b. T-DNA cannot be removed
  - c. DNA synthesis will not occur
  - d. None of the above
2. Which of these is not an activity of Reverse transcriptase?
  - a. RNA dependent DNA polymerase
  - b. RNA cleavage from hybrid
  - c. Polymerase activity on DNA template
  - d. None
3. PCR based method of site-directed mutagenesis is error prone
  - a. True
  - b. False
  - c. Maybe
  - d. Can't say
4. In vector recombinant vaccine, plasmid insertion vector incorporates its genes into \_ virus genome at a place that encodes for \_ enzyme
  - a. Baculovirus; HbSAg
  - b. *Vaccinia*; HbS
  - c. *Vaccinia*; thymidine kinase
  - d. Baculovirus; TK
5. Alkaline phosphatase is used to
  - a. Remove terminal phosphate from 5' end of cut DNA
  - b. Prevent recircularization of DNA
  - c. Remove phosphate groups
  - d. All of the above
6. What should not be the GC content of PCR primers?
  - a. 35%-45%
  - b. 55%
  - c. Poly G and Poly C
  - d. All
7. Difference between neo genes and Kan<sup>r</sup>
  - a. neo for selecting recombinant plant cells
  - b. Kan<sup>r</sup> for recombinant *Agrobacterium* cells and plant cells
  - c. both (a) and (b)
  - d. Only (b)
8. Recombinant Factor VIII protein is industrially produced in
  - a. *E. coli* cells
  - b. Hamster kidney cells
  - c. Embryonic stem cells
  - d. None
9. Replacement vectors are preferred over Insertional vectors because
  - a. Large size of gene of interest
  - b. Presence of polylinkers
  - c. Both 1 and 2
  - d. None

10. His-tag is used as a fusion partner with proteins in \_ chromatography because it can bind to \_
- Affinity; Ni-NTA beads
  - Affinity; Imidazole
  - Gel permeation; cations
  - Gel permeation; Imidazole
11. If Vir D1 gene is absent in Ti plasmid, which of the following functions will be affected?
- opening of the ds DNA
  - phosphorylation of VirA proteins
  - negative supercoiling of DNA
  - only (a)
12. Hepatitis vaccine, a \_ vaccine, is produced by cloning \_ gene in yeast cells
- Attenuated; HbS
  - Subunit; HbS
  - Subunit; HbSAg
  - Attenuated, HbSAg
13. Genomic DNA library contains only the expressed genes of an organism
- True
  - False
  - Maybe
  - Can't say
14. The function of ligase is
- Seals nicks in DNA
  - Forms bonds between cut DNA bases
  - Join sugar-phosphate backbone of cut DNA
  - Both 1 and 3
15. Which of these is solved by DNA fingerprinting?
- Blood clot formation in crime scene
  - Paternity disputes
  - Making of passport
  - All
16. Reverse transcription doesnot involve
- Extension of DNA from 3' end
  - 2 jumps of U and R region
  - Removal of viral R and U5 regions
  - None
17. If LacZ gene is recombined, what will be the selection process for recombined bacteria?
- Blue coloured colonies
  - White coloured colonies
  - Transparent colonies
  - Both a & b
18. ANDi is the name of
- Smart mouse
  - Youth mouse
  - Glowing monkey
  - Super pig
19. EcoR1 is an example of
- Type I RE
  - Type III RE
  - Type II RE
  - None
20. In \_ PCR, the annealing temperature in the early cycles is usually 3-5°C above the standard T<sub>m</sub> of the primers used, while in the later cycles it is a similar amount below the T<sub>m</sub>
- Touchdown
  - Hot-start
  - Real time
  - Anchored

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**(PART-B : Descriptive)**

Time : 2 hrs. 40 min.

Marks : 50

**[ Answer question no.1 & any four (4) from the rest ]**

1. Explain the interaction of Vir genes and chromosomal genes during infection by *Agrobacterium*. What are cointegrate vectors and binary vectors? How are you going to select recombinant cells when binary vectors are used for gene transfer? Write in brief the problems associated with using TI plasmid having T-DNA. 3+2+3+2  
=10
  
2. Differentiate between 5+5=10
  - a. Conventional and recombinant vaccines
  - b. Genomic and cDNA library
  
3. Write short notes on 5+5=10
  - a. Common method to solve crimes
  - b. Injection taken by someone with high glucose levels
  
4. Explain in brief how integration occurs between intermediate vector and disarmed Ti plasmid. What are the functions of the marker genes in cointegrate vectors? Mention the marker genes. 3+2+3+2  
=10

Explain the working of electroporation and microinjection. What types of cells are helpful in microinjection?
  
5.
  - a. You have a fragment of DNA and you need to test if a particular sequence is present or not. How will you do it? Explain the process with diagrams. 1+5+1=7  
1+2=3
  - b. How is testing RNA sequence in a fragment done? List its applications
  
6.
  - a. What is the commonest vehicle of transferring DNA? Write about its important features. Briefly describe the insertion of DNA into bacteria using Ca ions? 1+2+3=6
  - b. Briefly explain 'molecular scissors' and 'removal of phosphate group' enzymes in molecular biology. 2+2=4

7. a. Explain the process to increase the quantity of DNA. Write about 2 changes from the conventional method? 2+3=5
- b. Explain the process to estimate the quantity of DNA in a sample using diagrams. 5
8. a. What are 3 methods of introducing a transgene in animals? Explain the process of SCNT. Name a transgenic animal produced by SCNT. 1++3+1=5
- b. *Vibrio cholerae* caused a disease. Explain the process of finding the cure for it. 2+3=5

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