

B. N. BANDODKAR COLLEGE OF SCIENCE, THANE
IV SEMESTER END EXAMINATION - MARCH - 2015
 ADDITIONAL/ATKT S.Y.B.Sc. JUNE
 USBT 402

Duration: 2 hrs 30 min

Total Marks: 75

- N. B.** 1) All questions are compulsory.
 2) Figures to right indicate full marks.
 3) Draw neat and labeled diagrams wherever necessary

Q.1 A Answer the following. (Any four)

8

- 1) Give two examples of human recessive traits.
- 2) Define: proposita. In pedigree analysis, which symbol is used to denote it?
- 3) What is chiasma interference?
- 4) In a doubly heterozygous individual, what is the given arrangement of alleles called as: i) $w^+ m / w m^+$ ii) $w^+ m^+ / w m$
- 5) Define: two point test cross.
- 6) Define: linkage group. How many linkage groups will be present in an organism whose brain cells have 44 chromosomes?
- 7) If the frequency of PD tetrads equals frequency of NPD tetrads, comment on the gene linkage.
- 8) Define: i) homologous chromosomes ii) sister chromatids

Q.1 B Answer the following. (Any two)

12

- 1) Discuss the importance of pedigree analysis as a genetic tool.
- 2) In a three-point test cross ($ABC/abc \times abc/abc$), following data are obtained:

ABC	abc	aBc	AbC	ABc	abC	aBC	Abc	Total
462	481	24	19	279	285	193	207	1950

Prepare a linkage map showing relative distances and linear order between the genes. Also find out the coefficient of coincidence and interference.

- 3) Describe the method of calculating gene-centromere distance in haploid organisms using ordered tetrads.
- 4) A cross between a orange (o^-) yeast strain of mating type α and a pale yellow strain (o^+) of mating type α produced the following tetrads:

18	$o^+ \alpha$	$o^+ \alpha$	$o^- \alpha$	$o^- \alpha$
8	$o^+ \alpha$	$o^- \alpha$	$o^+ \alpha$	$o^- \alpha$
20	$o^+ \alpha$	$o^+ \alpha$	$o^- \alpha$	$o^- \alpha$

On the basis of these results, determine whether o and the mating type genes are on separate chromosomes?

P.T.O.

Q.2 A Answer the following. (Any four) **8**

- 1) What is the function of peptidyl transferase?
- 2) Which three codons are called as stop codons?
- 3) State the significance of 5'-capping.
- 4) What is Kozak sequence?
- 5) Explain the term: polyribosome.
- 6) Name the 3 translational termination factors found in *E.coli*.
- 7) Give two examples of core promoter elements in eukaryotes.
- 8) State the role of poly(A) polymerase.

Q.2 B Answer the following. (Any two) **12**

- 1) Explain the process by which introns are removed from pre-mRNA to form matured mRNA.
- 2) Differentiate between prokaryotic and eukaryotic transcription.
- 3) Write a note on termination of RNA synthesis in prokaryotes.
- 4) Describe how translation is initiated in prokaryotes.

Q.3 A Answer the following. (Any four) **8**

- 1) State the Endosymbiont hypothesis.
- 2) State any two main characteristics of non-Mendelian inheritance.
- 3) Explain temperature-dependent sex determination using one example.
- 4) What is sexual dimorphism?
- 5) What is the function of XOL gene?
- 6) Explain the term: Haplodiploidy mechanism.
- 7) What is MERRF disease?
- 8) State the chromosome theory of inheritance.

Q.3 B Answer the following. (Any two) **12**

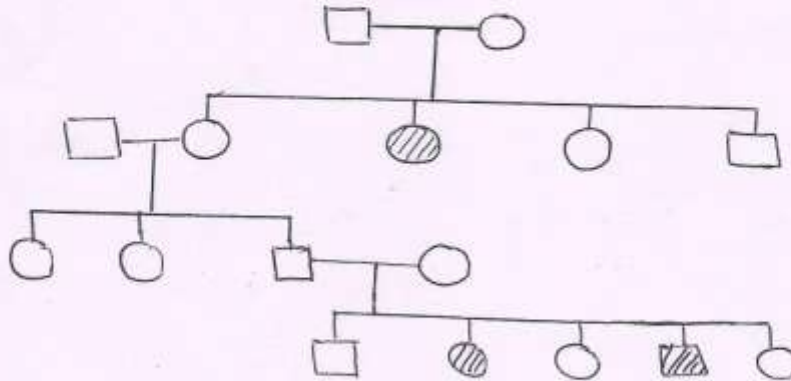
- 1) Write a note on inheritance of neutral and suppressive Yeast petite mutants.
- 2) Explain mechanism of sex determination in *Drosophila*.
- 3) Describe inheritance of the direction of shell coiling in *Limnaea peregra*.
- 4) Discuss non-Mendelian inheritance in *Neurospora crassa*.

P.T.O.

Q. 4 A Answer the following

15

- 1) Give the general characteristics of dominant inheritance for a rare trait.
OR
- 1) Identify the pattern of inheritance in the given pedigree. Justify your answer.



- 2) Explain wobble hypothesis.
OR
- 2) Show diagrammatic representation of charging of tRNA.
- 3) Write a note on Freemartin cattle.
OR
- 3) Discuss XX-XO method of sex determination
