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NET JRF TEST 6

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TEST-6

Nucleic Acid Structure, Genetic code, DNA Repair, DNA replication, Transcription, Translation.

1. The universality of the code was demonstrated for the first time by
 - (a) Sidney Brenner
 - (b) Marshall, Caskey and Nirenberg
 - (c) Sanger et. al
 - (d) M. Nirenberg and S. Ochoa
 - (e) None of the above

2. Rho protein discovered by J. Roberts plays an important role in
 - (a) Elongation
 - (b) Initiation
 - (c) Termination
 - (d) Post transcriptional modification
 - (e) Both 1 and 2

3. One of the following transcriptional factors has the ability to bind to the promoter sequences
 - (a) TF II E
 - (b) TF II A
 - (c) TF II D
 - (d) TF II F
 - (e) TF II B

4. The ATP engine among the initiating factors of eukaryote translation is
 - (a) IF2
 - (b) IF1
 - (c) IF3
 - (d) IF4
 - (e) IF5

5. The initiation factor IF3
 - (a) Helps in the activating the other initiating factors
 - (b) Helps the detachment of 30s and 50s subunits
 - (c) Prevents the reunion of 30s and 50s subunits
 - (d) Brings the f-met tRNA to the P site
 - (e) None of the above

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6. The peptide bond formation between the f-met and consecutive amino acid in the P-site is brought about by

- (a) Translocation
- (b) Transacylation
- (c) Transduction
- (d) Transpeptidylation
- (e) Transfection

7. The nucleotides can also be known as _____ of nucleosides

- (a) Disulphide esters
- (b) Glycosidic esters
- (c) Phosphate esters
- (d) Both 1 and 2
- (e) All the above

8. The chemical nature of Nucleobases is

- (a) Heterocyclic aliphatic inorganic compounds
- (b) Heterocyclic aromatic inorganic compounds
- (c) Heterocyclic aliphatic organic compounds
- (d) Heterocyclic aromatic organic compounds
- (e) None of the above

9. The presence of _____ enables the eukaryotic mRNA to be purified away from rRNA and tRNA by a affinity chromatography.

- (a) Poly A tail
- (b) Cap
- (c) Introns
- (d) Exons
- (e) None

10. DNA is single stranded in

- (a) Prokaryotes
- (b) Eukaryotes
- (c) Viruses
- (d) Phi x? 174
- (e) Chloroplast

11. One of the following is not a din (damage inducible) genes, identify

- (a) uvr B
- (b) uvr A
- (c) uvr C

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- (d) hin A
- (e) rec A

12. The RPB I & II subunits of RNA polymerase enzyme have YSPTSPS consensus amino acid sequence at the

- (a) Amino terminal domain
- (b) Carboxyl terminal domain
- (c) Intermediate domain
- (d) Both 1 and 3
- (e) Both 2 and 3

13. The single stranded region of DNA is used as a template for replacing DNA by DNA polymerase I in this step of excision repair.

- (a) Excision step
- (b) Incision step
- (c) Synthesis step
- (d) Deamination
- (e) None of the above

14. Each turn of the Z-DNA double stranded polypeptide chains consists of how many base pairs approximately

- (a) 10 base pairs
- (b) 3.4 base pairs
- (c) 11 base pairs
- (d) 12 base pairs
- (e) 14 base pairs

15. The shape of the tertiary structure of t RNA is-

- (a) Clover leaf shape
- (b) L shape
- (c) Psi shape
- (d) Given by Robert Holly
- (e) T shape

16. Who discovered the enzyme known as RNA dependant DNA polymerase?

- (a) Temin and Baltimore
- (b) Jacob and Monad
- (c) Watson and Crick
- (d) Sutton and Boveri
- (e) Hugo de vries

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17. The distance between the axis of the DNA to the sugar phosphate would be about
- (a) 9 Angstroms
 - (b) 3.4 Angstroms
 - (c) 10 Angstroms
 - (d) 20 Angstroms
 - (e) 34 Angstroms
18. The gaps created due to the RNA primers on the lagging strand is filled by
- (a) DNA polymerase II
 - (b) DNA polymerase III
 - (c) DNA polymerase I
 - (d) DNA Ligase
 - (e) DNA Primase
19. What are the isotopes used by Mathew Messelson and Franklin W. Stall to isotopically label DNA in order to prove the semi conservative mode of replication in the DNA
- (a) P35 and P34
 - (b) N15 and N14
 - (c) P32 and P35
 - (d) S35 and P32
 - (e) N15 and P32
20. The tetraplet codons of the eukaryote sequences are recognized by
- (a) Initiating factor 8
 - (b) Initiating factor 2
 - (c) e EF gamma
 - (d) e RF I
 - (e) None of the above
21. RNA polymerase II enzyme of the eukaryote transcription synthesizes the
- (a) Hn RNA and 18s RNA
 - (b) t RNA and 5s rRNA
 - (c) 18s RNA and 5s rRNA
 - (d) Hn RNA
 - (e) 28s rRNA
22. Okazaki segments are
- (a) Small peptides
 - (b) Small segments of RNA
 - (c) Small DNA segments

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- (d) Small DNA segments formed over DNA template running in 3' to 5' direction
- (e) None of the above

23. Identify the amino acids that are coded exclusively by single codon.

- (a) Ocher and Amber
- (b) Tyroisne and Lysine
- (c) Tryptophan and Cysteine
- (d) Methionine and Tryptophan
- (e) Methionine and Opal

24. The correction of the DNA damage by reversing of the situation by photoreactivation is known by

- (a) Direct repair
- (b) Excision repair
- (c) Mismatch repair
- (d) SoS repair
- (e) All the above

25. One of the following properties of genetic code cannot be included in the properties suggested by George Gamow who propose diamond code and triangle code

- (a) Degeneracy
- (b) Triplet codon
- (c) Colinearity
- (d) Universality
- (e) Non-overlapping

26. The tRNA attached to the amino acid in the A site of ribosomes after the action of tRNA deacylase on the P site is know as

- (a) Dipeptidyl tRNA
- (b) Amino acyl tRNA
- (c) Peptidyl tRNA
- (d) Formyl methionine tRNA
- (e) None of the above

27. The conserved sequences present at the intron - exon extreme ends are

- (a) AG and CG
- (b) AU and GA
- (c) AU and GU
- (d) GC and AU
- (e) GU and AG

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28. Nucleic acids were discovered in 1868 by

- (a) Robert W. Holley
- (b) Severo Ochoa
- (c) Friedrich Miescher
- (d) Felice Fontana
- (e) Waldeyer

29. Who successfully used the homopolymer (Poly U as their synthetic mRNA) technique for codon assignment for the first time

- (a) M. Nirenberg and H. Matthaei
- (b) M.G. Manago and S. Ochoa
- (c) Sarabhai et. al
- (d) M. Nirenberg and S. Ochoa
- (e) Watson and Crick

30. The anti Shine-Dalgarno sequence which is present on _____ helps in bind of mRNA

- (a) 18s rRNA of 40s subunit
- (b) 16s rRNA of 30s subunit
- (c) 5s rRNA of 50s subunit
- (d) 23s rRNA of 50s subunit
- (e) 28s rRNA of 60s subunit

31. The T - Antigen of eukaryotes

- (a) synthesizes okazaki fragments continuously on the lagging strand
- (b) help in replacing or switching the DNA polymerases
- (c) binds at site I and causes split in the site II in the presence of ATP
- (d) is thought to be involved in the elongation process
- (e) helps the beta subunit to be loaded and which captures the core enzyme

32. The triplet codon refers to the sequence of three bases present on

- (a) tRNA
- (b) mRNA
- (c) rRNA
- (d) ssDNA
- (e) Hn RNA

33. The methylase gene that brings about the methylation in adenine of sequence GATC is coded by

- (a) Dam genes
- (b) Mut genes

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- (c) Lex A gene
- (d) Rec A gene
- (e) Repressor genes

34. The genetic code has degenerate nature. Some amino acids are coded by more than four codons, identify such codons from the following

- (a) Glycine
- (b) Alanine
- (c) Threonine
- (d) Valine
- (e) Leucine

35. Sir Arthur Kornberg discovered _____ and isolated this enzyme in 1960? S and suggested that it is involved in DNA replication

- (a) DNA polymerase II
- (b) DNA polymerase I
- (c) DNA polymerase III
- (d) DNA - C protein or helicase
- (e) Primase

36. One of the following is not a cause of the structural distortions type of DNA damage

- (a) Removal of base
- (b) Single strand nick
- (c) Introduction of covalent link between the bases of same strand
- (d) Formation of thiamine dimer
- (e) Modification or conversion of one base to another

37. DNA polymerase I is also known as

- (a) Khorenbergs enzyme
- (b) Proof reading enzyme
- (c) High processivity enzyme
- (d) Both 1 and 2
- (e) All the above

38. Termination of polypeptide chain is brought about by

- (a) UUG, UGC and UCA
- (b) UUG, UAG and UCG
- (c) UAA, UAG and UGA
- (d) UCG, GCG and ACC
- (e) UAA, UAG and UCA

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39. The transcription process is coupled with protein synthesis in

- (a) Eukaryotes
- (b) Prokaryotes
- (c) Viruses
- (d) Bacteriophages
- (e) Only in certain eukaryotes

40. The increased capacity to repair damaged DNA is brought about by

- (a) SOS response
- (b) Excision repair
- (c) VSP system
- (d) Methylation
- (e) Endonucleases

41. One of the following genetic diseases in humans is moderately hypersensitive to the DNA damage by DNA cross linking agents

- (a) Xeroderma pigmentosum
- (b) Fanconi anaemia
- (c) Ataxia telangiectasia
- (d) Bloom's syndrome
- (e) None

42. In the ribosomal RNA which is not formed coordinately with the other molecules formed within the ribosome is

- (a) 28s
- (b) 8 s
- (c) 5.8s
- (d) 5s
- (e) 16s

43. In the following repair mechanisms removal of thymine dimers using FADH is done in

- (a) Nucleotide excision repair
- (b) Base excision repair
- (c) Direct repair
- (d) Sos repair
- (e) Mismatch repair

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44. 5' to 3' exonuclease activity of the DNA polymerase enzyme

- (a) Removes a stretch of damaged strand of 20 nucleotides
- (b) Is also known as klenow fragment
- (c) Removes primers on the lagging strand
- (d) Both 1 and 2
- (e) All the above

45. DNA is not in a circular shape in

- (a) Prokaryotes
- (b) Eukaryotes
- (c) Chloroplast
- (d) Mitochondria
- (e) All the above

46. The enzyme necessary for the transcription is

- (a) Endonucleases
- (b) RNAase
- (c) Exonucleases
- (d) RNA polymerase
- (e) DNA polymerase

47. Who proposed the wobble hypothesis?

- (a) W. Astbury
- (b) Robert Holly
- (c) Nirenberg
- (d) Crick
- (e) Beadle and Tatum

48. Nobel Prize was awarded to _____ for demonstrating the presence of 2 pyrimidines (cytosine and thiamine) and two purines in nucleic acids.

- (a) Watson and crick
- (b) Kossel
- (c) McLeod and McCarty
- (d) Altman
- (e) F. Meischer

49. Which of the following is not involved in protein synthesis?

- (a) Termination
- (b) Polymerization
- (c) Transcription

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- (d) Elongation
- (e) Initiation

50. Purine biosynthesis is inhibited by

- (a) Methotrxate
- (b) Amino pterin
- (c) Cycloheximide
- (d) Chloramphenicol
- (e) Both 1 and 2

51. Following are the factors that are used in the mismatch repair and identify which is not one of them

- (a) Mut L
- (b) Mut S
- (c) Mut M
- (d) Mut H
- (e) Mut U

52. The first amino acid that is attached to initiate a protein formation in eukaryotes is

- (a) Methionine
- (b) Formyl methionine
- (c) Phenyl alanine
- (d) Both 1 and 2
- (e) all the above

53. The protein Mut H of the VSP system

- (a) Helps in binding of Mut S protein on the mismatch site
- (b) Cleaves the newly synthesized strand
- (c) Helps in unwinding the strands
- (d) Allows recognition of the mismatch site by Mut L
- (e) None of the above

54. Which process in protein synthesis requires hydrolysis of GTP?

- (a) Translocation
- (b) Formation of 70s initiation complex
- (c) Termination
- (d) Transacylation
- (e) Both 1 and 2

55. The sequence of t-RNA was first given by Robert Holly in

- (a) t-RNA phenylalanine

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- (b) t-RNA methionine
- (c) t-RNA isoleucine
- (d) t-RNA tryptophan
- (e) t-RNA valine

56. Addition of an irrelevant base instead of a normal base is called

- (a) Mismatching
- (b) Base modification
- (c) Dimer formation
- (d) Base excision
- (e) None of the above

57. Replication of DNA occurs only at the time of cell division during

- (a) Prophase
- (b) Metaphase
- (c) Telophase
- (d) Anaphase
- (e) Interphase

58. In the transcription bubble one of the strands of DNA is exactly similar to RNA except for the substitution of U in place of T. such strand is called as

- (a) Coding strand
- (b) Sense strand
- (c) Non coding strand
- (d) Non sense strand
- (e) Both 1 and 2

59. RF? A or replication factor A of eukaryotic replication similar to _____ of prokaryotic replication

- (a) DNA - B protein
- (b) DNA - A protein
- (c) DNA - C protein
- (d) Primase
- (e) SSBPs

60. After the binding of the sigma subunit to the promoter sequences it splits and opens the DNA in eukaryotes at the

- (a) Hogness box
- (b) Pribnow box
- (c) mRNA start site
- (d) Coding region

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(e) None of the above

61. The excision of damaged strand in 5' to 3' direction by Kornberg's enzyme is carried out by removing

- (a) Each nucleotide in the region of damage
- (b) A stretch of damaged strand of 20 nucleotides
- (c) Removing each nucleotide and replacing them
- (d) Randomly excising the nucleotides until all the damaged parts are repaired
- (e) All the above

62. With the progress of transcription the synthesized mRNA is detached regularly after _____ but not completely removed.

- (a) 10 base pairs
- (b) 8 base pairs
- (c) 12 base pairs
- (d) 24 base pairs
- (e) 56 base pairs

63. The sliding of the mRNA on the 30S subunit of ribosomes by translocation is done to bring about

- (a) Releasing of dipeptidyl tRNA from P site
- (b) Releasing of dipeptidyl tRNA from A site
- (c) Peptide bond formation between A and P site
- (d) Dipeptidyl tRNA from A site to P site
- (e) Dipeptidyl tRNA from P site to A site

64. Charging is the process by which a tRNA molecule is loaded with an amino acid, which involves two steps. They are

- (a) Peptidylation and aminoacylation
- (b) Phosphorylation and adenylation
- (c) Aminoacylation and methylation
- (d) Phosphorylation and Peptidylation
- (e) Adenylation and aminoacylation

65. Hypoxanthine is a mutant form of

- (a) Guanine
- (b) Adenine
- (c) Tyrosine
- (d) Cytosine
- (e) Uracil

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66. The life span of mRNA in prokaryotes is about

- (a) 1 to 2 hours
- (b) At most 1 hour
- (c) 2 to 3 hours
- (d) Not more than half an hour
- (e) None of the above

67. Two of the enzymes in replication work bound closely together through out the reaction since it initiates working.

- (a) Beta subunit and DNA polymerase
- (b) Helicase and primase
- (c) DNA ligase and DNA polymerase
- (d) Primase and DNA polymerase
- (e) Helicase and DNA polymerase

68. Identify one of the following which is NOT a subunit of DNA polymerase III enzyme

- (a) Epsilon
- (b) Alpha
- (c) Theta
- (d) Rho
- (e) Beta

69. Considering the following sequence as m-RNA, suppose a mutation occurs in the template DNA which results in a change codon 55 to UAA. What type of mutation is that?

- (a) Silent
- (b) Missense
- (c) Nonsense
- (d) Suppressor
- (e) Frameshift

70. Evidence for semi conservative mode of replication of chromosomes in eukaryotes is provided by

- (a) Mathew Messelson and Franklin W. Stall
- (b) Avery, McLeod and McCarty
- (c) Hershey and Chase
- (d) J.H. Taylor and P. Woods
- (e) Paul de Lucia and John Cairns

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71. Transcription is a process of
DNA dependant DNA synthesis
RNA dependant DNA synthesis
DNA dependant RNA synthesis
RNA dependant RNA synthesis
RNA dependant protein synthesis

72. The Shine-Dalgarno sequence is
(a) Present in prokaryotic mRNA
(b) A purine-rich upstream sequence
(c) A consensus sequence
(d) None of the above
(e) All the above

73. An irreversible state of dormancy of a cell is known as
(a) Apoptosis
(b) Senescence
(c) Tumor formation
(d) Programmed cell death
(e) Deformed

74. The core enzyme of DNA polymerase III is a complex of
(a) Alpha, Epsilon, Theta
(b) Alpha, Beta, Delta
(c) Alpha, Epsilon, Delta
(d) Alpha, Epsilon, tau
(e) Alpha, Beta, Gama

75. The sigma subunit of RNA polymerase enzyme helps in
(a) Binding to DNA template
(b) Binding to regulatory sequences
(c) Binding to promoter sequences
(d) Forming phosphodiester bonds
(e) Elongation process

76. One of the following is not a base concerned with DNA, Identify
(a) Uracil
(b) Thiamine
(c) Cytosine
(d) Guanine
(e) Adenine

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77. The information transfer from DNA to RNA is a process known by the name
- (a) Transcription
 - (b) Replication
 - (c) Translation
 - (d) Reverse transcription
 - (e) Reverse genetics
78. The DNA - A proteins recognizes the ori ?C? site in prokaryotes and
- (a) Binds at the 3 repeats of 9 base pair inverted repeat sequence regions and split opens the double stranded DNA at the 4 repeats of 13 base pairs sequence.
 - (b) Binds at the 4 repeats of 9 base pair inverted repeat sequence regions and split opens the double stranded DNA at the 3 repeats of 13 base pairs sequence.
 - (c) Binds at the 4 repeats of 13 base pair inverted repeat sequence regions and split opens the double stranded DNA at the 3 repeats of 9 base pairs sequence.
 - (d) Binds at the 3 repeats of 13 base pair inverted repeat sequence regions and split opens the double stranded DNA at the 4 repeats of 9 base pairs sequence.
 - (e) Binds at the 3 repeats of 4 base pair inverted repeat sequence regions and split opens the double stranded DNA at the 9 repeats of 13 base pairs sequence.
79. In eukaryote replication the mismatches are removed by the _____ just like in prokaryotes.
- (a) DNA polymerase rho
 - (b) DNA polymerase alpha
 - (c) DNA polymerase gamma
 - (d) DNA polymerase epsilon
 - (e) DNA polymerase beta
80. _____ enzyme helps in binding of amino acid to the tRNA at free 3' OH group.
- (a) Peptidyl transferase
 - (b) tRNA deacylase
 - (c) Dipeptidyl tRNA
 - (d) tRNA synthase
 - (e) Phosphate kinase
81. This hypothesis states that during replication both the strands of the DNA remains with the parent cell and the newly synthesized two strands of DNA is retained by the daughter cell.
- (a) Conservative mode
 - (b) Dispersive mode
 - (c) Semi conservative mode

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- (d) Stringent mode
- (e) Bidirectional mode

82. The minimum number of t-RNA available for each of the total amino acids present in the proteins

- (a) two
- (b) one
- (c) three
- (d) one to three
- (e) four

83. The transcription process which is also required for the genome of mitochondria and chloroplast make use of _____

- (a) RNA polymerase II
- (b) RNA polymerase I
- (c) RNA polymerase III
- (d) Own transcription factors
- (e) Not listed above

84. The distance between the two polypeptide strands of a DNA is

- (a) 3.4 angstroms
- (b) 0.34 angstroms
- (c) 10 angstroms
- (d) 20 angstroms
- (e) 24 angstroms

85. The nucleotides of a polypeptide chain are linked by

- (a) Phosphodiester bonds
- (b) Beta (n) glycosidic bonds
- (c) Alpha (n) glycosidic bonds
- (d) Hydrogen bonds
- (e) Disulphide bonds

86. Fusidic acid inhibits the _____ during the translation

- (a) Translocation
- (b) Peptidyl transferase
- (c) f-met tRNA
- (d) Amino acyl tRNA
- (e) Elongation factors

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87. For the synthesis of lagging strand, the _____ has to work on the same strand to which DNA B helicase is bound.

- (a) DNA polymerase II
- (b) DNA polymerase I
- (c) DNA polymerase III
- (d) DNA polymerase alpha
- (e) DNA polymerase rho

88. Synthesis of a DNA polypeptide chain on DNA template polypeptide chain is called

- (a) Translation
- (b) Replication
- (c) Transcription
- (d) Transduction
- (e) Both 1 and 2

89. During transcription mRNA chain grows at a rate of _____ in E.coli at 37degrees centigrade

- (a) 40 to 50 nucleotides
- (b) 30 to 40 nucleotides
- (c) 50 to 60 nucleotides
- (d) 60 to 70 nucleotides
- (e) 70 to 80 nucleotides

90. One of the following plays a role in mitochondrial DNA polymerization in eukaryotes-

- (a) DNA polymerase rho
- (b) DNA polymerase alpha
- (c) DNA polymerase epsilon
- (d) DNA polymerase gamma
- (e) DNA polymerase beta

91. In prokaryote RNA polymerase the core enzyme is

- (a) Alpha, beta and beta dash subunits
- (b) Sigma, beta and beta dash subunits
- (c) Two alpha, beta and beta dash subunits
- (d) Sigma, alpha and beta subunits
- (e) None of the above

92. Helix destabilizing agents are also called as

- (a) SSBPs
- (b) Helicases
- (c) Topoisomerases

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- (d) DNA - a protein
- (e) None of the above

93. In the eukaryotic transcription one of the below enzymes participates in the transcription of rRNA in nucleolus.

- (a) RNA polymerase II
- (b) RNA polymerase I
- (c) RNA polymerase III
- (d) Holoenzyme
- (e) None of the above

94. Messenger RNA are _____ in 5' to 3' direction

- (a) Translated
- (b) Synthesized
- (c) Degraded
- (d) Both 1 and 2
- (e) All the above

95. The arrangement of base pairs are _____ to the axis of the sugars or back bone of the DNA.

- (a) Diagonal
- (b) Parallel
- (c) Perpendicular
- (d) Flexible
- (e) None of the above

96. Eukaryotic mRNA is

- (a) Polycistronic
- (b) Monocistronic
- (c) Consists SD sequence
- (d) 5' cap is absent
- (e) Both 1 and 2

97. Repliosome complex required for the generation of replication fork is

- (a) Holoenzyme + RNAase H
- (b) Helicase + primase
- (c) Beta subunit + Primosome
- (d) DNA ligase + Core enzyme
- (e) Helicase + DNA polymerase

98. The processivity of the DNA polymerase III enzyme is

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- (a) 1000 nucleotides for second
- (b) 50 nucleotides for second
- (c) 900 nucleotides for second
- (d) 100 nucleotides for second
- (e) 20 nucleotides for second

99. DNA replication in eukaryotes commences from

- (a) Several sites along DNA of a chromosome simultaneously
- (b) Both the ends of a chromosome simultaneously
- (c) From the centeromere to either end
- (d) From one end of chromosome to the other
- (e) None of the above is true

100. One of the following statements regarding the 'single base changes' is false, identify.

- (a) These are corrected during DNA replication
- (b) Caused by the conversion of one base to another
- (c) It is a type of DNA damage
- (d) It does not belong to the class of structural distortions
- (e) None of the above

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