



BIOLOGY

BOOKS - SANTRA BIOLOGY (BENGALI ENGLISH)

MOLECULAR BASIS OF INHERITANCE

Multiple Choice Questions

1. In polypeptide synthesis, amino acids are brought over ribosome mRNA complex by

A. rRNA

B. tRNA

C. DNA

D. Nucleotides

Answer: B



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2. tRNA attaches amino acid at its

A. 3 end

B. 5 end

C. Anticodon

D. Loop

Answer: A



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3. Blender experiment to prove DNA as genetic material was performed by

A. Hershey and Chase

B. Messelson and Stahl

C. watson and crick

D. Rosalind franklin

Answer: A



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4. Genetic information is carried out by long chain molecule made up of

A. Amino acid

B. Enzymes

C. Nucleotides

D. histone proteins

Answer: C



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5. Beadle and Tatum mutant strain of Neurospora by

A. X-rays

B. UV rays

C. Beta rays

D. Gamma rays

Answer: A



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6. A gene that takes part in the synthesis of polypeptide is

A. Structural gene

B. Regulator gene

C. Operator gene

D. Okazaki segment

Answer: A



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7. Regulated unit of genetic material is termed

as

A. Operon

B. Regulator gene

C. Operator gene

D. Okazaki segment

Answer: A



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8. Components of an operon are

A. Operator, promoter and regulator genes

B. Regulator, promoter, operator and structural genes

C. Regulator, promoter and structural genes

D. Operator, regulator and structural genes

Answer: B



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9. Part of the operon producing repressor is known as

A. Repressor gene

B. Operator gene

C. Regulator gene

D. Promoter gene

Answer: C



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10. The essential components of eukaryotic cistron are

A. Introns

B. exons

C. operon

D. Operator and regulator region

Answer: B



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11. Segments of mRNA removed during splicing are

A. Exon

B. Intros

C. Integrator regions

D. Promoter regions

Answer: B



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12. Cistron is

- A. Functional unit of DNA
- B. Functional unit of RNA
- C. Nonfunctional unit of DNA
- D. Nonfunctional unit of RNA

Answer: A



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13. Griffith effect is

A. RNA translation

B. DNA trans rription

C. Bacterial transformation

D. bacterial transduction

Answer: C



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14. Adapter molecule is

A. mRNA

B. rRNA

C. tRNA

D. DNA

Answer: C



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15. mRNA coded language is known as

A. Cryptogam

B. Cryptoanalysis

C. Cryptogram

D. Codons

Answer: C



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16. Anticodon is made of

A. Three adjacent nitrogen bases

B. Unpaired triplet of nitrogen bases at
one end of tRNA

C. unpaired triplet bases on mRNA

D. Paired triplet of nitrogen bases on tRNA

Answer: B



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17. RNA which is present in minimum amount in a cell is

A. mRNA

B. tRNA

C. rRNA

D. Both (a) and (c)

Answer: A



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18. Methionine carrying tRNA has an anticodon

A. AUG

B. UAG

C. UAA

D. UAC

Answer: D



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19. Protein can not be a genetic material because it is not

A. ubiquitous

B. Large molecule

C. Having diversity and specificity

D. Able to replicate

Answer: D



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20. Bacterium in which transformation was first studied is

A. *Salmonella typhimurium*

B. *Streptococcus pneumoniae*

C. *Escherichia coli*

D. *Streptococcus aureus*

Answer: B



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21. Experimental material used by Hershey and Chase for proving that DNA controls heredity was

A. *Diplococcus pneumoniae*

B. T2 phage

C. Salmonella typhimurium

D. TMV

Answer: B



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22. In eukaryotes mRNA is synthesised with the aid of

A. RNA polymerase III

B. RNA polymerase II

C. RNA polymerase I

D. Reverse transcriptase

Answer: B



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23. A bacterium grown over medium having radioactive ^{35}S incorporates radioactivity in

A. Carbohydrates

B. proteins

C. DNA

D. RNA

Answer: B



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24. GUG specifies amino acid valine. However, when functioning as initiation codon it specifies

A. Valine

B. Isoleucine

C. Lysine

D. methionine

Answer: D



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25. New strand formation on a DNA template can be initiated only by

A. RNA primer

B. DNA primer

C. DNA polymerase I

D. DNA polymerase

Answer: A



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26. DNA has alternate grooves

A. One major and one minor

B. Two major and one minor

C. One major and two minor

D. Two major and two minor

Answer: A



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27. Number of DNA coils of Nucleosome is

A. $2\frac{1}{4}$

B. $2\frac{3}{4}$

C. $1\frac{3}{4}$

D. 11/4

Answer: C



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28. what is true about Ori?

A. One in all organisms

B. Several in all organism

C. One in eukaryotes and deveral in
prokaryotes

D. One in prokaryotes of amino acids during protein

Answer: D



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29. Energy for activation of amino acids during protein synthesis comes from

A. GTP

B. ATP

C. CTP

D. UTP

Answer: B



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30. Central domain is not directly connected with synthesis of

A. Polypeptide

B. mRNA

C. Amino acids

D. Both (a) and (b)

Answer: C



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31. AUG initiation codon occurs over

A. 5'end of mRNA

B. 3' end of mRNA

C. Long arm of tRNA

D. short arm of tRNA

Answer: A



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32. In sterptococcu pneumoniae

A. virulent form is rough

B. virulent form is smooth

C. Nanvirulent form is capsulated

D. All forms are rough

Answer: B



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33. A codon is read in

- A. 5' \rightarrow 3' direction
- B. 3' \rightarrow 5' direction
- C. 6' \rightarrow 3' direction
- D. 3' \rightarrow 6' direction

Answer: A



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34. Enzyme required during DNA replication is

- A. DNA ligase
- B. DNA polymerase
- C. Sigma factor
- D. Both a and b

Answer: D



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35. Codon is triplet of

A. mRNA

B. tRNA

C. Template strand of DNA

D. Non -template strand of DNA

Answer: D



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36. First triplet codon to be deciphered was

A. AAA

B. UUU

C. CCC

D. CTA

Answer: B



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37. Finger printing was first used in

A. Germany

B. USA

C. India

D. England

Answer: D



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38. Number of base pairs present in minisatellite sequence is

A. 11-60

B. 1-6

C. 400-1000

D. 100-300

Answer: A



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39. For DNA fingerprinting , DNA is obtained from

- A. Hair root cells
- B. White blood corpuscles
- C. Body secretions
- D. All the above

Answer: D



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40. Father of DNA fingerprinting is

A. Sundar Lal Bahugana

B. jeffreys

C. Vishwanath

D. Rockfella

Answer: B



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41. DNA finger printing can resolve

- A. Meternity dispute
- B. Paternity dispute
- C. Indentification of a person
- D. All the above

Answer: D



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42. The scientists involved in discovery of DNA as chemical basis of heredity were

A. Watson and Crick

B. Griffith and Avery

C. Harshey and Chase

D. Avery, MacLeod and McCarty

Answer: D



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43. The process of multiplication of DNA from DNA is known as

- A. Duplication
- B. Transcription
- C. Replication
- D. Translation

Answer: D



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44. Number of codons in the genetic triplet code is as

A. 4

B. 32

C. 16

D. 64

Answer: C



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45. DNA strand is synthesised in the direction

A. 5' → 3'

B. 3' → 5'

C. 6' → 1'

D. 1' → 4'

Answer: A



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46. Okazaki fragments give rise to

A. Master strand

B. Lagging strand

C. Sense strand

D. Leading strand

Answer: B



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47. The area of unwinding and separation of DNA strands during replication is called

A. Intiation point

B. Origin

C. Replication fork

D. Primer

Answer: B



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48. Leading strand during DNA replication is formed

- A. In short segment
- B. Continuously
- C. First
- D. Ahead of replication

Answer: B



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49. Topoisomerase is involved in

- A. Joining of DNA segment

B. Producing RNA primer

C. Producing nick in DNA

D. Separation of DNA strands

Answer: C



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50. One turn of DNA possesses

A. One base pair

B. Two base pairs

C. Four base pairs

D. Ten base pairs

Answer: D



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51. Nucleic acids are found in

A. Cytoplasm

B. Nucleus

C. Nucleus and ribosome

D. Both (a) and (b)

Answer: D



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52. nucleic acids/chromosomes absorb UV light of

A. 260nm

B. 1600A

C. 3600 A

D. 2600 mu

Answer: A



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53. DNA absorbs

A. 7600 A (760nm)

B. 2600 A (260 nm)

C. 3000 A (760 nm)

D. 3900 A (390 nm)

Answer: B



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54. The contribution of cytoplasmic DNA is cells's total DNA is

A. 1-5%

B. 10-12%

C. 5-10%

D. 0.65%

Answer: A



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55. On cooling the two separated strands of DNA again recoil. It is called

- A. annealing
- B. renaturation
- C. palindrome
- D. Both (a) and (b)

Answer: D



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56. How many nucleotides are found in one spiral of B-DNA?

A. 25

B. 20

C. 10

D. 5

Answer: B



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57. How many spirals (Twins or helices) of DNA of 2000 base pairs will have

A. 45.5

B. 200

C. 4000

D. 2000

Answer: B



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58. Which one of the following elements is not present in nitrogenous base?

A. C

B. P

C. H

D. N

Answer: B



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59. A nucleotide important in transfer of energy is

A. GDP

B. AMP

C. ATP

D. ADP

Answer: C



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60. which one is a nucleotide

A. Glutamic acid

B. Cytosine

C. Thymidine

D. uridylic acid

Answer: D



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61. RBC cannot divide because

- A. They lack enzymes
- B. They lack mitochondria and nucleus
- C. They do not have any type of nucleic acid
- D. none of the above

Answer: C



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62. Nitrogenous base absent in DNA is

A. U

B. T

C. C

D. A

Answer: A



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63. The DNA genetic information is carried by

A. Sugar

B. Bases

C. Phosphoric acid

D. All of them

Answer: B



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64. DNA replicates during

A. G2 phase

B. S phase

C. prophase

D. G1 phase

Answer: B



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65. Ratio of DNA: RNA in prokaryotes is 1:2
what is this ratio in eukaryotes?

A. 2:1

B. 1:1

C. 1: 2

D. not fixed

Answer: B



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66. Which of the following is the odd one out in RNA?

A. Guanine

B. Thymine

C. Adenine

D. none of these

Answer: B



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67. In the sperm instead of histone the basic protein is

A. albumin

B. nuclein

C. protamines

D. none of these

Answer: C



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68. Gene is a

- A. Piece of DNA
- B. Piece of chromosome
- C. Linkage group
- D. sequence of amino acid

Answer: A



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69. similarity of RNA and DNA is that both

- A. have similar pyrimidines
- B. are polymers of nucleotides
- C. have similar sugar
- D. are double

Answer: B



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70. DNA can be tested by

- A. Iodine

B. Molish test

C. fuelgen reaction

D. Millons reagent

Answer: C



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71. In which year it was proved that DNA is the genetic material

A. 1950

B. 1944

C. 1928

D. 1945

Answer: B



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72. The distance between 2 strands of DNA is

A. 34Å

B. 19.8Å

C. 10A

D. 3.4A

Answer: B



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73. Which is odd among the following in terms of $\{A\}/\{T\}$ and $\{G\}/\{C\}$ in DNA is equal .

A. Polio virus

B. TMV

C. coliphage o x 174

D. All of these

Answer: B



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74. Viruses with double stranded (ds) RNA are called

A. Prophase

B. Retroviruses

C. Riboviruses

D. Revoviruses

Answer: D



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75. The DNA in o x 174 coliphage is single stranded and called

A. = strand

B. +ve strand

C. -ve strand

D. None of this

Answer: B



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76. In 'Z' DNA pitch of each turn of helix is

A. 46A

B. 250 nm

C. 340 nm

D. 34A

Answer: A



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77. The biochemical nature of gene (DNA) was shown by

A. Taylor

B. harshey and Chase

C. Avery et al

D. Griffith

Answer: C



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78. The helical model for DNA given by Watson and crick was

- A. Z type right handed
- B. B type left handed
- C. Z type left handed

D. B type right handed

Answer: D



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79. Diameter and pitch per turn of helix of 'A' model of DNA is

A. 19A and 20A

B. 18A and 46A

C. 20A and 34A

D. 23A and 25A

Answer: D



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80. which one is correct for RNA?

A. $[A] = [G]$

B. $[A] = [U]$

C. $[G] = [U]$

D. $[A] = [T]$

Answer: B



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81. Error in base pairing during replication are corrected by

A. DNA polymerase

B. Primase

C. DNA ligase

D. Topoisomerases

Answer: A



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82. The wobble effect is the

A. Undulating movement of mRNA

B. instability of pairing when a purine pairs
with another purine

C. Instability of the DNA molecule when
unwound

D. Lack of precision with regard to the third
base of anticodon and condon

Answer: D



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83. Genetic drift is a random change in

A. gene recombination

B. recessive alleles

C. Gene frequency from one generation to another

D. All of these

Answer: D



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84. How many codons in mRNA are required to code 1000 amino acids?

A. $3000 + 1 + 1$

B. $1000+1$

C. 1000

D. $1000+1+1$

Answer: D



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85. which is recognition site of tRNA ?

A. 3'-- OH end

B. loop IV

C. loop I

D. Anticodon

Answer: D



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86. tRNA attached to mRNA by its

A. IV loop

B. III loop

C. II loop

D. I loop

Answer: C



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87. In prokaryotes, first amino acid taking part in protein synthesis is

A. f met

B. val

C. met

D. None of these

Answer: A



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88. The initiation, elongation and termination of protein synthesis require energy that comes from

A. TTP

B. UTP

C. GTP

D. ATP

Answer: C



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89. The element required for the activation of DNA as well as RNA polymerase is

A. Ca^{++}

B. Mg^{++}

C. Cu^{++}

D. K^+

Answer: B



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90. Genetic code determines

A. Constancy of traits

B. variation on offsprings

C. Sequence of amino acids in a protein

D. Stuctural pattern

Answer: C



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91. Translocation involves

A. Freeing of A-site tRNA

B. freeing of P-site tRNA to A-site

C. Pulling of P-site tRNA to A-site

D. Pulling of A-site tRNA to P-site

Answer: D



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92. Which one of the following has minimum life span

A. DNA

B. tRNA

C. rRNA

D. mRNA

Answer: D



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93. Which one of the following is the main site of DNA coding for ribosomal RNA?

A. Nucleolus

B. Basic and acidic protein

C. Euchromatin

D. heterochromatin

Answer: A



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94. The transfer of genetic material from one bacterial cell to another bacterial cell with the help of a bacteriophage was discovered by Lederberg and Zinder. It is known as

A. Genetic transfer

B. Transduction

C. Transformation

D. Mutation

Answer: B



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95. Lac operon is

- A. Controlled by regulator gene
- B. Inducible system
- C. Five structural genes control it
- D. Repressible system

Answer: A



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96. Best method to determine parternity is

- A. DNA figerprinting
- B. Gene counting
- C. Chromosome counting
- D. Protein analysis

Answer: A



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97. Intrinsic flow of information means

- A. Transcription
- B. Translation
- C. None of these
- D. Both of these

Answer: D



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98. Primase is involved in

- A. DNA replication
- B. RNA synthesis
- C. Protein synthesis
- D. DNA synthesis

Answer: B



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99. Thermal cycler is used in

A. Enzymal catalysed reactions

B. PCR

C. Chemical reaction

D. redioactivation

Answer: B



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100. VNTR is remployed for

- A. Enhancing photosynthetic genes
- B. Regulation of hormones
- C. DNA fingerprinting
- D. Protoplast culture

Answer: C



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Choose More Than One Correct Answers

1. Which of the following are stop codons?

A. UAG

B. UAA

C. AUG

D. UGA

Answer: A::B::D



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2. Which of the following are components of DNA

A. Nucleic acid

B. base

C. proteins

D. Ca^{2+}

Answer: A::B



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3. What are the levels of organisation of DNA?

A. Chromosome

B. chromatin

C. Histone

D. Nulceosome

Answer: A::B::D



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4. What are the levels of organisation of DNA?

A. A

B. B

C. Z

D. N

Answer: B::C



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5. Which of these are not pyrimidine bases?

A. Cytosine

B. Guanine

C. Adenine

D. Thymine

Answer: B::C



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6. Which of these are histone proteins forming nucleosome?

A. H3

B. H4

C. H1

D. H2

Answer: A::B::C



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7. Which of the following are ribonucleotides?

A. ATP

B. UTP

C. GTP

D. TTP

Answer: A::B::C



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8. RNA polymerase is produces the following

A. mRNA

B. tRNA

C. 55S rRNA

D. 28S rRNA

Answer: C::D



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9. Which of the following are produced by lac operon ?

A. Lac permease

B. #REF!

C. Transacetylase

D. lactase

Answer: A::B::C



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10. DNA fingerprinting is done for

A. identifying any culprit for murder or rape

B. identifying paternity

C. identifying disease incidences

D. identifying blood groups

Answer: A::B



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iii Fill In The Blanks

1. Nuclein was discovered by _____ in 1869.



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Fill In The Blanks

1. ____ and ____ showed the structure of DNA.



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2. In 1928, ___ carried out experiments on transformation .



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3. Blenders experiment was done by ____



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4. Chargeff's rule states that ____ = ____



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5. DNA can form its own copy throug ____



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6. Secondary structure of _____ is called clover leaf Model.



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7. The active protein coding regions of DNA are _____



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8. Scherrer and Darmell detected the presence of _____



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9. RNA acting as enzymes are called _____



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Mention True Of False

1. Levene deciphered the structure of nucleic acid.



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2. Wastson and Crick gave the double helix structure of DNA in 1969.



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3. Harshey and Chase did experiments on transduction.



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4. Other than nucleus organelles like mitochondria and chloroplast also contain DNA



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5. Guanine is a pyrimidine.



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6. Thymine with phosphoric acid is called thymidine.



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7. The dimension of one turn of DNA helix is
3.4A



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8. Wobble hypothesis is associated with anticodon position of tRNA



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9. Solenoid structure forms 30 nm fibre.



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10. Replication of DNA is unidirectional.



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Very Short Answer Type Questions

1. Who first isolated nucleus in 1869?



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2. Who discovered the three parts of nucleic acid ?



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3. Who first unravelled the structure of DNA?



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4. Who proved first the phenomenon of transformation experimentally?



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5. What were the two radioactive elements used by Harshey and Chase?



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6. Who developed a technique to stain the DNA present in cell?



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7. What is the chemical name of uracil?



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8. What is the dimension of one complete helix turn of DNA double helix?



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9. who discovered the presence of mRNA?



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10. What is the structure of tRNA known as?



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11. What is the process known as by which introns are excised out from hnRNA?



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12. What is the packing ratio of DNA molecule at the nucleosome stage?



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13. How many nucleotide pairs does a nucleosome compose of?



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14. Which stage of DNA packing does have the packaging ratio 1:40?



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15. Who proved the semi conservative nature of DNA replication?



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16. Which enzyme unwinds the DNA helix ?



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17. Who proposed the central dogma?



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18. What is the process of formation RNA from DNA known as ?



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19. Which subunit of RNA polymerase of E. coli binds with the template?



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20. Which RNA polymerase enzyme of eukaryotes does synthesize mRNA?



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21. Name a retrovirus.



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22. In which direction is a codon read in mRNA?



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23. What is the initiation codon in translation and what is the amino acid it codes for ?



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24. Which enzyme catalyses the formation of peptide bond?



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25. Which antibiotic inhibits translation in bacteria by chain termination?



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26. which is the induce molecule of lac operon?



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27. Which is the first eukaryotic organisms whose genome has been sequenced?



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28. How many genes does the human genome have approximately?



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29. what is the full form of VNTR?



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30. Who discovered the technique of DNA fingerprinting?



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Short Answer Type Questions

1. What is nuclein?



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2. What according to Mirsky and Ris, constituted the major fraction of chromosomes?





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3. Define transformation?



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4. what was the principle which was the basis of Harshey and chase's experiment?



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5. What are the two types of nitrogenous bases found in DNA? Name them.



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6. What is Chargaff's rule?



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7. What is the main difference between eukaryotic and prokaryotic mRNA?



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8. What are the different types of rRNA found in prokaryotes?



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9. What are the types of rRNA found in eukaryotes?



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10. What are different histone proteins found associated with DNA forming nucleosome?



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11. What is spliceosome?



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12. What are introns and exons?



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13. What are Okazaki fragments?



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14. What is the rate of replication in E.coli and human?



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15. what is pribnow box?





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16. what is a retrovirus? Give example?



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17. What causes sickle cell anaemia?



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18. what do you mean by activation of tRNA?





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19. Where is the lactose operon present in E.coli genome?



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20. Define human genome project.



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