

2017

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer five questions in which
Q. No. 1 is compulsory.

1. Choose the correct answer from the following :
1 × 16 = 16
- (a) Nucleic acids are composed of three types of molecules. Which of the following is not part of a nucleic acid ?
- (i) A carbohydrate
 - (ii) A heterocyclic aromatic ring
 - (iii) A lipid
 - (iv) A phosphate ester

(b) Which of the following base occurs only in RNA ?

(i) Adenine

(ii) Uracil

(iii) Guanine

(iv) Thymine

(c) The DNA in the form of long strand is called :

(i) Monomer

(ii) Dimer

(iii) Polymer

(iv) Tetramer

(d) DNA normally contains equal amount of purines and pyrimidines. If A, G, C, T are the four nucleotides which possibly will exist.

(i) $A + G = C + T$

(ii) $A + T = C + G$

(iii) Both (i) and (ii)

(iv) None of these

(e) Two alleles for pea plant height are designated T (tall) and t (dwarf) ; these alleles are found on :

(i) Genes

- (ii) Sex chromosomes
 - (iii) Ribosomes
 - (iv) Homologous chromosomes
- (f) A picture of person's chromosomes is called a :
- (i) Karyotype
 - (ii) Syndrome
 - (iii) Chromatin
 - (iv) Fingerprint
- (g) If a person receives an X and a Y chromosome that person is :
- (i) Female
 - (ii) Male
 - (iii) Red eyed
 - (iv) Mentally challenged
- (h) Polytene chromosome or salivary gland chromosomes are found in :
- (i) Cells of the salivary glands of insects
 - (ii) Cells of the salivary glands of Rabbits

- (iii) Cells of the salivary glands of human beings
 - (iv) Cells of the salivary glands of mice
- (i) Lampbrush chromosome occurs in :
- (i) Diplotene of meiosis
 - (ii) Prophase of meiosis
 - (iii) Interphase
 - (iv) Metaphase of meiosis
- (j) A gene is made up of :
- (i) DNA
 - (ii) RNA
 - (iii) Either DNA or RNA
 - (iv) Amino acids
- (k) One important difference between DNA replication in prokaryotes and eukaryotes is that :
- (i) Prokaryotes do not use enzyme in the replication process
 - (ii) There is only one replication origin in prokaryotes

- (iii) There are no okazaki fragments in prokaryotes
- (iv) Replication is conservative, not semi-conservative in prokaryotes
- (l) Which of the following statement is true for sex chromosome abnormalities in human ?
- (i) They usually have mild effects and rarely are fatal
- (ii) Most are not gender specific
- (iii) They cannot be diagnosed before birth
- (iv) They are always fatal
- (m) A chromosomal abnormality that causes a woman to be unusually short in stature (always 4' 7"), to have a webbed neck and to generally lack feminine secondary sexual characteristics is :
- (i) Triple X syndrome
- (ii) Turner syndrome
- (iii) XYY syndrome
- (iv) Klinefelter syndrome
- (n) What is the concept called wherein people with 'superior' genes are encouraged to reproduce and those with 'inferior' genes are discouraged from having offspring ?
- (i) Euphenics
- (ii) Eugenics
- (iii) Euthenics
- (iv) None of these
- (o) The human genome project was initiated in the year : <https://www.tmbuonline.com>
- (i) 1950
- (ii) 1980
- (iii) 1990
- (iv) 2000
- (p) The word genetics was suggested for the first time :
- (i) Mendel
- (ii) Kornberg
- (iii) Bateson
- (iv) Wilmot

(Turnover)

2. Discuss Mendel's Laws of Inheritance. Which law do you think is most important and why? 16
3. Clarify the difference between genes, chromosomes and DNA. Discuss, in brief, the organization of eukaryotic chromosome. 16
4. Explain, in detail, the structure of mRNA, tRNA and rRNA. 16
5. What is a polytene chromosome? Discuss its importance in the study of genetics. 16
6. Give an account of origin and evolution of bread wheat. 16
7. Write an essay on microbial genetics with its basic concept. 16
8. Write, in short, about any two of the following
8×2 = 16
- (a) Transformation
 - (b) Repetitive and unique sequence DNA
 - (c) Gene interactions
 - (d) Interference and co-incidence

9. Write short notes on any four of the following :

4×4 = 16

- (a) Heterochromatin and euchromatin
- (b) Extrachromosomal inheritance
- (c) Acrocentric and telocentric chromosome
- (d) One gene – one enzyme hypothesis
- (e) Karyotype and Genotype
- (f) Genotypic frequencies

