

2014

Time : 3 hours

Full Marks : 100

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, selecting two from each Group, in which Q. No. 1 is compulsory.

1. Select the correct answer out of the various options given below :  $1 \times 20 = 20$

(a) The functional unit of Golgi apparatus is :

- (i) Thylakoids      (ii) Oxysomes  
(iii) Cristae      (iv) Cisternae

(b) Nucleolus takes part in the synthesis of :

- (i) tRNA      (ii) mRNA  
(iii) rRNA      (iv) DNA

(c) Ribosomes of mitochondria are of :

- (i) 30s type      (ii) 50s type  
(iii) 70s type      (iv) 80s type

(d) Smooth endoplasmic reticulum synthesizes :

- (i) Carbohydrates  
(ii) Proteins  
(iii) Steroids and lipids  
(iv) All of these

(e) Polysome is chain of :

- (i) Oxysomes      (ii) Sphacrosomes  
(iii) Ribosomes      (iv) Dictyosomes

(f) Chemoiosmotic hypothesis for phosphorylation was proposed by :

- (i) Peter Mitchell  
(ii) P. C. Winter  
(iii) B. D. Hames  
(iv) R. Twyman

(g) The square of sum of deviation divided by number of observations is called :

- (i) Standard deviation

- (ii) Standard error
  - (iii) Variance
  - (iv) None of these
- (h) Student "t" test was first designed by :
- (i) R. A. Fisher      (ii) Robertson
  - (iii) Gossett      (iv) Pearson
- (i) The fastest memory in a computer system is :
- (i) ROM      (ii) RAM
  - (iii) Cache      (iv) None of these
- (j) Chromatin contains :
- (i) DNA only
  - (ii) DNA and histones
  - (iii) DNA, histones and non-histones.
  - (iv) All of these
- (k) In eukaryotes DNA replication takes place in :
- (i) G<sub>0</sub> phase      (ii) G<sub>1</sub> phase
  - (iii) S phase      (iv) M phase
- (l) In DNA the nitrogenous bases are linked to sugar at :
- (i) C - 1 carbon
  - (ii) C - 3 carbon

- (iii) C - 5 carbon
  - (iv) At any of these positions
- (m) Smallest unit of DNA capable of coding for the synthesis of polypeptide is the :
- (i) Operon      (ii) Cistron
  - (iii) Replicon      (iv) Repressor gene
- (n) How many possible phenotypes are there for the ABO blood groups ?
- (i) 4      (ii) 6
  - (iii) 8      (iv) 16
- (o) An organism with two copies of the same allele is :
- (i) Homozygous for that trait
  - (ii) Homozygous for the allele
  - (iii) Heterozygous for that trait
  - (iv) Heterologous for the allele
- (p) An interaction between non-allelic genes in which an allele at one locus prevents the expression of an allele at another locus is called :
- (i) Complementation
  - (ii) Epistasis

(iii) Collaboration

(iv) Modification

(q) The \_\_\_\_\_ syndrome in humans in which an individual's somatic cells contain three sex chromosomes (XXX) is called

(i) Klinefelter's

(ii) Turner's

(iii) Down's

(iv) Super female

(r) Which of the following disease is an example of deletion? <https://www.tmbuonline.com>

(i) Cri-du-chat syndrome

(ii) Turner's syndrome

(iii) Klinefelter's syndrome

(iv) Down's syndrome

(s) Induction of foreign genes for improving genotypes is:

(i) Tissue culture

(ii) Immunization

(iii) Biotechnology

(iv) Genetic engineering

(t) Some of the medically important proteins that can be produced by biotechnology include

(i) Interferon

(ii) Hormones

(iii) Antibodies

(iv) All of these

### Group - A

2. Write the structure and functions of the following cell organelles: 5×4 = 20

(a) Lysosomes

(b) Endoplasmic reticulum

(c) Centrosomes

(d) Cell junctions

3. Discuss, in detail, the structure and functions of ribosomes. 10+10 = 20

4. Discuss the testing hypothesis (t-test). 20

Using appropriate statistical test find out the correlation exists between following two sets of data:

Group - B

What is heredity? Name the geneticists who discovered Mendel's Laws of heredity. State the laws of heredity in the light of Monohybrid cross.  $2+8+12 = 20$

Give an account of the structure and replication of DNA.  $8+12 = 20$

Discuss the mechanism of sex-linked inheritance in man with examples. 20

Write an essay on the important products of biotechnology for the human welfare. 20

Write short notes on the following:  $10 \times 2 = 20$

- (a) Basic concepts of genetic engineering
- (b) Chromosomal aberration and their significance

