



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

MCBACOR14T-MICROBIOLOGY (CC14)

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.*

Answer Question No. 1 and any four from the rest

1. Answer any **four** questions from the following: 2×4 = 8
- (a) What is the name of first type II restriction enzyme that was discovered and mention its cleavage site?
 - (b) How some bacteriophage perform anti-restriction mechanism to get entry into host *E. coli* cell?
 - (c) Why TEMED is used during SDS-PAGE?
 - (d) Name any two methods that can be used for the screening of genomic DNA library.
 - (e) How would you increase the stringency and specificity of Southern blotting reaction?
 - (f) Why nested PCR is considered to be advantageous over conventional PCR technique?
 - (g) What are the limitations of DNA microarray?
 - (h) How would you minimize the 'star activity' of a restriction enzyme?
2. (a) Describe the essential features of a recombinant plasmid that is required to express foreign genes in mammalian cell line. 2
- (b) How can you modify foreign protein to facilitate its purification? 2
- (c) What is the advantage of expressing a protein in mammalian cell than a bacterial cell? 2
- (d) Why M13 vector is used for gene sequencing? 2
3. (a) How does the gene delivery take place by micro-injection process? 2
- (b) What factors affect SDS-PAGE? 2
- (c) What are the applications of gene therapy? 2
- (d) Mention the advantage of nylon membrane over nitrocellulose membrane in southern blotting. 2

4. (a) Describe the differences between RFLP, SNP and VNTRs. 3
(b) How GFP and CAT gene act as reporter gene? 3
(c) What are the two different types of gene therapy? 2
5. (a) Describe the principle of DNA Microarray citing a hypothetical experimental condition. 3
(b) What are opines? 1
(c) Describe one method of production of one biomedically important protein using RDT. 3
(d) Name the hybridization technique used to screen RNA. 1
6. (a) What is the difference between PCR and Real time PCR? 3
(b) How cosmids can act as cloning vector? 3
(c) What are the advantages of using SV40 as cloning vector? 2
7. (a) How will you determine the localization of a particular gene in mammalian genome? 3
(b) Describe the principles of selection of recombinants when cloning is supposed to be done by using YAC vector. 3
(c) Why are type II restriction enzymes important for recombinant DNA technology? 2
8. Write short notes on: 2×4 = 8
(a) C DNA library
(b) Colony PCR
(c) Selectable marker
(d) Ti plasmid.
9. (a) Draw the autoradiograph derived from dideoxynucleotide sequencing of 5'-CCTAGTTGATCTTAGCCAT-3'. 2
(b) Comment on the rate of chain termination if the ratio of ddNTP : dNTP is 2
(i) 1 : 100
(ii) 1 : 50
(c) What is linker? How is it used? 2
(d) What are the conditions that must be met for T4 DNA ligase catalysis? 2

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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