



**WEST BENGAL STATE UNIVERSITY**  
B.Sc. Programme 6th Semester Examination, 2022

**MLBGDSE03T-MOLECULAR BIOLOGY (DSE2)**

**RECOMBINANT DNA TECHNOLOGY AND FUNDAMENTALS OF IMMUNOLOGY**

Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.  
Candidates should answer in their own words and adhere to the word limit as practicable.  
All symbols are of usual significance.*

1. Answer any **ten** questions from the following: 1×10 = 10
- Choose the correct option:
- (a) pBR322 has/have which of the following selection marker  
(A) Amp<sup>r</sup>                      (B) Tet<sup>r</sup>                      (C) both (A) and (B)                      (D) None of them
- (b) Which of the following primers would you allow copying of the single stranded DNA sequence 5'ATGCCTAGGTC-3'?'  
(A) 5'ATGCC                      (B) 5'TACGG                      (C) 5'GACCT                      (D) 5'CTGGA
- (c) Restriction enzymes are isolated from  
(A) Virus                      (B) Fungi                      (C) Bacteria                      (D) Protozoa
- (d) Monoclonal antibodies recognize a single  
(A) antigen                      (B) bacterium                      (C) epitope                      (D) B cell
- (e) The following is characteristic of B-cell but not T-cells  
(A) Class I MHC                      (B) CD3  
(C) Measles virus receptor                      (D) surface immunoglobulin
- (f) Monocyte differentiate into which kind of phagocytic cells?  
(A) Neutrophil                      (B) B cell                      (C) Macrophage                      (D) T-cell
- (g) Antibody titer refers to the:  
(A) Affinity of specific antibody  
(B) Avidity of specific antibody  
(C) Concentration of specific antibody  
(D) Highest dilution of antibody still able to give a positive result in a test system
- (h) Southern blotting technique used in genetic fingerprinting is called so because,  
(A) it is done from the south side                      (B) it was discovered by E.M. Southern  
(C) it was popular in South America                      (D) it separates RNA

- (i) Which of the following statement about plasmids is incorrect?
- (A) they are circular DNA molecules
  - (B) they have antibiotic resistance gene
  - (C) they have DNA that is as long as chromosomal DNA
  - (D) they have the ability of autonomous replication
- (j) Plasmid incompatibility is
- (A) inability of a plasmid to grow in the host
  - (B) inability of two different plasmids to co-exist in the same host cell in the absence of selection pressure
  - (C) both (A) and (B)
  - (D) none of the above
- (k) Majority of auto immune diseases are
- (A) cell mediated
  - (B) antibody mediated
  - (C) mast cell mediated
  - (D) macrophage mediated
- (l) B lymphocytes arise from
- (A) Hematopoietic stem cell
  - (B) Germ cell
  - (C) Somatic cell
  - (D) Spermatocytes
- (m) Type II restriction endonucleases recognize specific sequences on DNA called
- (A) non-coding sequences
  - (B) palindromes
  - (C) satellites
  - (D) tandem repeats
- (n) In the nomenclature of restriction endonuclease EcoRI, 'E' stands for
- (A) Extraction
  - (B) Exonuclease
  - (C) Endangered
  - (D) the letter of the genus of the bacteria from which it is isolated.
- (o) Which of the following Ig is involved in mediating allergic reactions
- (A) IgG
  - (B) IgM
  - (C) IgE
  - (D) IgA

2. Answer any *ten* questions from the following:

2×10 = 20

- (a) What is herd immunity?
- (b) What is haptan?
- (c) What do you mean by 'α-complementation'?
- (d) What is shuttle vector?
- (e) Explain the active immunization.
- (f) What is Cosmid?
- (g) Which stain is used in DNA gel electrophoresis? Mention its one advantage and one disadvantage.
- (h) Mention the utility of Reverse Transcriptase in RDT.
- (i) What do you mean by recombinant DNA technology?

- (j) Name a restriction endonuclease producing cohesive ends. Mention its recognition sequence.
- (k) What are YACs? Mention one advantage and disadvantage of using YACs in cloning.
- (l) What is 'northern blotting'?
- (m) What is palindromic sequence?
- (n) Define antigen presenting cells.
- (o) Briefly describe any one method for c-DNA synthesis.

3. Answer any *two* questions from the following: 5×2 = 10
- (a) Explain the principle of PCR. 5
  - (b) Explain the Type III hypersensitivity. 5
  - (c) Mention the source and uses of following enzymes in RDT: 2½ × 2 = 5
    - (i) Polynucleotide kinase
    - (ii) Terminal transferase
  - (d) Differentiate between the following: 2½ × 2 = 5
    - (i) Isoschizomers and Neoschizomers
    - (ii) Memory B-cell and Plasma cell

**N.B. :** *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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