



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 5th Semester Examination, 2020, held in 2021

MCBADSE03T-MICROBIOLOGY (DSE1/2)

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.*

Question No. 1 is compulsory and answer any *four* questions from the rest

1. Answer any *four* questions from the following: 2×4 = 8
 - (a) State the Mendel's law of segregation.
 - (b) What is Barr body?
 - (c) Distinguish between heterochromatin and euchromatin.
 - (d) What do you mean by 'Atavism'?
 - (e) Define test cross and back cross in genetics.
 - (f) What do you mean by sex-limited and sex-influenced traits? Cite an example.
 - (g) What is Centromere? Describe its functional role.

2. (a) State the major differences between homologous recombination and sitespecific recombination with the help of a diagram. 3
 - (b) Why are *E. coli* Rec A mutants very UV sensitive? 2
 - (c) Describe the role of the Rec BCD complex when it encounters the 'Chi' site during the process of recombination. 3

3. (a) What is tetrad analysis? 2
 - (b) How was *Neurospora* found suitable for the study of crossing over and recombination? 3
 - (c) Using *Neurospora*, how can you show that crossing over takes place at four strand stage? 3

4. (a) What do you mean by multiple allele? If father is A+, mother is O-, then what could be the possible blood groups of their children? Give answer with punnett square. 2+3
 - (b) What are lethal genes? Give examples. 2+1

5. (a) Define the terms Linkage Groups and Recombination Frequency. 2+2
- (b) In rabbits an allele for spotted pattern is dominant to one for self-coloured (solid colour), and an allele for short hair is dominant to one for long hair (angora). A rabbit from a pure-breeding English spotted short-haired strain is mated to a self-coloured long hair angora rabbit and the F₁ animals are then backcrossed to the self-coloured angora stock. If the backcross produces 26 spotted angora, 144 self-coloured angora, 157 spotted short-haired, and 23 self-coloured short-haired, what is the Percentage of Recombination between these two genes? 4
6. (a) Write short note on (any *two*): 2+2
- (i) VNTR
- (ii) Codominance
- (iii) Pleiotropism.
- (b) Distinguish between 2+2
- (i) Polytene chromosome and lampbrush chromosome
- (ii) LINEs and SINEs.
7. (a) What is C-value paradox? 2
- (b) What are the probable reasons behind formation of pseudogene? 2
- (c) How will you identify one unknown bacteria at species level? 2
- (d) How does negatively charged DNA wrap against histone protein? 2
8. (a) Define the terms Coefficient of Coincidence and Interference. 2
- (b) If mother is A+ and father is B–, then some physiological problem arises especially during second pregnancy. Justify. How to overcome this problem? 3
- (c) Explain the reason behind “Bombay phenotype”. 3

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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