2019

MSc

2nd Semester Examination

MICROBIOLOGY

PAPER – MCB-202

(Theory)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their

own words as far as practicable.

Illustrate the answers wherever necessary.

Group – A

1) Answer any *TWO* questions: 2 X 2=4

   a) What is Y-linked character? Cite one example.

   b) What is C-value paradox?

   c) What is linkage group?

   d) Define co-transformation?

2) Answer any *TWO* questions: 2 X 4=8

   a) Explain dosage compensation with example.

   b) State the genetic basis of Bombey phenotype of blood.

   c) State the importance of Hfr strain? Write the co-dominance?   2 + 2

   d) Write short note on : (*Any TWO*)   2 + 2

      i) Cis-trans test

      ii) Homologous recombination

      iii) Insertion sequence

3) Answer any *ONE* question: 1 X 8=8

   a) What is the frequency of heterozygous Aa in a random mating population if the frequency of recessive phenotype is 0.09 ?

   State the genetic basis of color blindness.

   What is polygenic trait?   (3+3+2)

   b) Diagrammatically represent the interrupted mating experiment.State the significance of extra-chromosomal inheritance in eukaryotes. State the function of telomere and telomerase?   (4+4+2)

Group - B

1. Answer any **TWO** questions: 2 X 2=4

   (a) Give the features of DNA Topoisomerase.

   (b) Define SOS repair in bacteria. Give example of participating genes.

   (c) Define Epigenetic tag.

   (d) What is alarmone?

2. Answer any **TWO** questions: 4 X 2=8

   (a) Differentiate between Non-homo logous End joining (NHEJ) and Homologous Recombinational Repair (HRR).

   (b) Differentiate between prokaryotic DNA polymerases & Enkaryotic DNA polymerases.

   (c) Elucidate the role of DNA mismatch repair in the HNPCC (hereditary non-polyposis colon cancer).

   (d) Environmental effects can cause epigenetic regulation – Justify with reasons.

3. Answer any *ONE* of the following: 1 X 8=8

(a) Eukaryotic gene regulation is a combinatorial phenomena–Elucidate with reasons.(8)

   (b)   (i) Describe the regulation of lac-operon with diagram.

       (ii) In an MMR event in the genome of Drosophila 180×10^6 bp long, the
           mutation frequency of any two ORFs having a gap of 600 bp are 0.035 and
           0.7×10^{-3} respectively. If the organism is 2n, then calculate the probability
           of mutant and wild type progeny after cell division (meiosis). (5 + 3=8)