

Answer ALL the following questions.

Read each statement and decide whether it is true or false. If you think it is true, write 'T' in the space provided. If you think it is false, write 'F'.

One mark will be awarded for a correct answer and a quarter of a mark will be deducted for an incorrect answer. –

1. The genes on chromosome are different in every tissue []
2. In each cell there are a total of 22 autosomes and one sex chromosome []
3. The charge on the DNA is positive and so it combines with negatively charged proteins []
4. In the G₀ phase of the cell cycle the cells do not perform transcription or translation processes []
5. There are 20 different tRNA in each cell for transporting every amino acid []
6. In the mitochondria the DNA is present in strands of chromatin which condenses to form chromosome before cell division []
7. The exons are the coding sequences and are not spliced out during transcription []
8. The chromosomal banding patterns in human are different from those in other animals []
9. The karyotype in a patient with Down's syndrome is 47,XXY
10. Formation of nucleosomes requires eight histones surrounded by DNA and is linked to another nucleosome by linker DNA []

In answering these questions, use the following key. No mark will be deducted for an incorrect answer.

- KEY: Put A, if 1, 2 and 3 are correct,
B, if 1 and 3 are correct,
C, if 2 and 4 are correct,
D, if only 4 is correct, and
E, if all statements are correct.

11. In the cell cycle: .

- (1) Replication occurs during the S phase.
- (2) Gene expression does not occur.
- (3) The structure and packing of chromatin changes
- (4) Mitosis does not occur.

12. The DNA in the chromosomes is of different types.

- (1) Almost 10% is highly repeated sequences which are called satellite DNA.
- (2) The Alu and Li families are distributed throughout the genome.
- (3) The unique sequences which comprise the genes are single copy sequences.
- (4) The satellite DNA are highly localized in centomere and tetomeres.

13. Eucaryotic genes have a typical structure:

- (1) All genes have three exons and two introns.
- (2) The promoter site is always at the 5' end of the gene.
- (3) The introns are translated in the cytoplasm.
- (4) The polyadenylation signal is at the 3' end of the gene.

14. Meiosis:

- (1) Occurs in every cell of the body.
- (2) Is the cell division by which somatic cells multiply.
- (3) Gives rise to diploid cells.'
- (4) Involves many recombination reactions by crossing over of chromosomes.

15. Chromosomes.

- (1) Are present at all stages of the cell cycle in the nucleus of the cell.
- (2) Are formed of two chromatids formed by DNA replication.
- (3) Are said to be metacentric if the q arm is longer than p arm.
- (4) Are seen as condensed bodies at the metaphase of mitotic cell division.

For each of the following questions, there is only ONE correct answer. Insert the number of the correct answer in the bracket provided.

16. Ribonucleic acid

- (a) Contains the bases adenine, uracil, cytosine and thymine.
- (b) Is the carrier of genetic information from parent to daughter cells.
- (c) Is always a single stand of ribonucleotides.
- (d) has A/T ratio = 1.

17. Transcription

- (a) Occurs only if the gene is to be expressed.
- (b) Occurs before cell division.
- (c) Is the process by which RNA makes DNA.
- (d) Requires a double stranded DNA.

18. The human genome

- (a) Has 6-7 billion base pairs.
- (b) Is 90% genes and 10% non-coding areas.
- (c) Has a total of 5000-10,000 genes.
- (d) Is not changed in patients who have Down's syndromes.

19. Translation

- (a) Starts at the codon UAA.
- (b) On polysomes results in the production of many molecules of the same proteins.
- (c) Results in the formation of RNA.
- (d) in the process by which genetic information is transmitted from DNA to mRNA.

20. In DNA

- (a) The two polynucleotide strands are parallel.
- (b) The nitrogenous bases are on the outside and sugar phosphate Backbone is inside.
- (c) The sequence of bases determines the sequence of amino acids in proteins.

(d) The ratio of A/G is always.