15 Molecular Basis of Inheritance

1. Monomer of nucleic acids are –**(Pg. 95, E)**
   A) Peptides
   B) Nucleosides
   C) Ribonucleosides
   D) None of these
2. DNA and RNA are types of – **(Pg. 95, E)**
   A) Nucleotides B) Nucleosides
   C) Nucleic acids D) Nucleamides

Paragraph 6.1

The DNA

3. Length of DNA is usually defined as- **(Pg. 96, E)**
   A) Number of nucleotides present in it
   B) Number of pair of nucleotides present in it
   C) Number of base pairs present in it
   D) All of these
4. Match the length of DNA with the correct organisms – **(Pg. 96, M)**

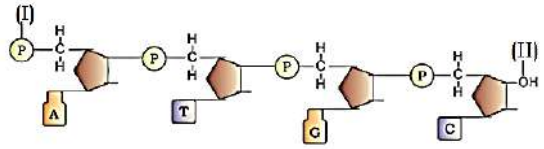
	A		B
I	Φ × 174	1	4.6×10^6 bp (base pairs)
II	Bacteriophage γ	2	3.3×10^9 bp
III	E. coli	3	48502 bp
IV	Human DNA (haploid)	4	5386 nucleotides

	I	II	III	IV
A)	4	3	1	2
B)	3	4	2	1
C)	4	3	2	1
D)	3	4	1	2

Paragraph 6.1.1

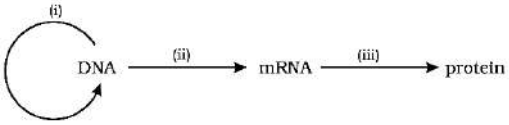
Structure of polynucleotides chain

5. A nucleotides contains – **(Pg. 96, E)**
   A) Hexose sugar + nitrogenous base + phosphate group
   B) Pentose sugar + nitrogenous base + phosphate group
   C) Hexose sugar + nitrogenous base + sulphate group
   D) Pentose sugar + nitrogenous base + sulphate group
6. Which of these is a purine – **(Pg. 96, E)**
   A) Cytosine
   B) Adenine
   C) Thiamine
   D) More than one is correct
7. Which of these is a pyrimidine – **(Pg. 96, E)**
   A) Adenine B) Thymine
   C) Guanine D) None of these
8. Which of these is a correct combination for a DNA nucleotides **(Pg. 96, E)**
   A) Oxyribose + Phosphate + Uracil
   B) Oxyribose + Phosphate + Thymine
   C) Deoxyribose + Phosphate + Uracil
   D) Deoxyribose + Phosphate + Thymine
9. All the given nucleotides exists, except **(Pg. 96, E)**
   A) Deoxy uridine B) Thymine
   C) Both A & B D) None of these
10. Nitrogenous base is linked to which carbon of pentose sugar **(Pg. 96, E)**
    A) 1'C B) 2'C
    C) 3'C D) 5'C
11. Nitrogenous base is linked to pentose sugar by which bond – **(Pg. 96, E)**
    A) N – Glycosidic bond
    B) Phosphoester bond
    C) Phosphodiester bond
    D) Peptide bond
12. Phosphate group is linked to which carbon of pentose sugar **(Pg. 96, E)**
    A) 1'C B) 2'C
    C) 3'C D) 5'C
13. Identify the free ends of given polynucleotides chain – **(Pg. 96, E)**



	I	II
A)	3' phosphate	5' hydroxyl
B)	5' hydroxyl	3' phosphate
C)	5' phosphate	3' hydroxyl
D)	3' hydroxyl	5' phosphate

14. Backbone of polynucleotide chain is formed due to –**(Pg. 97, E)**
    A) Sugar and N-base
    B) Sugar and phosphate
    C) Phosphate and N – Base
    D) All of these
15. Which is correct about thymine & uracil – **(Pg. 97, E)**
    A) Uracil is 5-methyl thymine
    B) Thymine is 5-methyl uracil
    C) Uracil is 5-ethyl thymine
    D) Thymine in 5-ethyl uracil
16. DNA is –**(Pg. 97, E)**
    A) Acidic and positively charged
    B) Basic and positively charged
    C) Acidic and negatively charged
    D) Basic and negatively charged
17. Name of DNA as 'Nuclein' was given by – **(Pg. 97, E)**
    A) Francis crick
    B) Erwin Chargaff
    C) Friedrich Meischer
    D) Rosalind Franklin
18. Double Helix for structure of DNA model was proposed by – **(Pg. 97, E)**
    A) Wilkins and Franklin based on their X-ray diffraction date
    B) Watson and Crick based on their X-ray diffraction date
    C) Chargaff based on their X-ray diffraction data
    D) None of these
19. The proposition of base pairing between the two stands of polynucleotide chain in double Helix model of DNA was based on observation of – **(Pg. 97, E)**
    A) Maurice Wilkins
    B) Rosalind Franklin
    C) Erwin Chargaff
    D) Both A & B
20. The two chains of double Helix DNA have – **(Pg. 97, E)**
    A) Parallel polarity
    B) Anti-parallel polarity
    C) No polarity
    D) Depends on organism
21. The bases in two stands of DNA are paired through **(Pg. 97, E)**
    A) Hydrogen bond B) Peptide bond
    C) Glycosidic bond D) Sulfide bond
22. Which of the following is true about base pairing in DNA – **(Pg. 97, E)**
    A) Adenine forms two hydrogen bond with Guanine
    B) Adenine forms three hydrogen bond with Guanine
    C) Adenine forms two hydrogen bond with Thymine
    D) Adenine forms three hydrogen bond with Thymine
23. Which of the following is true about base pairing in DNA –**(Pg. 97, E)**
    A) Guanine forms two H-bond with Cytosine
    B) Guanine forms three H-bond with Cytosine
    C) Guanine forms two H-bond with Adenine
    D) Guanine forms three H-bond with Adenine
24. Uniform distance between two stands of Helix is due to –**(Pg. 97, E)**
    A) Double and triple bond formed between base pairs
    B) Sugar – phosphate backbone
    C) Purine – pyrimidine base pairing
    D) None of these
25. How many of the following statements about Double – helix structure of DNA is correct –**(Pg. 97, E)**
    i) Two chains are coiled in right – handed fashion
    ii) Pitch of helix is 3.6 nm
    iii) There are roughly 10 bp in each turn
    iv) Plane of one base pair stacks over the other
    A) 1 B) 2
    C) 3 D) 4
26. Pitch of helix in double helix DNA is –**(Pg. 98, E)**
    A) 3.6 nm B) 3.4 nm
    C) 3.2 nm D) 3.8 nm
27. Central dogma in molecular biology was proposed by —**(Pg. 98, E)**
    A) Crick B) Watson
    C) F. Meischar D) Chragaff
28. Identify correct labels —**(Pg. 98, E)**

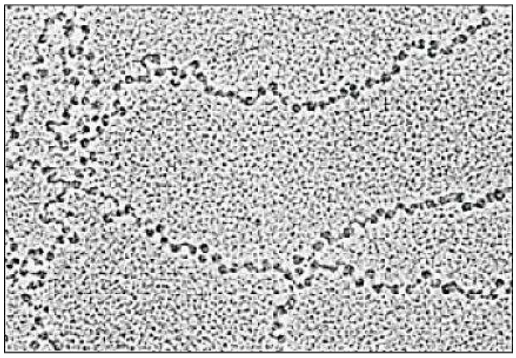


	(i)	(ii)	(iii)
A)	Replication	Translation	Transcription
B)	Replication	Transcription	Translation
C)	Transcription	Replication	Translation
D)	Translation	Replication	Transcription

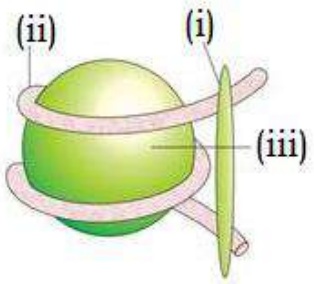
Paragraph 6.1.2

Packaging of DNA Helix

29. If length of E. coli DNA is 1.36 mm, calculate number of base pair in E. coli? Given – distance between consecutive base pairs is 0.34×10^{-9} m. – **(Pg. 99, E)**
    A) 4×10^{6} B) 4×10^{9}
    C) 4×10^{-6} D) 4×10^{12}
30. **Assertion** : In E. coli, DNA is scattered throughout the cell
    Reason : In E. coli, there is no defined nucleus **(Pg. 99, M)**
    A) Both Assertion & Reason are correct & Reason is correct explanation for Assertion
    B) Both Assertion & Reason are correct but Reason is not correct explanation for Assertion
    C) Assertion is correct and Reason is incorrect
    D) Reason is correct and Assertion is incorrect
31. Histones are – **(Pg. 99, E)**
    A) Positive and acidic in eukaryotes
    B) Positive and acidic in prokaryotes
    C) Positive and basic in eukaryotes
    D) Positive and basic in prokaryotes
32. Assertion – Histones are positively charged
    Reason – Histones are rich in basic amino acid residues lysine and arginine **(Pg. 99, M)**
    A) Assertion & Reason are correct and Reason is correct explanation for Assertion
    B) Assertion & Reason are correct and Reason is not the correct explanation for Assertion
    C) Assertion is correct and Reason is wrong
    D) Both Assertion and Reason are wrong
33. Histones are organized into –**(Pg. 99, E)**
    A) Hexamer B) Octamer
    C) Tetramer D) Dimer
34. A typical nucleosome contain _____ bp of DNA has **(Pg. 99, E)**
    A) 200 B) 400
    C) 600 D) 800
35. Repeating unit of chromatin –**(Pg. 99, E)**
    A) Are nucleosomes
    B) Are seen as 'beads-on-string' under electron microscope
    C) Are packed to form fibres
    D) All of these
36. The figure show –**(Pg. 99, E)**



    A) Beads-on-string
    B) A nucleosome
    C) Chromatin
    D) More than one option is correct
37. Identify the correct label for given figure **(Pg. 99, M)**



	(i)	(ii)	(iii)
A)	H_2 histone	DNA	Histone octamer
B)	H_1 histone	Histone octamer	DNA
C)	H_2 histone	Histon octamer	DNA
D)	H_1 histone	DNA	Histone octamer

38. Chromosomes are connected chromatin fibres present – **(Pg. 99, E)**
A) At all times in cell
B) Only during cell division – formed at prophase
C) Only during cell division – formed at metaphase
D) Only during cell division – formed at Interphase

39. In a typical nucleus, euchromatin & hetero chromatin are present. Choose the correct set of characters for heterochromatin – **(Pg. 99, E)**
i) Loosely packed
ii) Densely packed
iii) Light stain
iv) Dark stain
v) Inactive chromatin
vi) Active chromatin
A) i, iii, v B) ii, iv, vi
C) i, iii, vi D) ii, iv, v

40. Choose correct set of characters for euchromatin **(Pg. 99, E)**
i) Loosely packed
ii) Densely packed
iii) Light stain
iv) Dark stain
v) Inactive chromatin
vi) Active chromatin
A) i, iii, v B) ii, iv, vi
C) i, iii, vi D) ii, iv, v

6.2 The Search for Genetic Material

Transforming Principle

41. Griffith's experiments were conducted in- **(Pg. 100, E)**
A) 1928 B) 1958
C) 1978 D) 1968

42. The experiment of Griffith was performed in- **Pg. 100, E)**
A) Diplococcus pneumoniae, bacteria
B) Haemophilus influenzas, fungi
C) Streptococcus pneumoniae, fungi
D) None of these

43. Match the given columns- **Pg. 100, M)**

I	II	III

i.	R-strain	(a)	Smooth	(1)	Mucous coat
ii.	S-strain	(b)	Rough colonies	(2)	No mucous coat

A) (i)-(a)-(1) B) (i)-(b)-(1)
C) (ii)-(a)-(1) D) (ii)-(a)-(2)

44. Which strain of the microbe used Griffith is virulent- **Pg. 100, E)**
A) S-strain B) R-strain
C) Both D) None

45. Griffith observed that the mice died surprisingly the following combination of strains was used, which was unusual- **Pg. 100, E)**
A) S-strain heat killed
B) Heat killed S-strain
C) Heat killed R-strain + Live S-strain
D) Heat killed S-strain + Live R-strain

46. In Griffith experiment (**Pg. 100, E)**
A) R-strain transformed to S-strain and became virulent
B) R-strain transformed to S-strain and lost virulence
C) S-strain transformed to R-strain and became virulent
D) S-strain transformed to R-strain and lost virulence

47. Griffith claimed that- (**Pg. 100, E)**
A) Some protein was transferred among bacteria
B) Some DNA was transferred among bacteria
C) Some carbohydrates was transferred among bacteria
D) None of these

Biochemical Characterization of Transforming Principle

48. Prior to work of Avery, Macleod and McCarty, genetic material was thought to be- (**Pg. 100, E)**
A) Protein B) DNA
C) RNA D) None

49. Avery, Macleod & McCarty discovered that- (**Pg. 100, E)**
A) DNA caused transformation
B) RNA caused transformation
C) Protein caused transformation

D) Lipid caused transformation

50. Which enzyme inhibited the transformation-(**Pg. 101, E)**
A) Protease B) RNase
C) DNase D) All

6.2.1 The Genetic Material is DNA

51. Unequivocal proof that DNA is genetic material came from experiments of-(**Pg. 101, E)**
A) Avery, Macleod & McCarty
B) Hershey and Chase
C) de Vries, Correns and Tschermak
D) Sutton and Boveri

52. The scientists of Q-11 worked with- (**Pg. 101, E)**
A) a virus B) a bacteria
C) a fungi D) a nematode

53. In the experiment performed for proving DNA as genetic material, the bacteriophages were grown on medium containing- (**Pg. 101, E)**
A) radioactive sulfur
B) radioactive nitrogen
C) radioactive phosphorous
D) More than one option

54. The bacteriophages growing in presence of radioactive phosphorous __(i)__ contained radioactive __(ii)__. (**Pg. 101, E)**

	(i)	**(ii)**
A)	P_{32}	DNA
B)	P_{35}	Protein
C)	P_{32}	Protein
D)	P_{35}	DNA

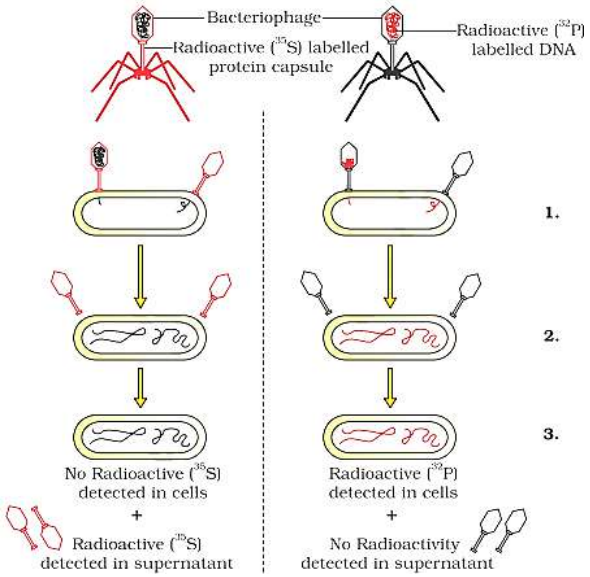
55. Bacteriophages grown on radioactive Sulphur __(i)__ contained radioactive __(ii)__. (**Pg. 101, E)**

	(i)	**(ii)**
A)	S_{32}	DNA
B)	S_{32}	Protein
C)	S_{35}	DNA
D)	P_{35}	Protein

56. The bacteria involved in Hershey & chase experiment of 1952 was- (**Pg. 102, E)**
A) Bacteriophage
B) E. coli
C) S. pneumoniae
D) C. butyliwm

57. Bacteria infected with virus that showed radioactivity had- (**Pg. 102, E)**
A) radioactive DNA (S_{32})
B) radioactive DNA (S_{35})
C) radioactive DNA (P_{32})
D) radioactive DNA (P_{35})

58. (**Pg. 102, E)**



Identify the correct label.

	1	**2**	**3**
A)	Blending	Infection	Centrifugation
B)	Infection	Blending	Centrifugation
C)	Centrifugation	Infection	Blending
D)	Blending	Centrifugation	Infection

6.2.2 Properties of Genetic Material (DNA vs RNA)

59. RNA is genetic material in- (**Pg. 102, E)**
A) TMV
B) QB Bacteriophage
C) Both A and B
D) None of these

60. Properties of genetic material include- (**Pg. 103, E)**
A) Stable B) Mutable
C) Replicable D) All of these

61. A - Stability as a property of genetic material was very evident in Griffith's transforming principle.

R - Heat can kill the bacteria and completely destroy the properties of genetic material (**Pg. 103, M)**

A) Both A and R are true and R is correct explanation for A
B) Both A and R are true but R is not correct explanation for R
C) A is true but R is false
D) Both A and R are false

62. Which is more structurally and chemically stable? (**Pg. 103, E)**
A) DNA B) RNA
C) Protein D) All

63. RNA viruses show- (**Pg. 103, E)**
A) Less mutation
B) Faster evolution
C) Slower evolution
D) More than one option is correct

64. DNA is preferred by nature over RNA for- (**Pg. 103, E)**
A) Storage of genetic information
B) Transmission of genetic information
C) Expression of genetic information
D) More than one

6.3 RNA World

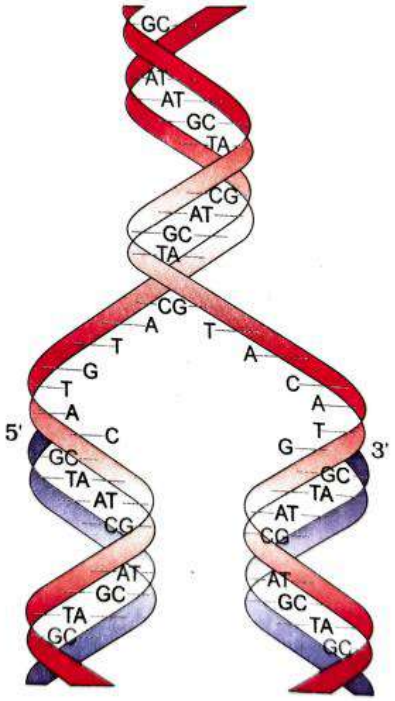
65. Choose incorrect statement RNA- (**Pg. 104, E)**
A) was first genetic material
B) acts as catalyst too
C) is more stable than DNA
D) has protein synthesizing mechanism built around it

6.4 Replication

66. Scheme for replication of DNA was proposed by-(**Pg. 104, E)**
A) Watson & Crick
B) Meselson & Stahl
C) Taylor
D) Hershey & Chase

67. The replication of DNA is-(**Pg. 104, E)**
A) Conservative
B) Non-conservative
C) Semi-conservative
D) All of these depending on organism

68. (**Pg. 104, E)**



The figure shows-
A) Conservative DNA replication model
B) Semi-conservative DNA replication model
C) Non-conservative DNA replication model
D) Can't say

6.4.1 The Experimental Proof

69. The DNA replication model experimental proof was first shown in- (**Pg. 104, E)**
A) Human cells B) E. coli
C) Plant cell D) Vicia faba

70. Meselson and stahl performed experiment for proving DNA replication scheme in- (**Pg. 105, E)**
A) 1952 B) 1953
C) 1958 D) 1961

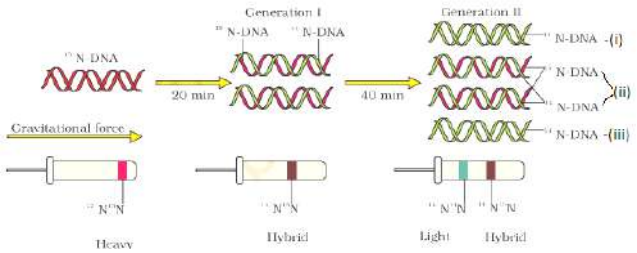
71. The bacteria were grown in medium containing-(**Pg. 105, E)**
A) $^{15}NH_4Cl$ – ^{15}N is heavy isotope of nitrogen
B) $^{14}NH_4Cl$ – ^{14}N is heavy isotope of nitrogen
C) $^{15}NH_4Cl$ – ^{15}N is normal isotope of nitrogen
D) $^{14}NH_4Cl$ – ^{14}N is normal isotope of nitrogen

72. The heavy DNA molecule containing heavy isotope of N is distinguished from normal DNA by- (**Pg. 105, E)**

A) UV rays
B) Ethidium bromide solution
C) Centrifugation is CsCl density gradient
D) PCR technique

73. In Meselson & Stahl experiment, first they-(**Pg. 105, E)**
A) grew bacteria on heavy isotope of N medium followed by normal one
B) grew bacteria on normal isotope of N medium followed by heavy one
C) grew bacteria on radioactive N followed by Keavy one
D) grew bacteria on heavy isotope of N followed by radioactive one

74. (**Pg. 105, E)**



Identify the correct label

	(i)	(i)	(iii)
A)	Light	Heavy	Hybrid
B)	Heavy	Hybrid	Light
C)	Light	Hybrid	Light
D)	Heavy	Hybrid	Heavy

75. In Meselson & Stahl expt a bacteria after dividing in 20 minutes had a hybrid DNA. What will be the ratio of Hybrid to Light after 80 minutes? (**Pg. 105, E)**
A) 2 : 14 B) 14 : 2
C) 16 : 2 D) 2 : 16

76. Similar experiment on Vicia faba was conducted by ____ to detect distribution of newly synthesized DNA in chromosomes. **(Pg. 106, E)**
A) Taylor B) Stahl
C) Gamow D) Nirenberg

77. Experiment on Vicia faba involved use of-(**Pg. 106, E)**
A) Radioactive uridine
B) Radioactive thymidine
C) Radioactive adenosine
D) Radioactive cytidine

6.4.2 The Machinery and the Enzymes

78. The main enzyme of replication is-(**Pg. 106, E)**
A) RNA dependent RNA polymerase
B) RNA dependent DNA polymerase
C) DNA dependent DNA polymerase
D) DNA dependent RNA polymerase

79. Choose correct statement with regard with efficiency of DNA polymerase. (**Pg. 106, E)**
A) 4.6×10^6 bp of E. coli replicate within 46 minutes
B) The average rate of polymerization of DNA polymerase has to be approximately 2000 bp/minute
C) The polymerization accuracy is very high and very fast
D) All of these

80. What is function of deoxyribonucleoside triphosphate-(**Pg. 106, E)**
A) It act as substrate
B) Provide energy for polymerization
C) A and B both
D) It is product formed after polymerization

81. Assertion : The two strands of DNA cannot be separated in their length.
Reason : Separation required very high energy. (**Pg. 106, E)**
A) Both Assertion & Reason are correct and reason is correct explanation of assertion
B) Both Assertion & Reason are correct and reason is not correct explanation of assertion
C) Assertion is correct, Reason is false
D) Assertion & Reason are false

82. Polymerization by DNA polymerase is in-(**Pg. 106, E)**
A) 3' → 5' direction only
B) 5' → 3' direction only
C) A and B both
D) Random

83. The template of replication fork with polarity 5' → 3' is ____ while 3' → 5' is ____.(**Pg. 106, E)**
A) continuous, continuous
B) continuous, discontinuous
C) discontinuous, continuous
D) discontinuous, discontinuous

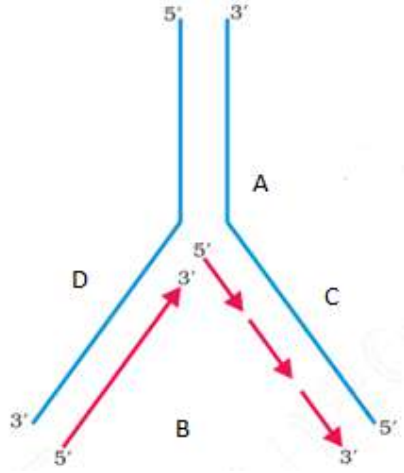
84. DNA ligase act on-(**Pg. 106, E)**
A) 5' → 3' template strand

B) 3' → 5' template strand
C) Both A and B
D) Ligate RNA with vector of 3' → 5' polarity

85. The replication is eukaryotes take place in-(**Pg. 106, E)**
A) M-phase B) G_1 phase
C) S-phase D) G_2 phase

86. Polyploidy resulted by-(**Pg. 106, E)**
A) A failure in cell division after DNA replication
B) A failure in DNA replication after cell division
C) A failure in cell division before DNA replication
D) A and C both

87. (**Pg. 107, E)**



Correct label of A, B, C, D is-
(i) A = Template parental strand
(ii) B = Newly synthesized strand
(iii) D = Continuous strand
(iv) C = Discontinuous strand
A) i, ii only B) iii, iv only
C) i, ii, iii, iv D) None of these

6.5 Transcription

88. Transcription is-(**Pg. 107, E)**
A) The process of copying genetic information from both strand of DNA into RNA
B) The process of copying genetic information from one strand of DNA into RNA
C) The process of copying genetic information from RNA into DNA
D) A and B both

89. In transcription, adenosine bind with (**Pg. 107, E)**
A) Thymine B) Uracil
C) Cytosine D) A and B both

90. Why both the strand of DNA are not copied during transcription-(**Pg. 107, E)**
A) If both strands act a template, th would code for RNA molecules ı same sequence
B) RNA formed by transcription of both strand, when code for protein, the sequence of amino acid in protein are same
C) The two RNA molecules if produced simultaneously would be complementary to each other
D) All of these

91. Translation of RNA would be prevented if-(**Pg. 107, E)**
A) RNA is single strand
B) RNA is double-stranded
C) RNA is produced by both strand of DNA
D) B and C both

6.5.1 Transcription Unit

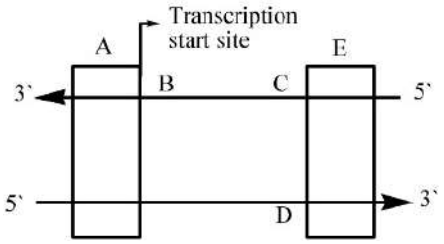
92. Transcription unit primarily consist of-(**Pg. 107, E)**
A) 1 region B) 2 regions
C) 3 regions D) None of these

93. Transcription primarily required-(**Pg. 107, E)**
A) RNA dependent RNA polymerase
B) DNA dependent RNA polymerase
C) DNA dependent DNA polymerase
D) RNA dependents DNA polymerase

94. Template strand of transcription unit is/are-(**Pg. 108, E)**
A) 5' → 3' strand of DNA
B) 3' → 5' strand of DNA
C) Site of catalysis of enzyme required for transcription
D) B and C both

95. What is coding strand of given template strand
3' – AGCATGCA – 5' (**Pg. 108, E)**
A) 5' – TACGTACGT – 3'
B) 5' – UACGUACGU – 3'
C) 3' – UACGUACGU – 5'
D) 3' – TACGTACGT – 5'

96. Label A, B, C, D, E of given diagram. (**Pg. 108, E)**



	a	b	c	d	e
A)	Promoter	Structural gene	Template strand	Coding strand	Terminator
B)	Terminator	Structural gene	Coding strand	Template strand	Promoter
C)	Promoter	Template strand	Coding strand	Structural gene	Terminator
D)	None of these				

97. Promoter is located-(**Pg. 108, E)**
(i) 3' end
(ii) 5' end
(iii) upstream of structural gene
(iv) downstream of structural gene
A) i, iii B) ii, iii
C) i, iv D) ii, iv

98. Terminator is located at (**Pg. 108, E)**
(i) 3' end
(ii) 5' end
(iii) upstream of structural gene
(iv) downstream of structural gene
A) i, iii B) ii, iii
C) i, iv D) ii, iv

6.5.2 Transcription unit and the gene

99. A gene is defined as- **(Pg. 108, E)**
A) Functional unit of inheritance
B) Non-functional region of DNA that haven't any information
C) A and B both
D) None of these

100. Cistron is- **(Pg. 109, E)**
A) Segment of DNA coding for a polypeptide
B) Segment of RNA coding for a polypeptide
C) Segment of DNA that are non-coding sequence
D) Segment of RNA have not any coding sequence

101. Choose the correct statement. **(Pg. 109, E)**
A) Monocistronic eukaryotic structural gene have interrupted coding sequence.
B) Polycistronic prokaryotic structural gene have interrupted coding sequence.
C) Monocistronic prokaryotic structural gene have interrupted coding sequence.
D) A and B both

102. Exons are- **(Pg. 109, E)**
A) Coding sequence
B) Non-coding sequence
C) Expressed sequence
D) A and C both

103. Intron- **(Pg. 109, E)**
A) appear is mature or processed RNA
B) do not appear in mature or processed RNA
C) appear is prokaryotes
D) B and C both

6.5.3 Types of RNA & Process of Transcription

104. Which of following play role is protein synthesis of prokaryote? **(Pg. 109, E)**
A) r-RNA B) t-RNA
C) m-RNA D) All of these

105. The function of some RNA are given below choose the incorrect one. **(Pg. 109, E)**
A) mRNA provide template strand
B) mRNA provide non-template strand
C) tRNA bring amino acid
D) rRNA play structural & catalytic role

106. How many polymerase required is bacteria for transcription of all type of RNA? **(Pg. 109, E)**
A) One B) Two
C) Three D) Five

107. Choose incorrect step about transcription. **(Pg. 109, E)**
A) RNA polymerase binds to promoter and initiate transcription.

B) Nucleotide triphosphate act as substrate and polymerization in a template.
C) A short stretch of RNA remains bound to enzyme.
D) Last step is termination.

108. Initiation factor and termination factor are- **(Pg. 110, E)**
A) Sigma and Rho factor respectively.
B) Rho and Sigma factor respectively.
C) Rho and Rho factor respectively.
D) Sigma and Sigma factor respectively.

109. Translation & transcription in eukaryote occur in **(Pg. 110, E)**
A) Cytoplasm & nucleus respectively
B) Nucleus & cytoplasm respectively
C) Cytosol
D) Nucleus

110. Which of following can be coupled in bacteria? **(Pg. 110, E)**
A) Replication & transcription
B) Transcription & translation
C) Replication & translation
D) None of these

111. Transcription of 18 s rRNA is done by ____ in eukaryote. **(Pg. 111, E)**
A) RNA pol. I B) RNA pol. II
C) RNA pol. III D) All of these

112. Choose incorrect statement. **(Pg. 111, E)**
A) 5.8 s r-RNA and 5 s-RNA transcribes by same RNA polymerase in eukaryote.
B) hnRNA & mRNA transcribe by same RNA polymerase in eukaryote.
C) tRNA & snRNA transcribes by same RNA polymerase in eukaryote.
D) None of these

113. Splicing is required to- **(Pg. 111, E)**
A) remove intron in eukaryote
B) remove exon in eukaryote
C) remove exon in prokaryote
D) remove intron in prokaryote

114. Capping is- **(Pg. 111, E)**
A) Addition of methyl guanosine triphosphate at 5' end
B) addition of adenylate residue at 3' end
C) addition of methyl guanosine triphosphate at 3' end
D) addition of adenylate residue at 5' end

115. The fully processed hnRNA is- **(Pg. 111, E)**
A) tRNA B) mRNA
C) rRNA D) None of these

6.6 Genetic Code

116. George Gamow argued- **(Pg. 111, E)**
A) There are only 5 bases and if they have code for 20 amino acid the code should constitute a combination of bases
B) There are only 4 bases and if they have code for 20 amino acid the code should constitute a combination of bases
C) Genetic code is triplet
D) B and C

117. Which of following have maximum codon in genetic code-(**Pg. 112, E)**
A) Leu B) Met
C) Cal D) Phe

118. Which of following is/are showing dual function-(**Pg. 112, E)**
A) UUU B) AUG
C) UGA D) GUA

119. Least number of codon is for- (**Pg. 112, E)**
A) Met B) Phe
C) Gls D) Gly

6.6.1 Mutations and Genetic Code

120. Sickle cell anaemia is classical example of- **(Pg. 113, E)**
A) point mutation
B) frameshift mutation
C) deletion mutation
D) addition mutation

121. In sickle cell anaemia, there are changes in gene for- **(Pg. 113, E)**
A) alpha globin chain
B) beta globin chain
C) gamma globin chain
D) delta globin chain

122. In sickle cell anaemia, resultant effect of mutation is change of amino acid residue- **(Pg. 113, E)**
A) Valine to alanine
B) Valine to glutamic acid
C) Alanine to valine
D) Glutamic acid to valine

123. The following is an example of-
BIG RED CAP ⇒ BIG REM DCA P **(Pg. 113, E)**
A) Deletion mutation
B) Point mutation
C) Addition mutation

D) More than one option

124. RAM HAS CAP ⇒ RAM HAS BIG CAP **(Pg. 113, E)**

The given example shows-

A) Addition mutation
B) Deletion mutation
C) Substitution mutation
D) More than one option

6.6.2 tRNA – the Adapter Molecule

125. tRNA has- (**Pg. 114, E)**

A) Codon loop B) Anticodon loop
C) Both D) Neither

126. The presence of adapter molecule to read the code on DNA and bind to amino acids was postulated by- **(Pg. 114, E)**

A) James Watson
B) Francis Crick
C) Friedrich Meisher
D) Both A and B

127. tRNA was also called- **(Pg. 114, E)**

A) s RNA (soluble RNA)
B) s RNA (single RNA)
C) s RNA (smart RNA)
D) s RNA (simple RNA)

128. The amino acid acceptor end of tRNA is- (**Pg. 114, E)**

A) 5'
B) 3'
C) Can be any of these
D) Free end

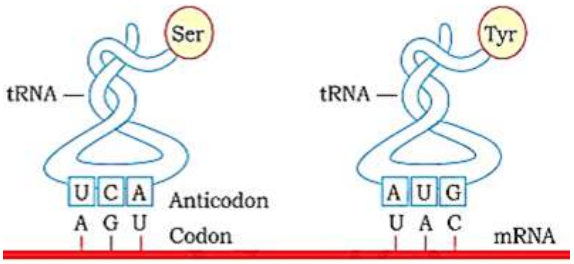
129. For initiation translation, (**Pg. 114, E)**

A) Only tRNA carries initiator amino acid to the site.
B) Specific rRNA carries initiator amino acid to the site.
C) Any rRNA carries initiator amino acid to the site.
D) Specific tRNA carries initiator amino acid to the site.

130. For stop codon- (**Pg. 114, E)**

A) There are specific tRNAs with amino acids.
B) There are specific tRNAs which do not bind to any amino acids.
C) There are no tRNA.
D) There are tRNAs which may or may not bind to amino acids.

131. **(Pg. 114, E)**



The given figure shows-

A) Secondary structure of tRNA – Clover-leaf
B) Primary structure of tRNA – clover-leaf
C) Secondary structure of tRNA – inverted-L
D) Primary structure of tRNA – inverted-L

6.7 Translation

132. Translation refers to process of- (**Pg. 114, E)**

A) Making RNA from DNA
B) Making DNA from RNA
C) Polymerization of nucleotide to form a DNA
D) Polymerization of amino acid to form a polypeptide

133. The order and sequence of amino acid during translation are defined by- (**Pg. 114, E)**

A) The sequences of bases in r-RNA
B) The sequences of bases in t-RNA
C) The sequences of bases in m-RNA
D) All of these

134. Which of following bond is formed during translation? (**Pg. 115, E)**

A) Glycosidic bond
B) Phosphodiester bond
C) Peptide bond
D) All of these

135. First phase of translation does not involve- **(Pg. 115, E)**

A) Charging of RNA
B) Amino acids are activated in presence of ATP
C) Activated amino acid are linked to their cognate tRNA
D) None of these

136. Initiation or first phase of translation is- (**Pg. 115, E)**

A) Amino acylation of tRNA
B) Amino acylation of mRNA

C) Both A and B
D) Deamino acylation of mRNA

137. The cellular factory responsible for synthesizing protein is- (**Pg. 115, E)**
A) Ribosome B) Lysosome
C) Peroxisome D) None of these

138. In inactive state, protein factory of cell exist in (**Pg. 115, E)**
A) Two state
B) 4 state in prokaryote
C) 6 state in eukaryote
D) B and C both

139. Which of following is sign as beginning of translation? (**Pg. 115, E)**
A) When the large subunit of protein factory of cell encounters an mRNA.
B) When the small subunit of protein factory of cell encounters an mRNA.
C) When the small subunit of protein factory of cell encounter a tRNA.
D) When the large subunit of protein factory of cell encounters a tRNA.

140. The bond formation (peptide) between charged tRNA is accomplished due to- (**Pg. 115, E)**
A) Presence of ATP and catalyst
B) Two such charged tRNA are brought close by two site in large subunit of ribosome
C) Two charged tRNA are brought close by two site in small subunit of ribosome & presence of ATP along with catalyst
D) A and B both

141. The ribosome act as catalyst during bond formation (peptide) as in- (**Pg. 115, E)**
A) 28 s rRNA in bacteria
B) 23 s rRNA in bacteria
C) 23 s rRNA in eukaryote
D) 28 s tRNA in bacteria

142. Choose the correct statement- (**Pg. 115, E)**
A) A translational unit in mRNA is sequence of RNA that is flanked by start codon and stop codon and codes for polypeptide.
B) A translational unit is sequence of DNA that is flanked by start codon & codes for polypeptide.
C) A transcriptional unit in tRNA is the sequence of RNA that is flanked by start codon and stop codon and codes for polypeptide.
D) A transcriptional unit in rRNA is the sequence of RNA that is flanked by start codon (AUG) and stop codon and codes for polypeptide.

143. UTR is/are-(**Pg. 115, E)**
(i) Untranslated region of mRNA
(ii) It present at both 5' end (start codon) and 3' end (before stop codon)
(iii) They are required for efficient translation process
(iv) It present at both 3' end (before start codon) and 3' end (after stop codon)
A) i, ii, iii are correct
B) i, ii, iii and iv are correct
C) i, iii, iv are correct
D) i, iii are correct

144. Initiator tRNA binds with (**Pg. 115, E)**
A) AUG codon of mRNA
B) at initiation of protein synthesis
C) ATG codon of dsDNA
D) A and B both

145. Choose the correct about elongation of translation- (**Pg. 115, E)**
A) Complexes composed of an amino acid linked to tRNA, sequentially bind to appropriate codon in mRNA by forming complementary base pairs with the tRNA anticodon
B) The ribosome moves from codon to codon along the mRNA in (3' → 5').
C) Complexes composed of an amino acid linked to tRNA, sequentially bind to appropriate anticodon in mRNA by forming complementary base pair with tRNA codon.
D) A and B both

146. Termination of translation complex is done when- (**Pg. 115, E)**
A) Release factor binds with stop codon (AUG)
B) Release factor binds with UGA like codon
C) Complete translation of DNA including UTR occurs in eukaryotes
D) B and C both

6.8 Regulation of Gene Expression

147. Gene regulation is eukaryote exerted at-(**Pg. 115, E)**
   A) Formation of primary transcript
   B) Transport of mRNA from nucleus to cytoplasm
   C) A and B both
   D) Regulation of splicing of tRNA
148. β-glactosidase is used to catalyze the hydrosis of (**Pg. 116, E)**
   A) Lactose into galactose and glucose
   B) Lactose into fructose & glucose
   C) Lactose into fructose & fructose
   D) None of these
149. E.coli do not have lactose around them to utilized for energy source, they would- (**Pg. 116, E)**
   A) No longer require the synthesis of enzyme α-galactosidase
   B) Synthesized enzyme β-galactosidase
   C) Die due to lack of carbon source and energy source
   D) None of these
150. In prokaryote, predominant site for control of gene expression is-(**Pg. 116, E)**
   A) Control of rate of transcriptional initiation
   B) Control of rate of translational
   C) Control of rate of transcriptional elongation
   D) B and C both
151. Given below are statement. Choose the incorrect statement. (**Pg. 116, M)**
   A) The development and differentiation of embryo into adult organisms are result of coordinated regulation of expression of several sets of genes.
   B) Regulatory proteins act positively in activator.
   C) In a transcriptional unit the activity of RNA polymerase at a given promoter is in turn regulated by interaction with accessory protein.
   D) None of these
152. Operator- (**Pg. 116, E)**
   A) Region adjacent to sequence by which repressor mRNA formed
   B) Bind with repressor protein
   C) Bind with inducer
   D) A and B both
153. Each operon has-(**Pg. 116, E)**
   A) Same operator and same repressor
   B) Same operator but specific repressor
   C) Specific operator but same repressor
   D) Specific operator and specific repressor

6.8.1 The Lac operon

154. Lac operon was studied first by-(**Pg. 116, E)**
   A) Francois Jacob
   B) Jacque Monod
   C) Geneticist and Biochemist
   D) None of these
155. Lac operon is/are-(**Pg. 116, E)**
   A) Monocistronic structural gene is regulated by a common promoter & regulators genes.
   B) Polycistronic structural gene is regulated by a common promoter & regulatory genes.
   C) Consist of one regulatory gene, monocistronic structural gene having five gene along with promotor & operator.
   D) A and C both
156. Regulatory gene of lac-operon is- (**Pg. 116, E)**
   A) p-gene B) i-gene
   C) o-gene D) z-gene
157. i in i-gene stand for-(**Pg. 116, E)**
   A) inducer
   B) inhibitor
   C) A and B both
   D) Inactive repressor
158. Match Column-I & Column-II. (**Pg. 116, E)**

Column-I (Gene)		**Column-II (Product)**	
(a)	Z-gene	(i)	Repressor mRNA
(b)	a-gene	(ii)	β-gal
(c)	Y-gene	(iii)	Permease
(d)	i-gene	(iv)	Transacetylase

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

159. The monomeric product of lactose is chiefly hydrolyzed by-(**Pg. 116, E)**

A) i-gene B) z-gene
C) a-gene D) y-gene.

160. Lac in lac-operon is for(**Pg. 116, E)**
A) Monosaccharide
B) Disaccharide
C) Polysaccharide
D) Insect

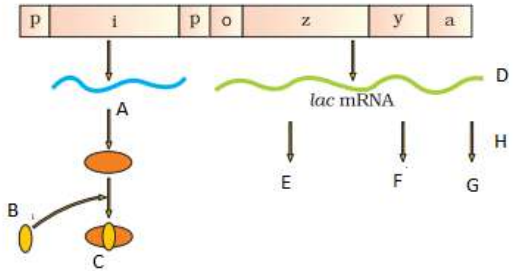
161. In absence of preferred carbon source, if lactose is provided in growth medium of bacteria, the lactose is transported into cell through by action of product formed by- (**Pg. 117, E)**
A) i-gene B) z-gene
C) a-gene D) y-gene

162. Allolactose is-(**Pg. 117, E)**
A) Inducer of lac-operon
B) Inductive repressor
C) Form of lactose that bind with product of repressor mRNA and inhibit transcription of structural gene
D) All of these

163. Lac operon is-(**Pg. 117, E)**
A) Negative regulation operon
B) Positive regulation operon
C) A and B both
D) None of these

164. Inducer of lac-operon is-(**Pg. 117, E)**
A) Glucose B) Galactose
C) Lactose D) Fructose

165. (**Pg. 117, M)**



A) The given diagram is in presence of lactose
B) The given diagram is in absence of lactose
C) The given diagram is of gene off
D) D and H is same process

6.9 6.9 Human Genome Project (HGP)

166. HGP was launched in- (**Pg. 118, E)**
A) 1980 B) 1970
C) 1990 D) 2000

167. HGP was called a- (**Pg. 118, E)**
A) Minor project
B) Hexagonal project
C) Mega project
D) None of these

168. Human genome has approx. _____ bp. (**Pg. 118, E)**
A) 3×10^9 B) 3×10^6
C) 6×10^9 D) 6×10^6

169. If cost of sequencing required is US $ 3 per bp, then total cost of sequencing human genome as per 8-3 will be: (**Pg. 118, E)**
A) US $ 18 billion
B) US $ 9 billion
C) US $ 18 million
D) US $ 9 million

Goals of HGP

170. There were approx. ____ genes in human DNA, as per the goals of HGP (**Pg. 118, E)**
A) 20,000 – 25,000
B) 40,000 – 45,000
C) 10,000 – 15,000
D) 50,000 – 60,000

171. HGP was a ____ year project (**Pg. 118, E)**
A) 15 B) 12
C) 13 D) 14

172. HGP was coordination by- (**Pg. 118, E)**
A) US department of engineering & national institute of health
B) US department of engineering and national institute of biotechnology
C) US department of energy and national institute of biotechnology
D) US department energy and National Institute of Health

173. The ____ of U.K was a major partner of HGP (**Pg. 118, E)**
A) Wellcome trust
B) Health trust
C) Social trust
D) Welcome trust

174. Project was completed in- (**Pg. 118, E)**
A) 2005 B) 2004
C) 2003 D) 2002

175. Additional contributes to HGP was- (**Pg. 118, E)**
A) Japan B) China
C) Germany D) All of these

176. Caenorhabditis elegans is a- (**Pg. 119, E)**

A) Fungi B) Nematode
C) Bacteria D) Virus

177. Caenorhabditis elegans is-(**Pg. 119, E)**
A) Free living , non-pathogenic
B) Parasitic , pathogenic
C) Free living , pathogenic
D) Parasitic , non-pathogenic

178. Methods / approaches of HGP include-(**Pg. 119, E)**
A) Excess sequence tags
B) Expressed sequence tags
C) Exercise sequence tags
D) Exerted sequence tags

179. Sequence annotations refer to- (**Pg. 119, E)**
A) Identifying all genes expressed as RNA and then sequencing then
B) Sequencing the whole set of genome and then assigning different regions with functions
C) Identifying and sequencing the genome simultaneously
D) More than one option is correct

180. For sequencing, the DNA is- (**Pg. 119, E)**
A) Partially extracted from cell
B) Totally isolated from cell
C) Not needed to isolated from cell
D) None of these

181. The DNA for sequencing is converted to fragments of small size. The fragments are made- (**Pg. 119, E)**
A) On a pre – decided basis
B) On a pre – defined basis
C) Randomly
D) Depending upon organism

182. The step in DNA sequencing after fragmentation of DNA is- (**Pg. 119, E)**
A) Cloning in host using vectors
B) Cloning in vectors using host
C) Amplification of DNA fragments
D) More than one option

183. Commonly used hosts for DNA cloning include- (**Pg. 119, E)**
A) Bacteria B) BAC
C) YAC D) Both A and C

184. BAC stands for-(**Pg. 119, E)**
A) Bacterial artificial colour
B) Binominal artificial characterization
C) Bacterial artificial chromosome
D) Bacterial articular chromosome

185. Fragments were sequenced using automated DNA sequence that worked on principle of a method developed by- (**Pg. 119, E)**
A) Erwin Chargaff
B) Marshal Nirenberg
C) Frederick Sanger
D) George Gamow

186. Method for determination of amines acid sequence in protein was developed by- (**Pg. 119, E)**
A) Erwin Chargaff
B) Marshal Nirenberg
C) Frederick Sanger
D) George Gamow

187. The last of the 24 human chromosomes to be sequenced was- (**Pg. 120, E)**
A) Chromosome 1
B) Chromosome X
C) Chromosome 22
D) Chromosome Y

6.9.1 Salient Features of Human Genome

188. According to HGP, human genome contains-
A) ~ 3000 million bp
B) ~ 6000 million bp
C) ~ 9000 million bp
D) ~ 1000 million bp

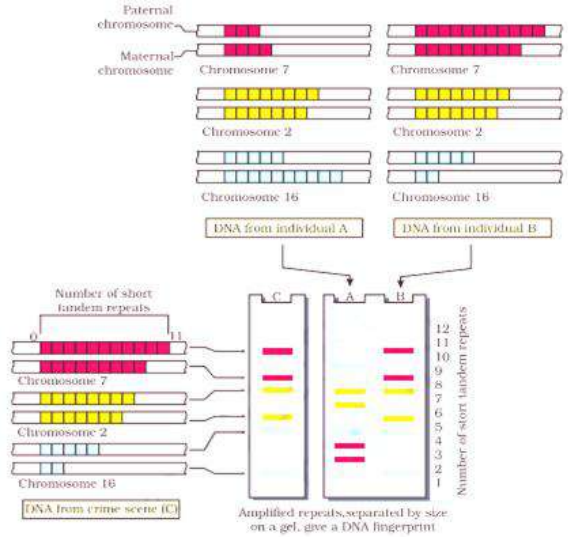
189. Dystrophin was found to be-
A) Largest known human gene with 2.4 million bases
B) Smallest known human gene with 2.4 million bases
C) Largest known human gene with 4.8 million bases
D) Smallest known human gene with 4.8 million bases

190. Which chromosome was found to have most genes- (**Pg. 120, E)**
A) Chr 22 B) Chr 1
C) Chr 5 D) Chr Y

191. Which chromosome was found to have fewest genes-(**Pg. 120, E)**
A) Chr X B) Chr Y
C) Chr 1 D) Chr 5

6.10 DNA Finger printing

192. The DNA sequence in which small stretch of DNA is repeated many times is called- (**Pg. 121, E)**
   A) SNP
   B) Repetitive DNA
   C) Polymorphic DNA
   D) More than one option
193. Satellite DNA classified into different categories like micro - satellite , mini - satellite , etc based on- (**Pg. 121, E)**
   A) Length of segment
   B) Number of repetitive
   C) Base composition
   D) All of these
194. Polymorphism arises due to-(**Pg. 121, E)**
   A) Mutation – inheritable
   B) Stability of genetic material
   C) Mutation - non-heritable
   D) All of these
195. DNA polymorphism is observed more in- (**Pg. 122, E)**
   A) non-coding DNA sequence as its mutation affects reproduction
   B) coding DNA sequence as its mutation affects reproduction
   C) non-coding DNA sequence as it mutation may not affect reproduction ability
   D) Coding DNA sequence as its mutation may not affect reproduction ability
196. Technique of DNA fingerprinting was initially developed by-(**Pg. 122, E)**
   A) James Watson B) Jansley
   C) Alec Jeffreys D) Maheshwari
197. VNTR stands for-(**Pg. 122, E)**
   A) Various number of Tendon Repeats
   B) Variable Number of Tendon Repeats
   C) Various Number of Tandem Repeats
   D) Variable Number of Tandem Repeats
198. VNTR belongs to- **Pg. 122, E)**
   A) Micro-satellite
   B) Macro-satellite
   C) Mini-satellite
   D) All of these
199. **Pg. 123, E)**



In the given figure if 'C' is the DNA collected from crime site and 'A' & 'B' are samples from suspects, than who is the criminal?

A) B B) A
C) Both A and B D) None of these

ANSWER KEY
MOLECULAR BASIS OF INHERITENCE

Q	01	02	03	04	05	06	07	08	09	10
Ans	D	C	D	A	B	B	B	D	D	A
Q	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans	A	D	C	B	B	C	C	A	C	B
Q	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans	A	C	B	C	C	B	A	B	A	D
Q	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Ans	C	A	B	A	D	D	D	C	D	C
Q	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
Ans	A	D	C	A	D	A	D	A	A	C
Q	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**
Ans	B	A	D	A	D	B	C	B	C	D
Q	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**
Ans	C	A	B	A	C	A	C	B	B	C
Q	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**
Ans	A	C	A	C	A	A	B	C	C	C
Q	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**	**89**	**90**
Ans	A	B	C	A	C	A	C	B	B	C
Q	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**	**100**
Ans	D	C	B	D	A	A	B	C	A	A
Q	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**
Ans	C	D	B	D	B	A	B	A	A	B
Q	**111**	**112**	**113**	**114**	**115**	**116**	**117**	**118**	**119**	**120**
Ans	A	A	A	A	B	B	A	B	A	A
Q	**121**	**122**	**123**	**124**	**125**	**126**	**127**	**128**	**129**	**130**
Ans	B	D	D	A	B	B	A	B	D	C
Q	**131**	**132**	**133**	**134**	**135**	**136**	**137**	**138**	**139**	**140**
Ans	A	D	C	C	D	A	A	A	B	D
B	**141**	**142**	**143**	**144**	**145**	**146**	**147**	**148**	**149**	**150**
Ans	B	A	D	D	A	B	C	A	D	A
Q	**151**	**152**	**153**	**154**	**155**	**156**	**157**	**158**	**159**	**160**
Ans	D	B	D	C	B	B	B	D	B	B
D	**161**	**162**	**163**	**164**	**165**	**166**	**167**	**168**	**169**	**170**
Ans	D	A	C	C	A	C	C	A	B	A
	171	**172**	**173**	**174**	**175**	**176**	**177**	**178**	**179**	**180**
Ans	C	D	A	C	D	B	A	B	B	B
Q	**181**	**182**	**183**	**184**	**185**	**186**	**187**	**188**	**189**	**190**
Ans	C	D	A	C	C	C	A	A	A	B
Q	**191**	**192**	**193**	**194**	**195**	**196**	**197**	**198**	**199**	
Ans	B	B	D	A	C	C	D	C	A	