

CHAPTER 6

Molecular Basis of Inheritance

6.1 The DNA

1. Which of the following statements is correct?
- (a) Adenine pairs with thymine through two H-bonds.
 - (b) Adenine pairs with thymine through one H-bond.
 - (c) Adenine pairs with thymine through three H-bonds.
 - (d) Adenine does not pair with thymine.

(NEET 2020)

2. Purines found both in DNA and RNA are
- (a) cytosine and thymine
 - (b) adenine and thymine
 - (c) adenine and guanine
 - (d) guanine and cytosine.

(NEET 2019)

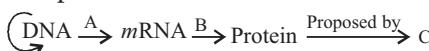
3. The association of histone H₁ with a nucleosome indicates that
- (a) DNA replication is occurring
 - (b) the DNA is condensed into a chromatin fibre
 - (c) the DNA double helix is exposed
 - (d) transcription is occurring.

(NEET 2017)

4. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are
- (a) G 17%, A 33%, T 33%
 - (b) G 8.5%, A 50%, T 24.5%
 - (c) G 34%, A 24.5%, T 24.5%
 - (d) G 17%, A 16.5%, T 32.5%.

(2015 Cancelled)

5. The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C.



- (a) A - Transcription, B - Translation, C - Francis Crick
- (b) A - Translation, B - Extension, C - Rosalind Franklin
- (c) A - Transcription, B - Replication, C - James Watson
- (d) A - Translation, B - Transcription, C - Ervin Chargaff

(NEET 2013)



The figure gives an important concept in the genetic implication of DNA. Fill the blanks A, B and C.

- (a) A-Maurice Wilkins, B-Transcription, C-Translation
- (b) A-James Watson, B-Replication, C-Extension
- (c) A-Erwin Chargaff, B-Translation, C-Replication
- (d) A-Francis Crick, B-Translation, C-Transcription

(Karnataka NEET 2013)

7. What are the structures called that give an appearance as 'beads-on-string' in the chromosomes when viewed under electron microscope?

- (a) Genes
- (b) Nucleotides
- (c) Nucleosomes
- (d) Base pairs

(2011)

8. Which one of the following does not follow the central dogma of molecular biology?

- (a) Pea
- (b) *Mucor*
- (c) *Chlamydomonas*
- (d) HIV

(2010)

9. The 3' - 5' phosphodiester linkages inside a polynucleotide chain serve to join

- (a) one DNA strand with the other DNA strand
- (b) one nucleoside with another nucleoside
- (c) one nucleotide with another nucleotide
- (d) one nitrogenous base with pentose sugar.

(Main 2010)

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

- (a) Centromere is found in animal cells, which produces aster during cell division.
- (b) The gene for producing insulin is present in every body cell.
- (c) Nucleosome is formed of nucleotides.
- (d) DNA consists of core of eight histones.

(Main 2010)

- 11.** In the DNA molecule,
- the proportion of adenine in relation to thymine varies with the organism
 - there are two strands which run anti-parallel-one in $5' \rightarrow 3'$ direction and other in $3' \rightarrow 5'$
 - the total amount of purine nucleotides and pyrimidine nucleotides is not always equal
 - there are two strands which run parallel in the $5' \rightarrow 3'$ direction. (2008)
- 12.** Which one of the following pairs of nitrogenous bases of nucleic acids, is wrongly matched with the category mentioned against it?
- Guanine, Adenine - Purines
 - Adenine, Thymine - Purines
 - Thymine, Uracil - Pyrimidines
 - Uracil, Cytosine - Pyrimidines (2008)
- 13.** One turn of the helix in a B-form DNA is approximately
- 2 nm
 - 20 nm
 - 0.34 nm
 - 3.4 nm. (2006)
- 14.** Antiparallel strands of a DNA molecule means that
- one strand turns clockwise
 - one strand turns anti-clockwise
 - the phosphate groups of two DNA strands, at their ends, share the same position
 - the phosphate groups at the start of two DNA strands are in opposite position (pole). (2006)
- 15.** Which one of the following makes use of RNA template to synthesise DNA?
- DNA polymerase
 - RNA polymerase
 - Reverse transcriptase
 - DNA dependant RNA polymerase (2005)
- 16.** Which one of the following hydrolyses internal phosphodiester bonds in a polynucleotide chain?
- Lipase
 - Protease
 - Endonuclease
 - Exonuclease (2005)
- 17.** The following ratio is generally constant for a given species:
- $A + G / C + T$
 - $T + C / G + A$
 - $G + C / A + T$
 - $A + C / T + G$. (2004)
- 18.** In a DNA percentage of thymine is 20% then what will be percentage of guanine?
- 20%
 - 40%
 - 30%
 - 60% (2002)
- 19.** Length of one loop of B-DNA
- 3.4 nm
 - 0.34 nm
 - 20 nm
 - 10 nm. (2000)
- 20.** DNA is mainly found in
- nucleolus
 - nucleus only
 - cytoplasm only
 - none of these. (1999)
- 21.** In prokaryotes, the genetic material is
- linear DNA without histones
 - circular DNA without histones
 - linear DNA with histones
 - circular DNA with histones. (1999)
- 22.** In DNA, when AGCT occurs, their association is as per which of the following pair?
- AT-GC
 - AG-CT
 - AC-GT
 - All of these (1999)
- 23.** The eukaryotic genome differs from the prokaryotic genome because
- the DNA is complexed with histone in prokaryotes
 - the DNA is circular and single stranded in prokaryotes
 - repetitive sequences are present in eukaryotes
 - genes in the former case are organised into operons. (1999)
- 24.** Genes are packaged into a bacterial chromosome by
- acidic protein
 - actin
 - histones
 - basic protein. (1997)
- 25.** Radiotracer technique shows that DNA is in
- multi-helix stage
 - single-helix stage
 - double-helix stage
 - none of these. (1996)
- 26.** Nucleosome core is made of
- H_0, H_2A, H_2B and H_3
 - H_1, H_2A, H_2B, H_4
 - H_1, H_2A, H_2B, H_3 and H_4
 - H_2A, H_2B, H_3 and H_4 . (1993)
- 27.** A DNA with unequal nitrogen bases would most probably be
- single stranded
 - double stranded
 - triple stranded
 - four stranded. (1993)
- 28.** Nucleotide arrangement in DNA can be seen by
- X-ray crystallography
 - electron microscope
 - ultracentrifuge
 - light microscope. (1993)
- 29.** An octamer of 4 histones complexed with DNA forms
- endosome
 - nucleosome
 - mesosome
 - centromere. (1990)

6.2 The Search for Genetic Material

- 30.** The experimental proof for semi-conservative replication of DNA was first shown in a
- fungus
 - bacterium
 - plant
 - virus. (NEET 2018)

31. Select the correct match.

- | | |
|-----------------------------------|------------------|
| (a) Ribozyme | - Nucleic acid |
| (b) $F_2 \times$ Recessive parent | - Dihybrid cross |
| (c) T.H. Morgan | - Transduction |
| (d) G. Mendel | - Transformation |
- (NEET 2018)

32. The final proof for DNA as the genetic material came from the experiments of

- (a) Hershey and Chase
 - (b) Avery, MacLeod and McCarty
 - (c) Hargobind Khorana
 - (d) Griffith.
- (NEET 2017)

33. Taylor conducted the experiments to prove semi-conservative mode of chromosome replication on

- (a) *Vinca rosea*
 - (b) *Vicia faba*
 - (c) *Drosophila melanogaster*
 - (d) *E. coli*.
- (NEET-II 2016)

34. A molecule that can act as a genetic material must fulfill the traits given below, except

- (a) it should be able to express itself in the form of 'Mendelian characters'
 - (b) it should be able to generate its replica
 - (c) it should be unstable structurally and chemically
 - (d) it should provide the scope for slow changes that are required for evolution.
- (NEET-II 2016)

35. Transformation was discovered by

- (a) Meselson and Stahl
 - (b) Hershey and Chase
 - (c) Griffith
 - (d) Watson and Crick.
- (2014)

36. The unequivocal proof of DNA as the genetic material came from the studies on a

- (a) bacterium
 - (b) fungus
 - (c) viroid
 - (d) bacterial virus.
- (Main 2011)

37. Semi-conservative replication of DNA was first demonstrated in

- (a) *Escherichia coli*
 - (b) *Streptococcus pneumoniae*
 - (c) *Salmonella typhimurium*
 - (d) *Drosophila melanogaster*.
- (2009)

38. Transformation experiment was first performed on which bacteria?

- (a) *E. coli*
 - (b) *Diplococcus pneumoniae*
 - (c) *Salmonella*
 - (d) *Pasteurella pestis*
- (2002)

39. The *Pneumococcus* experiment proves that

- (a) bacteria do not reproduce sexually
 - (b) RNA sometime controls the production of DNA and proteins
 - (c) DNA is the genetic material
 - (d) bacteria undergo binary fission.
- (1999)

40. DNA synthesis can be specifically measured by estimating the incorporation of radio-labelled

- (a) thymidine
 - (b) deoxyribose sugar
 - (c) uracil
 - (d) adenine.
- (1997)

41. The transforming principle of *Pneumococcus* as found out by Avery, MacLeod and McCarty was

- (a) mRNA
 - (b) DNA
 - (c) protein
 - (d) polysaccharide.
- (1993)

42. Who proved that DNA is basic genetic material?

- (a) Griffith
 - (b) Watson
 - (c) Boveri and Sutton
 - (d) Hershey and Chase
- (1993)

43. *Escherichia coli* fully labelled with ^{15}N is allowed to grow in ^{14}N medium. The two strands of DNA molecule of the first generation bacteria have

- (a) different density and do not resemble parent DNA
 - (b) different density but resemble parent DNA
 - (c) same density and resemble parent DNA
 - (d) same density but do not resemble parent DNA.
- (1992)

6.3 RNA World

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

- (a) Heterocyclic nitrogenous bases
 - (b) Chargaff's rule
 - (c) Complementary base pairing
 - (d) 5' phosphoryl and 3' hydroxyl ends
- (2015)

45. Similarity in DNA and RNA is that

- (a) both are polymer of nucleotides
 - (b) both have similar pyrimidine
 - (c) both have similar sugar
 - (d) both are genetic material.
- (2000)

6.4 Replication

46. During DNA replication, Okazaki fragments are used to elongate

- (a) the lagging strand towards replication fork
 - (b) the leading strand away from replication fork
 - (c) the lagging strand away from the replication fork
 - (d) the leading strand towards replication fork.
- (NEET 2017)

47. During replication of a bacterial chromosome DNA synthesis starts from a replication origin site and
(a) RNA primers are involved
(b) is facilitated by telomerase
(c) moves in one direction of the site
(d) moves in bidirectional way. (2004)

48. Method of DNA replication in which two strands of DNA separate and synthesise new strands is called
(a) dispersive (b) conservative
(c) semi-conservative (d) non conservative.
(2000)

49. There are special proteins that help to open up DNA double helix in front of the replication fork. These proteins are
(a) DNA ligase
(b) DNA topoisomerase I
(c) DNA gyrase
(d) DNA polymerase I. (1994)

50. During DNA replication, the strands separate by
(a) DNA polymerase (b) topoisomerase
(c) unwindase/helicase
(d) gyrase. (1993)

51. Experimental material in the study of DNA replication has been
(a) *Escherichia coli* (b) *Neurospora crassa*
(c) *Pneumococcus*
(d) *Drosophila melanogaster*. (1992)

52. DNA replication is
(a) conservative and discontinuous
(b) semi-conservative and semi-discontinuous
(c) semi-conservative and discontinuous
(d) conservative. (1989)

6.5 Transcription

53. Name the enzyme that facilitates opening of DNA helix during transcription.
(a) DNA ligase (b) DNA helicase
(c) DNA polymerase (d) RNA polymerase
(NEET 2020)

54. What will be the sequence of mRNA produced by the following stretch of DNA ?

3'ATGCATGCATGCATG5' TEMPLATE STRAND
5'TACGTACGTACGTAC3' CODING STRAND
(a) 3'AUGCAUGCAUGCAUG5'
(b) 5'UACGUACGUACGUAC 3'
(c) 3' UACGUACGUACGUAC 5'
(d) 5' AUGCAUGCAUGCAUG 3'

(Odisha NEET 2019)

55. Match the following RNA polymerase with their transcribed products :
1. RNA polymerase I (i) tRNA
2. RNA polymerase II (ii) rRNA
3. RNA polymerase III (iii) hnRNA
Select the correct option from the following:
(a) 1-i, 2-iii, 3-ii (b) 1-i, 2-ii, 3-iii
(c) 1-ii, 2-iii, 3-i (d) 1-iii, 2-ii, 3-i
(Odisha NEET 2019)

56. Select the correct statement.
(a) Franklin Stahl coined the term "linkage".
(b) Punnett square was developed by a British scientist.
(c) Spliceosomes take part in translation.
(d) Transduction was discovered by S. Altman.
(NEET 2018)

57. AGGTATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding sequence of the transcribed mRNA?
(a) AGGUUAUCGCAU (b) UGGTUTCGCAT
(c) ACCUAUGCGAU (d) UCCAUAGCGUA
(NEET 2018)

58. Which of the following RNAs should be most abundant in animal cell?
(a) tRNA (b) mRNA
(c) miRNA (d) rRNA (NEET 2017)

59. Spliceosomes are not found in cells of
(a) fungi (b) animals
(c) bacteria (d) plants. (NEET 2017)

60. The equivalent of a structural gene is
(a) muton (b) cistron
(c) operon (d) recon. (NEET-II 2016)

61. Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria?
(a) 5S rRNA (b) 18S rRNA
(c) 23S rRNA (d) 5.8S rRNA
(NEET-II 2016)

62. DNA-dependent RNA polymerase catalyses transcription on one strand of the DNA which is called the
(a) template strand (b) coding strand
(c) alpha strand (d) antistrand.
(NEET-II 2016)

63. Select the correct option.
- | Direction of RNA synthesis | Direction of reading of the template DNA strand |
|----------------------------|---|
| (a) 5' - 3' | 3' - 5' |
| (b) 3' - 5' | 5' - 3' |
| (c) 5' - 3' | 5' - 3' |
| (d) 3' - 5' | 3' - 5' |
- (2014)

- 64.** Removal of introns and joining of exons in a defined order during transcription is called
(a) looping (b) inducing
(c) slicing (d) splicing. (2012, 2009)
- 65.** If one strand of DNA has the nitrogenous base sequence as ATCTG, what would be the complementary RNA strand sequence?
(a) TTAGU (b) UAGAC
(c) AACTG (d) ATCGU (2012)
- 66.** Ribosomal RNA is actively synthesised in
(a) lysosomes (b) nucleolus
(c) nucleoplasm (d) ribosomes. (2012)
- 67.** Which one of the following is not a part of a transcription unit in DNA?
(a) The inducer
(b) A terminator
(c) A promoter
(d) The structural gene (2012)
- 68.** Removal of RNA polymerase III from nucleoplasm will affect the synthesis of
(a) tRNA (b) hnRNA
(c) mRNA (d) rRNA. (2012)
- 69.** Which one of the following also acts as a catalyst in a bacterial cell?
(a) 5S rRNA (b) snRNA
(c) hnRNA (d) 23S rRNA (2011)
- 70.** In eukaryotic cell transcription, RNA splicing and RNA capping take place inside the
(a) ribosomes (b) nucleus
(c) dictyosomes (d) ER. (Main 2010)
- 71.** One gene-one enzyme hypothesis was postulated by
(a) Beadle and Tatum (b) R. Franklin
(c) Hershey and Chase (d) A. Garrod. (2006)
- 72.** Telomerase is an enzyme which is a
(a) simple protein (b) RNA
(c) ribonucleoprotein (d) repetitive DNA. (2005)
- 73.** During transcription holoenzyme RNA polymerase binds to a DNA sequence and the DNA assumes a saddle like structure at that point. What is that sequence called?
(a) AAAT box (b) TATA box
(c) GGTT box (d) CAAT box (2005)
- 74.** Which form of RNA has a structure resembling clover leaf?
(a) rRNA (b) hnRNA
(c) mRNA (d) tRNA (2004)
- 75.** During transcription, if the nucleotide sequence of the DNA strand that is being coded is ATACG then the nucleotide sequence in the mRNA would be
(a) TATGC (b) TCTGG
(c) UAUGC (d) UATGC. (2004)
- 76.** During transcription, the DNA site at which RNA polymerase binds is called
(a) promoter (b) regulator
(c) receptor (d) enhancer. (2003)
- 77.** Which of the following reunites the exon segments after RNA splicing?
(a) RNA polymerase (b) RNA primase
(c) RNA ligase (d) RNA proteoses (2002)
- 78.** Exon part of mRNAs have code for
(a) protein (b) lipid
(c) carbohydrate (d) phospholipid. (2002)
- 79.** mRNA is synthesised on DNA template in which direction?
(a) $5' \rightarrow 3'$ (b) $3' \rightarrow 5'$
(c) Both (a) and (b) (d) Any (2001)
- 80.** Gene and cistron words are sometimes used synonymously because
(a) one cistron contains many genes
(b) one gene contains many cistrons
(c) one gene contains one cistron
(d) one gene contains no cistron. (2001)
- 81.** Types of RNA polymerase required in nucleus of eukaryotes for RNA synthesis
(a) 1 (b) 2
(c) 3 (d) 4. (2001)
- 82.** Anticodon occurs in
(a) tRNA (b) mRNA
(c) rRNA (d) DNA. (2000)
- 83.** In three dimensional view the molecule of tRNA is
(a) L-shaped (b) S-shaped
(c) Y-shaped (d) E-shaped. (2000)
- 84.** Genes that are involved in turning on or off the transcription of a set of structural genes are called
(a) redundant genes (b) regulatory genes
(c) polymorphic genes (d) operator genes. (1998)
- 85.** DNA elements, which can switch their position, are called
(a) cistrons (b) transposons
(c) exons (d) introns. (1998)
- 86.** The maximum formation of mRNA occurs in
(a) ribosome (b) nucleoplasm
(c) cytoplasm (d) nucleolus. (1996)

- 87.** If the sequence of bases in DNA is ATTGATG, then the sequence of bases in its transcript will be
 (a) GUAGCUUA (b) AUUCGAUG
 (c) CAUCGAU (d) UAAGCUAC. (1995)
- 88.** In split genes, the coding sequences are called
 (a) exons (b) cistrons
 (c) introns (d) operons. (1995)
- 89.** The process of transfer of genetic information from DNA to RNA/formation of RNA from DNA is
 (a) transversion (b) transcription
 (c) translation (d) translocation. (1991)
- 90.** If the distance between two consecutive base pairs is 0.34 nm and the total number of base pairs of a DNA double helix in a typical mammalian cell is 6.6×10^9 bp, then the length of the DNA is approximately
 (a) 2.0 meters (b) 2.5 meters
 (c) 2.2 meters (d) 2.7 meters.
 (NEET 2020)
- 91.** Under which of the following conditions there will be no change in the reading frame of following mRNA?
 5' AACAGCGGUGCUAUU 3'
 (a) Deletion of GGU from 7th, 8th and 9th positions
 (b) Insertion of G at 5th position
 (c) Deletion of G from 5th position
 (d) Insertion of A and G at 4th and 5th position respectively
 (NEET 2019)
- 92.** Which of the following features of genetic code does allow bacteria to produce human insulin by recombinant DNA technology?
 (a) Genetic code is specific.
 (b) Genetic code is not ambiguous.
 (c) Genetic code is redundant.
 (d) Genetic code is nearly universal. (NEET 2019)
- 93.** If there are 999 bases in an RNA that code for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered?
 (a) 11 (b) 33
 (c) 333 (d) 1 (NEET 2017)
- 94.** Which one of the following is the starter codon?
 (a) UAA (b) UAG
 (c) AUG (d) UGA (NEET-I 2016)
- 95.** Which of the following is not a property of the genetic code?
 (a) Non-overlapping (b) Ambiguous
 (c) Degeneracy (d) Universal
- 96.** The one aspect which is not a salient feature of genetic code, is its being
 (a) degenerate (b) ambiguous
 (c) universal (d) specific. (2010)
- 97.** Whose experiments cracked the DNA and discovered unequivocally that a genetic code is a "triplet"?
 (a) Hershey and Chase
 (b) Morgan and Sturtevant
 (c) Beadle and Tatum
 (d) Nirenberg and Matthaei (2009)
- 98.** What is not true for genetic code?
 (a) It is nearly universal.
 (b) It is degenerate.
 (c) It is unambiguous.
 (d) A codon in mRNA is read in a non-contiguous fashion. (2009)
- 99.** Which one of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid?
 (a) AUG, ACG - Start/methionine
 (b) UUA, UCA - Leucine
 (c) GUU, GCU - Alanine
 (d) UAG, UGA - Stop (2008)
- 100.** After a mutation at a genetic locus the character of an organism changes due to change in
 (a) protein structure (b) DNA replication
 (c) protein synthesis pattern
 (d) RNA transcription pattern. (2004)
- 101.** In mutational event, when adenine is replaced by guanine, it is a case of
 (a) frame shift mutation (b) transcription
 (c) transition (d) transversion. (2004)
- 102.** What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?
 (a) A polypeptide of 24 amino acids will be formed.
 (b) Two polypeptides of 24 and 25 amino acids will be formed.
 (c) A polypeptide of 49 amino acids will be formed.
 (d) A polypeptide of 25 amino acids will be formed. (2003)
- 103.** 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?
 (a) UCG - Start (b) UUU - Stop
 (c) UGU - Leucine (d) UAC - Tyrosine (2003)

(Karnataka NEET 2013)

- 104.** Degeneration of a genetic code is attributed to the
(a) first member of a codon
(b) second member of codon
(c) entire codon
(d) third member of a codon. (2003)

- 105.** In the genetic code dictionary, how many codons are used to code for all the 20 essential amino acids?
(a) 20 (b) 64
(c) 61 (d) 60 (2003)

- 106.** Out of 64 codons, 61 codons code for 20 types of amino acid. It is called
(a) degeneracy of genetic code
(b) overlapping of gene
(c) wobbling of codon
(d) universality of codons. (2002)

- 107.** Change in sequence of nucleotide in DNA is called
(a) mutagen (b) mutation
(c) recombination (d) translation. (2002)

- 108.** Which of the following is initiation codon?
(a) UAG (b) AUC
(c) AUG (d) CCU (2000)

- 109.** Initiation codon in eukaryotes is
(a) GAU (b) AGU
(c) AUG (d) UAG. (1999, 1994)

- 110.** What base is responsible for hot spots for spontaneous point mutations?
(a) 5-bromouracil (b) 5-methylcytosine
(c) Guanine (d) Adenine (1998)

- 111.** The codons causing chain termination are
(a) AGT, TAG, UGA (b) UAG, UGA, UAA
(c) TAG, TAA, TGA (d) GAT, AAT, AGT. (1997)

- 112.** Which of the following serves as a terminal codon?
(a) UAG (b) AGA
(c) AUG (d) GCG (1996)

- 113.** If the DNA codons are ATG ATG ATG and a cytosine base is inserted at the beginning, then which of the following will result?
(a) CAT GAT GAT G (b) A non-sense mutation
(c) C ATG ATG ATG (d) CA TGA TGA TG (1995)

- 114.** Anticodon is an unpaired triplet of bases in an exposed position of
(a) tRNA (b) mRNA
(c) rRNA (d) both (b) and (c). (1995)

- 115.** Initiation codon of protein synthesis (in eukaryotes) is
(a) GUA (b) GCA
(c) CCA (d) AUG. (1993)

- 116.** Khorana first deciphered the triplet codons of
(a) serine and isoleucine
(b) cysteine and valine
(c) tyrosine and tryptophan
(d) phenylalanine and methionine. (1992)

- 117.** In the genetic dictionary, there are 64 codons as
(a) 64 amino acids are to be coded
(b) 64 types of tRNAs are present
(c) there are 44 nonsense codons and 20 sense codons
(d) genetic code is triplet. (1990)

- 118.** Genetic code consists of
(a) adenine and guanine (b) cytosine and uracil
(c) cytosine and guanine (d) all of these. (1988)

6.7 Translation

- 119.** The first phase of translation is
(a) binding of mRNA to ribosome
(b) recognition of DNA molecule
(c) aminoacylation of tRNA
(d) recognition of an anti-codon. (NEET 2020)

- 120.** Many ribosomes may associate with a single mRNA to form multiple copies of a polypeptide simultaneously. Such strings of ribosomes are termed as
(a) polysome (b) polyhedral bodies
(c) plastidome (d) nucleosome. (NEET 2018)

- 121.** A complex of ribosomes attached to a single strand of RNA is known as
(a) polypeptide (b) Okazaki fragment
(c) polysome (d) polymer. (NEET-I 2016)

- 122.** Polysome is formed by
(a) a ribosome with several subunits
(b) ribosomes attached to each other in a linear arrangement
(c) several ribosomes attached to a single mRNA
(d) many ribosomes attached to a strand of endoplasmic reticulum. (2008)

- 123.** The two sub-units of ribosome remain united at a critical ion level of
(a) magnesium (b) calcium
(c) copper (d) manganese. (2008)

- 124.** Which antibiotic inhibits interaction between tRNA and mRNA during bacterial protein synthesis?
(a) Tetracycline (b) Erythromycin
(c) Neomycin (d) Streptomycin (2006)

- 125.** Amino acid sequence, in protein synthesis is decided by the sequence of
(a) rRNA (b) tRNA
(c) mRNA (d) cDNA. (2006)

126. Using imprints from a plate with complete medium and carrying bacterial colonies, you can select streptomycin resistant mutants and prove that such mutations do not originate as adaptation. These imprints need to be used

- (a) on plates with and without streptomycin
- (b) on plates with minimal medium
- (c) only on plates with streptomycin
- (d) only on plates without streptomycin. (2005)

127. Protein synthesis in an animal cell occurs

- (a) only on the ribosomes present in cytosol
- (b) only on ribosome attached to the nuclear envelope and endoplasmic reticulum
- (c) on ribosome present in the nucleolus as well as in cytoplasm
- (d) on ribosomes present in cytoplasm as well as in mitochondria. (2005)

128. During translation initiation in prokaryotes, a GTP molecule is needed in

- (a) formation of formyl-met-tRNA
- (b) binding of 30S subunit of ribosome with mRNA
- (c) association of 30S mRNA with formyl-met-tRNA
- (d) association of 50S subunit of ribosome with initiation complex. (2003)

129. The RNA that pick up specific amino acid from amino acid pool in the cytoplasm to ribosome during protein synthesis is called

- (a) rRNA
- (b) RNA
- (c) mRNA
- (d) tRNA. (1997)

130. Which of the following step of translation does not consume a high energy phosphate bond?

- (a) Peptidyl transferase reaction
- (b) Aminoacyl tRNA binding to A-site
- (c) Translocation
- (d) Amino acid activation (1997)

131. Protein synthesis in an animal cell, takes place

- (a) in the cytoplasm as well as endoplasmic reticulum
- (b) only on ribose attached to nucleon
- (c) only in the cytoplasm
- (d) in the nucleolus as well as in the cytoplasm. (1997)

132. In protein synthesis, the polymerisation of amino acids involves three steps. Which one of the following is not involved in the polymerisation of protein ?

- (a) Termination
- (b) Initiation
- (c) Elongation
- (d) Transcription (1994)

133. Because most of the amino acids are represented by more than one codon, the genetic code is

- (a) overlapping
- (b) wobbling
- (c) degenerate
- (d) generate. (1993)

134. The process of translation is

- (a) ribosome synthesis
- (b) protein synthesis
- (c) DNA synthesis
- (d) RNA synthesis. (1993)

6.8 Regulation of Gene Expression

135. Match the following genes of the *Lac* operon with their respective products.

- | | |
|-------------------|----------------------------|
| (A) <i>i</i> gene | (i) β -galactosidase |
| (B) <i>z</i> gene | (ii) Permease |
| (C) <i>a</i> gene | (iii) Repressor |
| (D) <i>y</i> gene | (iv) Transacetylase |

Select the correct option.

- (A) (B) (C) (D)
- (a) (iii) (iv) (i) (ii)
- (b) (i) (iii) (ii) (iv)
- (c) (iii) (i) (ii) (iv)
- (d) (iii) (i) (iv) (ii)

(NEET 2019)

136. Select the correct match.

- | | |
|--------------------------------------|-----------------------------------|
| (a) Alec Jeffreys | - <i>Streptococcus pneumoniae</i> |
| (b) Alfred Hershey and Martha Chase | - TMV |
| (c) Matthew Meselson and F. Stahl | - <i>Pisum sativum</i> |
| (d) Francois Jacob and Jacques Monod | - <i>Lac</i> operon |

(NEET 2018)

137. All of the following are part of an operon except

- (a) an operator
- (b) structural genes
- (c) an enhancer
- (d) a promoter.

(NEET 2018)

138. Which of the following is required as inducer(s) for the expression of *Lac* operon?

- (a) Lactose
- (b) Lactose and galactose
- (c) Glucose
- (d) Galactose

(NEET-I 2016)

139. Gene regulation governing lactose operon of *E.coli* that involves the *lac I* gene product is

- (a) negative and repressible because repressor protein prevents transcription
- (b) feedback inhibition because excess of β -galactosidase can switch off transcription
- (c) positive and inducible because it can be induced by lactose
- (d) negative and inducible because repressor protein prevents transcription.

(2015 Cancelled)

- 140.** Which one of the following is wrongly matched?
- (a) Transcription - Writing information from DNA to tRNA.
 - (b) Translation - Using information in mRNA to make protein.
 - (c) Repressor protein - Binds to operator to stop enzyme synthesis.
 - (d) Operon - Structural genes, operator and promoter. (2014)

- 141.** Which enzyme will be produced in a cell if there is a nonsense mutation in the lac Y gene?
- (a) Transacetylase
 - (b) Lactose permease and transacetylase
 - (c) β -galactosidase
 - (d) Lactose permease (NEET 2013)

- 142.** In an inducible operon, the genes are
- (a) usually not expressed unless a signal turns them "on".
 - (b) usually expressed unless a signal turns them "off".
 - (c) never expressed
 - (d) always expresser. (Karnataka NEET 2013)

- 143.** 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

- (a) (ii) and (iii)
- (b) (i) and (iii)
- (c) (ii) and (iv)
- (d) (i) and (ii). (2010)

- 144.** The lac operon consists of
- (a) four regulatory genes only
 - (b) one regulatory gene and three structural genes
 - (c) two regulatory genes and two structural genes
 - (d) three regulatory genes and three structural genes. (Main 2010)

- 145.** *E.coli* cells with a mutated z gene of the lac operon cannot grow in medium containing only lactose as the source of energy because
- (a) the lac operon is constitutively active in these cells
 - (b) they cannot synthesise functional beta galactosidase
 - (c) in the presence of glucose, *E.coli* cells do not utilise lactose
 - (d) they cannot transport lactose from the medium into the cell. (2005)

- 146.** What does "lac" refer to in what we call the lac operon?
- (a) Lactose
 - (b) Lactase
 - (c) Lac insect
 - (d) The number 1,00,000 (2003)

- 147.** Jacob and Monod studied lactose metabolism in *E. coli* and proposed operon concept. Operon concept is applicable for
- (a) all prokaryotes
 - (b) all prokaryotes and some eukaryotes
 - (c) all prokaryotes and all eukaryotes
 - (d) all prokaryotes and some protozoans. (2002)

- 148.** In *E. coli*, during lactose metabolism repressor binds to
- (a) regulator gene
 - (b) operator gene
 - (c) structural gene
 - (d) promoter gene. (2002)

- 149.** In negative operon,
- (a) co-repressor binds with repressor
 - (b) co-repressor does not bind with repressor
 - (c) co-repressor binds with inducer
 - (d) cAMP have negative effect on lac operon. (2001)

- 150.** In operon concept, regulator gene functions as
- (a) inhibitor
 - (b) repressor
 - (c) regulator
 - (d) all of these. (1999)

- 151.** The wild type *E.coli* cells are growing in normal medium with glucose. They are transferred to a medium containing only lactose as sugar. Which of the following changes take place?
- (a) The lac operon is induced.
 - (b) *E.coli* cells stop dividing.
 - (c) The lac operon is repressed.
 - (d) All operons are induced. (1995)

- 152.** The lac operon is an example of
- (a) repressible operon
 - (b) overlapping genes
 - (c) arabinose operon
 - (d) inducible operon. (1995)

- 153.** An environmental agent, which triggers transcription from an operon, is a
- (a) depressor
 - (b) controlling element
 - (c) regulator
 - (d) inducer. (1995)

- 154.** 'Lac operon' in *E. coli*, is induced by
- (a) 'T' gene
 - (b) promoter gene
 - (c) β -galactosidase
 - (d) lactose. (1994)

6.9 Human Genome Project

- 155.** Expressed Sequence Tags (ESTs) refers to
- (a) novel DNA sequences
 - (b) genes expressed as RNA
 - (c) polypeptide expression
 - (d) DNA polymorphism. (NEET 2019)

- 156.** Identify the correct order of organisation of genetic material from largest to smallest.
(a) Genome, chromosome, gene, nucleotide
(b) Chromosome, genome, nucleotide, gene
(c) Chromosome, gene, genome, nucleotide
(d) Genome, chromosome, nucleotide, gene (2015)
- 157.** Satellite DNA is important because it
(a) does not code for proteins and is same in all members of the population
(b) codes for enzymes needed for DNA replication
(c) codes for proteins needed in cell cycle
(d) shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children. (2015)

6.10 DNA Fingerprinting

- 158.** Which of the following is not required for any of the techniques of DNA fingerprinting available at present?
(a) Restriction enzymes
(b) DNA-DNA hybridisation
(c) Polymerase chain reaction
(d) Zinc finger analysis (NEET-I 2016)

- 159.** One of the most frequently used techniques in DNA fingerprinting is
(a) VNTR (b) SSCP
(c) SCAR (d) AFLP. (Karnataka NEET 2013)
- 160.** What is it that forms the basis of DNA finger-printing?
(a) The relative proportions of purines and pyrimidines in DNA.
(b) The relative difference in the DNA occurrence in blood, skin and saliva.
(c) The relative amount of DNA in the ridges and grooves of the fingerprints.
(d) Satellite DNA occurring as highly repeated short DNA segments. (Mains 2012)

- 161.** DNA fingerprinting refer to
(a) molecular analysis of profiles of DNA samples
(b) analysis of DNA samples using imprinting devices
(c) techniques used for molecular analysis of different specimens of DNA
(d) techniques used for identification of fingerprints of individuals. (2004)

ANSWER KEY

1. (a) 2. (c) 3. (b) 4. (a) 5. (a) 6. (d) 7. (c) 8. (d) 9. (c) 10. (b)
11. (b) 12. (b) 13. (d) 14. (d) 15. (c) 16. (c) 17. (c) 18. (c) 19. (a) 20. (b)
21. (b) 22. (a) 23. (b) 24. (d) 25. (c) 26. (d) 27. (a) 28. (a) 29. (b) 30. (b)
31. (a) 32. (a) 33. (b) 34. (c) 35. (c) 36. (d) 37. (a) 38. (b) 39. (c) 40. (a)
41. (b) 42. (d) 43. (a) 44. (b) 45. (a) 46. (c) 47. (d) 48. (c) 49. (b) 50. (c)
51. (a) 52. (b) 53. (d) 54. (b) 55. (c) 56. (b) 57. (a) 58. (d) 59. (c) 60. (b)
61. (c) 62. (a) 63. (a) 64. (d) 65. (b) 66. (b) 67. (a) 68. (a) 69. (d) 70. (b)
71. (a) 72. (c) 73. (b) 74. (d) 75. (c) 76. (a) 77. (c) 78. (a) 79. (a) 80. (c)
81. (c) 82. (a) 83. (a) 84. (d) 85. (b) 86. (d) 87. (d) 88. (a) 89. (b) 90. (c)
91. (a) 92. (d) 93. (b) 94. (c) 95. (b) 96. (b) 97. (d) 98. (d) 99. (d) 100. (a)
101. (c) 102. (a) 103. (d) 104. (d) 105. (c) 106. (a) 107. (b) 108. (c) 109. (c) 110. (c)
111. (b) 112. (a) 113. (a) 114. (a) 115. (d) 116. (b) 117. (d) 118. (d) 119. (c) 120. (a)
121. (c) 122. (c) 123. (a) 124. (c) 125. (c) 126. (c) 127. (d) 128. (c) 129. (d) 130. (a)
131. (d) 132. (d) 133. (c) 134. (b) 135. (d) 136. (d) 137. (c) 138. (a) 139. (d) 140. (a,d)
141. (c) 142. (a) 143. (c) 144. (b) 145. (b) 146. (a) 147. (c) 148. (b) 149. (a) 150. (b)
151. (a) 152. (d) 153. (d) 154. (c) 155. (b) 156. (a) 157. (d) 158. (d) 159. (a) 160. (d)
161. (a)