Molecular Basis of Inheritance Paper

1. The region of lac operon which must be free (unbound) for the structural gene transcription to occur is

(1) operator (2) promotor (3) a gene (4) regulator

2. **Identify the group which contains pyrimidines of RNA**

(1) adenine, cytosine (2) uracil, thymine cytosine

(3) uracil, cytosine (4) adenine, guanine.

3. The cap structure of mRNA is of methyl GTP and the tail is of

(1) methionine (2) formylmethionine (3) poly A (4) UAG codon

4. mRNA is a complementary copy of

(1) $5' - 3'$ DNA strand (2) $3' - 5'$ DNA strand

(3) antisense DNA strand (4) tRNA Strand

5. The regions expressed as polypeptides on mRNA are

(1) introns (2) promoter (3) cistrons (4) entire genome

6. The most important functions of mRNA is to

(1) provide specific binding sites for a series of specific tRNA molecules

(2) hold a group of ribosomes together

(3) transfer the genetic code to ribosomal RNA

(4) transfer the genetic code to DNA

7. Transcription is associated with

(1) aminoacid synthetase (2) RNA carboxylase

(3) RNA Polymerase (4) DNA Polymerase

8. A particular gene has 600 DNA nucleotides; ignoring introns; stop and start signals how many tRNA molecules are required to synthesize polypeptide coded for by this gene?

(1) 200 (2) 600 (3) 900 (4) 400

9. In E. coli the chain initiating amino acid in protein synthesis is

(1) N-formyl methionine (2) methionine (3) glycine (4) serine

10. The diagram shown an important concept in the genetic implication of DNA. Fill in A to C.

$$DNA \xrightarrow{A} mRNA \xrightarrow{B} protein \xrightarrow[C]{Proposed\ by}$$

(1) A-Translation B-Transcription C-Erevin Chargaff

(2) A-Transcription B-Translation C-Francis Crick

(3) A-Translation B-Extension C-Rosalind Franklin

(4) A-Transcription B-Replication C-James Watson

11. The Statements A, statement B are given, select the correct alternative from the below options.

Statement A: RNA was the first genetic material

Statement B: DNA has evolved from RNA by chemical modifications.

(1) Statement A is correct and statement B is incorrect.

(2) Statement B is correct and statement A is incorrect
(3) Both the statement are correct
(4) Both the statement are incorrect

12. A smaller subunit of ribosome has a binding site for….and the larger subunit has two binding sites for tRNA molecules

(1) Mg^{++} (2) peptidyl transferase (3) mRNA (4) none above

13. Which of the following pairs is correctly matched?

(1) Ribosomal RNA – Carries amino acids to the site of protein synthesis
(2)Translation – Process by which mRNA carries the information from the nucleus to ribosomes
(3) Trancription – Process by which protein is synthesized
(4) Anticodon – Site of a *t*RNA molecule that binds to the *m*RNA molecule

14. If somebody asked you to correct the sickle cell poly peptide chain sequence to a normal one. Which of the codon is to be corrected?

(1) 6 th codon of α chain GUA. (2) 6 th codon of β chain GUG
(3) 6 th codon of α chain AUG (4) 6 th codon of β chain GAG

15. Which of the following statement is incorrect?

(1) Southern blotting is useful in determining certain genetic defects
(2) Southern blotting is used to generate DNA finger prints
(3) DNA finger prints of any two individual may be similar
(4) DNA finger print of a person specifies Southern blot

16. Degeneracy of genetic code is due to

(1) functional 61 codons and 20 amino acids
(2) functional 64 codons and 20 amino acids
(3) functional 20 codons and 20 amino acids
(4) functional 20 codons and 61 amino acids

17. Genetically identical individuals are

(1) cybrids (2) clones (3) hybrids (4) all above

18. Okazaki fragments are

(1) the DNA fragment produced due to radiation
(2) the RNA primers required for initiation of DNA synthesis
(3) short DNA fragments on the lagging strand
(4) short fragments on the leading strand

19. The ability to change amino acid sequence of a protein by altering the sequence of its cDNA is called as

(1) genetic engineering (2) protein engineering
(3) finger printing (4) DNA sequencing

20. DNA probes used in finger printing are

(1) highly sensitive electron microscope (2) UV beams
(3) DNA segments having radioactive isotopes (4) X-ray scanners

21. PCR and Restriction Fragment Length Polymorphism are the methods for

(1) Genetic transformation (2) DNA finger printing

(3) DNA sequencing (4) Study of enzymes

22. During protein synthesis the anticodon on tRNA pairs with

(1) codon on tRNA (2) codon on mRNA

(3) ribosome unit (4) codon on rRNA

23. Of the following statements, which one is true?

(1) DNA is single stranded, RNA is double stranded

(2) There is only one type of RNA, whereas there are many types of DNA

(3) DNA synthesises RNA, but RNA generally cannot synthesise DNA

(4) DNA bases are adenine, guanine, cytosine, uracil and RNA has adenine, guanine, cytosine, thymine

24. Read the following Statements andanswer the correct alternative as directed below

Statement A: Replication to start RNA polymerase is necessary for the synthesis of Primer binds at 3' end of both the strands of DNA.

Statement B: Promotor region is always present at 3' end downstream of template strand or 5' end upstream of coding strand.

(1) Statement A is correct and statement B is incorrect.

(2) Statement B is correct and statement A is incorrect

(3) Both the statement are correct

(4) Both the statement are incorrect

25. What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?

(1) A polypeptide of 24 amino acids will be formed

(2) Two polypeptides of 24 and 25 amino acids will be formed

(3) A polypeptide of 49 amino acids will be formed

(4) A polypeptide of 25 amino acids will be formed

26. Which one of the following triplet codes, is correctly matched with its specificity for an amino acid in protein synthesis or as 'start' or 'stop' codon?

(1) UCG-Start (2) UUU-Stop (3) UGU-Leucine (4) UAC-Tyrosine

27. Degeneration of a genetic code is attributed to the

(1) first member of a codon (2) second member of a codon

(3) entire codon (4) third member of a codon

28 . One day while students were coming to their college they found a piece of flesh in the college ground. They feared and informed the police. Policemen came and collected the same and sent to forensic lab.. Later they got the result that the flesh belonged to a goat and closed the matter. but the students had question that how could they identified the piece of flesh belonged to goat? The way they traced

would be

1) boiled and tested it. 2) they did DNA finger print.

3) They studied the ratio of purines and pyrimidine.

4) they identified by the size of the muscle fibres.

29. During splicing the exons are joined by the which of the following enzyme.

(1) RNA ligase (2) RNA catalase

(3) RNA polymerase (4) RNA permiase

30. The sigma factor is associated with

(1) RNA polymerase (2) RNA ligase

(3) DNA polymerase (4) DNA ligase

31. During transfer of genetic information in the form of code, codon and anticodon belong to

(1) DNA, *m*RNA and *t*RNA respectively

(2) DNA, *t*RNA and *m*RNA respectively

(3) *m*RNA , DNA and *t*RNA respectively

(4) *t*RNA, *m*RNA and DNA respectively

32. In DNA fingerprinting, the sequences which are matched are

(1) minisatellite DNA (2) repetitive sequences of telomere

(3) microsatellite DNA (4) macrosatellite DNA

33. In *lac* operon, β-galactoside permease is encoded by

(1) lac-z (2)lac-a (3) lac-y (4) promoter

34. In mRNA, AUG is the initiating codon and UAA, UAG and UGA are terminating codons. Which of the following sequence can transcribes completely.

(1) AUGUUGUCCUGAUGGUAU

(2) AUGUUCUCCUGGUAAUAU

(3) AUGUAUUUCUGCCUGGUU

(4) AUGAGGUAUUUCUGACUC

35. The transcript for AAGCCATGT will be

(1) TTCGGTACA (2) GGACCTACA

(3) UGUACCGAA (4) UUCGGUACA

36. Which one of the following codons codes for the same information as UGC?

(1) UGU (2) UGA (3) UAG (4) UGG

37. The most recent technique used for separation of DNA fragments is…..blotting

(1) Southern (2) Northern (3) Western (4) Eastern

38. Enzymes called _____add complementary nucleotides, floating inside the nucleus

(1) DNA polymerase (2) DNA ligase (3) DNA Synthetase (4) topoisomerase

39. Hfr strain stands for

(1) haematoxylin fast reaction (2) high frequency recombination cells

(3) high female reactive cells (4) high female recombination cells

40. If the total amount of adenine and thymine in a double-stranded DNA is 45%, the amount of guanine in this DNA will be

(1) 22.5% (2) 27.5% (3) 55% (4) 45%

41. Identify the set of codons code for Valine amino acid

(1) CGU, CGC CGA and CGG (2) GCU, GCG, CGA and, GCC

(3) GUU GUC GUG and GUA (4) ACU, ACC, ACA and ACG

42. Which of the following help in repairing DNA?

(1) Ligase (2) DNA polymerase I

(3) RNA primer (4) DNA polymerase III

43. RNA polymerase I catalyzes

(1) elongation in transcription (2) rRNA synthesis

(3) mRNA synthesis (4) tRNA synthesis

44. RNA polymerase which is on the promoter, moves to the structural genes to transcribe them. However, it happens when

(1) RNA polymerase shifts first to regulator gene

(2) inducer binds to structural genes

(3) there is repressor on the operator

(4) there is no repressor on the operator

45. Of the following statements, which are true pertaining to eukaryotes?

(1) DNA is single stranded and RNA is double stranded

(2) DNA synthesizes RNA

(3) RNA synthesizes DNA

(4) purine pyrimidine ratio need not be 1:1 in RNA molecule

(1) 2 and 4 (2) 3 and 4 (3)1, 2 and 3 (4) 2, 3 and 4

46. A gene of operon which synthesizes a repressor protein is _____.

(1) promotor (2) regulator (3) operator (4) structural gene

47.Identify the two wrong statements from the following

i) Regulator genes code for inducer protein for regulating the transcription of cistrons

ii) Operator genes acts as switch to turn on or turn off the transcription of a structure gene as the cell requires.

iii) Eukaryotic genes have nonessential inserts called introns, between essential segments termed exons.

iv) Some repetitive DNA sequence changes their position in the DNA. These are called jumping genes.

v) Non functional genes do not replicate,

(1) i and iv (2) ii and iii (3) i and v (4) ii and v

48. Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid?

(1) AGG, ACG – Start/methionine (2) UUA, UCA – Leucine
(3) GUU, GCU – Alanine (4) CGU CGC CGA – Arginine

49. Polysome is formed by

(1) a ribosome with several subunits
(2) ribosomes attached to each other in a linear arrangment
(3) several ribosomes attached to a single mRNA
(4) many ribosomes attached to a strand of endoplasmic reticulum

50. Pertaining to a DNA molecule, which of the following statement is correct?

(1) the proportion of adenine in relation to thymine varies within the organism
(2) there are two strands which run antiparallel one in 5'→3' direction and other in 3'→5'
(3) the total amount of purine nucleotides and pyrimidine nucleotides is not always equal in DNA molecule.
(4) there are two strands which run parallel in the 5'→3' direction

51. What is not true for genetic code?

(1) It is nearly universal (2) It is degenerative
(3) It is unambiguous (4) A codon on mRNA is read in a non-contiguous fashion

52. Select the two correct statements out of the four (i-iv) statements given below about lac operon

(i) Glucose or galactose may bind with the repressor and inactivate it.
(ii) In the absence of lactose the repressor binds with the operator region.
(iii) The Z-gene codes for permease
(iv) This was elucidated by Francois Jacob and Jacques Monod.

The correct statements are

(1) (ii) and (iii) (2) (i) and (iii) (3) (ii) and (iv) (4) (i) and (ii)

53.Which one of the following statements about the particular entity is true?

(1) Centromere is found in animal cells, which produces aster during cell division
(2) The gene for producing insulin is present in every- body cell
(3) Nucleosome is formed of nucleotides
(4) DNA consists of core of eight histones

54. The Statements A, statement B are given, select the correct alternative from the below options.

Statement A: The amount of DNA per nucleus is constant in all the body cells of a given species
Statement B: The DNA molecule undergoes denaturation and renaturation

easily; the denatured DNA stands are highly hyperchromic.

(1) Statement A is correct and statement B is incorrect.
(2) Statement B is correct and statement A is incorrect
(3) Both the statement are correct
(4) Both the statement are incorrect

55. The lac operon consists of

(1) four regulatory genes only
(2) one regulatory gene and three structural genes
(3) two regulatory genes and two structural genes
(4) three regulatory genes and three structural genes

56. The 3'→5' phosphodiester linkages inside a polynucleotide chain serve to join

(1) one DNA strand with the other DNA strand
(2) one nucleoside with another nucleoside
(3) one nucleoside with another nucleotides
(4) one nitrogenous base with pentose sugar

57. Read the following four statements (A –D), How many of these statements are right?

A. In transcription, adenosine pairs with uracil.
B. Regulation of lac operon by repressor is referred to as positive regulation
C. The human genome has approximately 50,000 genes.
D. Haemophilia is a sex-linked recessive disease.

(1) Two (2) Three (3) Four (4) One

58. Which one of the following is wrongly matched?

(1) Transcription – Writing information from mRNA to tRNA
(2) Translation – Using information in mRNA to make a protein
(3) Repressor protein – Binds to operator to stop enzyme synthesis
(4) Operon – Structural genes, operator, promoter and regulator gene.

59. Gene regulation governing lactose operon of E.Coli that involves the lac I gene product is

(1) negative and repressible because repressor protein prevents transcription
(2) Feedback inhibition because excess of β-galactosidase can switch off transcription
(3) Positvie and inducible because it can be induced by lactose
(4) negative and inducible because repressor protein prevents transcription

60. Which one of the following is not applicable to RNA?

(1) Heterocyclic nitrogenous bases (2) Chargaff's rule
(3) Complementary base pairing (4) 5' phosphoryl and 3' hydroxyl ends

Molecular basis of inheritance Paper

Q 1	1
Q 2	3
Q 3	3
Q 4	2
Q 5	3
Q 6	1
Q 7	3
Q 8	1
Q 9	1
Q 10	2
Q 11	3
Q 12	3
Q 13	4
Q 14	2
Q 15	3
Q 16	1
Q 17	2
Q 18	3
Q 19	1
Q 20	3

Q 21	2
Q 22	2
Q 23	3
Q 24	3
Q 25	1
Q 26	4
Q 27	4
Q 28	3
Q 29	1
Q 30	1
Q 31	1
Q 32	1
Q 33	3
Q 34	3
Q 35	4
Q 36	1
Q 37	1
Q 38	1
Q 39	2
Q 40	2

Q 41	3
Q 42	2
Q 43	2
Q 44	4
Q 45	1
Q 46	2
Q 47	3
Q 48	4
Q 49	3
Q 50	2
Q 51	4
Q 52	3
Q 53	2
Q 54	3
Q 55	2
Q 56	2
Q 57	1
Q 58	1
Q 59	1
Q 60	2