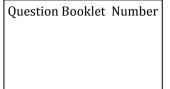
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# M. Sc. (Microbiology) (Second Semester) (NEP) EXAMINATION, 2022-23

FUNDAMENTALS OF MOLECULAR BIOLOGY

Paper Code											
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Time : 1:30 Hours ]

# Questions Booklet Series

[ Maximum Marks : 75

## Instructions to the Examinee :

- Do not open the booklet unless you are asked to do so.
- 2. The booklet contains 100 questions. Examinee is required to answer 75 the OMR Answer-Sheet questions in provided and not in the question booklet. All questions carry equal marks.
- Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

- प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
- प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
- 3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

### (Remaining instructions on the last page)

(Only for Rough Work)

- 1. What is the primary function of DNA replication ?
  - (A) Repair damaged DNA
  - (B) Produce RNA molecules
  - (C) Generate genetic diversity
  - (D) Copy DNA for cell division
- 2. Which enzyme is responsible for unwinding the DNA double helix during replication ?
  - (A) DNA polymerase
  - (B) RNA polymerase
  - (C) Helicase
  - (D) Ligase
- 3. Which direction does DNA replication occur ?
  - (A) 5' to 3'
  - (B) 3' to 5'
  - (C) Randomly in both directions
  - (D) It varies depending on the organism
- Which nucleotide base is complementary to adenine (A) in DNA replication ?
  - (A) Guanine (G)
  - (B) Thymine (T)
  - (C) Uracil (U)
  - (D) Cytosine (C)

- 5. Which statement accurately describes the leading and lagging strands during DNA replication ?
  - (A) Both strands are synthesized in the same direction.
  - (B) The leading strand is synthesized continuously, while the lagging strand is synthesized discontinuously.
  - (C) The leading strand is synthesized discontinuously, while the lagging strand is synthesized continuously.
  - (D) Both strands are synthesized in opposite directions.
- 6. Which enzyme is responsible for synthesizing new DNA strands during replication ?
  - (A) DNA helicase
  - (B) DNA ligase
  - (C) DNA polymerase
  - (D) DNA topoisomerase

- 7. Which molecule serves as the primer for DNA replication ?
  - (A) RNA primer
  - (B) DNA primer
  - (C) Protein primer
  - (D) Enzyme primer
- 8. How many replication forks are formed at each origin of replication ?
  - (A) One
  - (B) Two
  - (C) Three
  - (D) Four
- 9. Which of the following is not a component of the DNA replication machinery ?
  - (A) DNA polymerase Ill
  - (B) Single-stranded binding proteins
  - (C) DNA ligase
  - (D) RNA polymerase
- 10. Which statement is true about DNA replication in eukaryotic cells ?
  - (A) Replication occurs in the cytoplasm.
  - (B) Multiple origins of replication are present on each chromosome.
  - (C) Replication occurs only during the S phase of the cell cycle.
  - (D) Eukaryotic DNA replication does not require DNA polymerase.

- 11. During DNA replication, which enzyme is responsible for proofreading and correcting errors in the newly synthesized DNA strand ?
  - (A) DNA polymerase I
  - (B) DNA helicase
  - (C) DNA ligase
  - (D) DNA polymerase Ill
- 12. Which molecule is required for the initiation of DNA replication in eukaryotic cells ?
  - (A) Primase
  - (B) RNA polymerase
  - (C) Telomerase
  - (D) Topoisomerase
- 13. Which of the following is not a function of the sliding clamp protein during DNA replication ?
  - (A) Stabilizing DNA polymerase on the template strand
  - (B) Enhancing processivity of DNA polymerase
  - (C) Unwinding the DNA double helix
  - (D) Preventing DNA polymerase from dissociating from the template strand

- 14. Which enzyme is responsible for joining the Okazaki fragments during lagging strand synthesis in DNA replication ?
  - (A) DNA polymerase I
  - (B) DNA helicase
  - (C) DNA ligase
  - (D) DNA polymerase Ill
- 15. In DNA replication, what is the role of the origin of replication ?
  - (A) It serves as the starting point for DNA synthesis.
  - (B) It acts as a template for the synthesis of RNA primers.
  - (C) It stabilizes the DNA double helix during replication.
  - (D) It promotes the separation of DNA strands during replication.
- 16. Which of the following is a feature of telomeres in DNA replication ?
  - (A) They contain repetitive DNA sequences.
  - (B) They prevent the loss of genetic information during replication.
  - (C) They are synthesized by telomerase enzyme.
  - (D) All of the above.

- 17. Which molecule is responsible for removing RNA primers and replacing them with DNA during DNA replication ?
  - (A) DNA polymerase I
  - (B) DNA helicase
  - (C) DNA ligase
  - (D) DNA polymerase II
- 18. Which statement accurately describes the fidelity of DNA replication ?
  - (A) DNA replication is always errorfree.
  - (B) DNA replication is highly accurate, with an error rate of approximately 1 in 10,000 base pairs.
  - (C) DNA replication is prone to frequent errors, with an error rate of approximately 1 in 10 base pairs.
  - (D) The fidelity of DNA replication varies depending on the organism but is generally low.

- 19. Which molecule is responsible for relieving the torsional strain ahead of the replication fork during DNA replication ?
  - (A) DNA polymerase I
  - (B) DNA helicase
  - (C) Topoisomerase
  - (D) DNA ligase
- 20. Which of the following is a characteristic of DNA replication in prokaryotic cells ?
  - (A) It occurs in the nucleus.
  - (B) It is initiated at a single origin of replication on each chromosome.
  - (C) It requires telomerase enzyme for replication.
  - (D) It involves multiple DNA polymerases with different functions.
- 21. Which of the following is NOT a source of DNA damage ?
  - (A) Ultraviolet (UV) radiation
  - (B) Chemical mutagens
  - (C) Replication errors
  - (D) DNA polymerase

- 22. What type of DNA damage is caused by the formation of abnormal covalent bonds between adjacent pyrimidine bases ?
  - (A) Single-strand breaks
  - (B) Double-strand breaks
  - (C) DNA crosslinks
  - (D) Base modifications
- 23. Which enzyme is primarily responsible for repairing single-strand breaks in DNA ?
  - (A) DNA polymerase
  - (B) DNA ligase
  - (C) DNA helicase
  - (D) DNA glycosylase
- 24. Which of the following is a consequence of unrepaired DNA double-strand breaks ?
  - (A) Formation of DNA adducts
  - (B) Formation of DNA crosslinks
  - (C) Chromosomal rearrangements
  - (D) Base excision repair

- 25. What is the role of nucleotide excision repair (NER) in DNA damage repair ?
  - (A) Repairing single-strand breaks
  - (B) Repairing thymine dimers caused by UV radiation
  - (C) Repairing mismatched base pairs
  - (D) Repairing DNA crosslinks
- 26. Which enzyme is responsible for removing damaged bases during base excision repair (BER) ?
  - (A) DNA polymerase
  - (B) DNA ligase
  - (C) DNA helicase
  - (D) DNA glycosylase
- 27. Which type of DNA damage is repaired
  - by the process of homologous recombination ?
  - (A) Single-strand breaks
  - (B) Thymine dimers
  - (C) DNA crosslinks
  - (D) Double-strand breaks

- 28. Which of the following is an example of a DNA repair mechanism that can introduce mutations during the repair process ?
  - (A) Nucleotide excision repair (NER)
  - (B) Base excision repair (BER)
  - (C) Mismatch repair (MMR)
  - (D) Non-homologous end joining (NHEJ)
- 29. Which enzyme is responsible for catalyzing the ligation step during non-homologous end joining (NHEJ) repair ?
  - (A) DNA polymerase
  - (B) DNA ligase
  - (C) DNA helicase
  - (D) DNA glycosylase
- 30. What is the consequence of a failure to repair DNA damage ?
  - (A) Mutations can accumulate, leading to genetic disorders or cancer.
  - (B) The DNA damage itself can be repaired spontaneously.
  - (C) DNA replication can correct the errors introduced by the damage.
  - (D) The damaged DNA is efficiently degraded by cellular enzymes.

- 31. Which enzyme is responsible for recognizing and removing damaged bases during the base excision repair (BER) pathway ?
  - (A) DNA polymerase
  - (B) DNA helicase
  - (C) DNA glycosylase
  - (D) DNA ligase
- 32. Which type of DNA damage is repaired by the nucleotide excision repair (NER) pathway ?
  - (A) Single-strand breaks
  - (B) Thymine dimers
  - (C) DNA crosslinks
  - (D) Base modifications
- 33. Which DNA repair mechanism is specifically involved in repairing DNA mismatches that occur during DNA replication ?
  - (A) Nucleotide excision repair (NER)
  - (B) Base excision repair (BER)
  - (C) Mismatch repair (MMR)
  - (D) Homologous recombination (HR)

- 34. What is the primary function of the DNA repair protein p53 ?
  - (A) Recognizing and removing damaged bases
  - (B) Repairing single-strand breaks
  - (C) Promoting DNA replication
  - (D) Inducing cell cycle arrest or apoptosis in response to DNA damage
- 35. Which enzyme is responsible for sealing the nicks in the DNA backbone during the final step of DNA repair ?
  - (A) DNA polymerase
  - (B) DNA helicase
  - (C) DNA glycosylase
  - (D) DNA ligase
- 36. Which DNA repair mechanism is responsible for repairing DNA doublestrand breaks by aligning and joining broken DNA ends ?
  - (A) Nucleotide excision repair (NER)
  - (B) Base excision repair (BER)
  - (C) Mismatch repair (MMR)
  - (D) Non-homologous end joining (NHEJ)

- 37. Which protein complex is involved in detecting DNA damage and initiating the DNA repair process ?
  - (A) Telomerase
  - (B) Centromere protein
  - (C) DNA polymerase complex
  - (D) DNA damage sensor complex
- 38. Which DNA repair mechanism utilizes a undamaged DNA strand as a template to repair damaged DNA ?
  - (A) Nucleotide excision repair (NER)
  - (B) Base excision repair (BER)
  - (C) Mismatch repair (MMR)
  - (D) Homologous recombination (HR)
- 39. Which genetic disorder is caused by defects in the nucleotide excision repair (NER) pathway ?
  - (A) Xeroderma pigmentosum (XP)
  - (B) Down syndrome
  - (C) Cystic fibrosis
  - (D) Huntington's disease

- 40. Which of the following is NOT a DNA repair mechanism ?
  - (A) Direct reversal repair
  - (B) Transcription-coupled repair
  - (C) Reverse transcription repair
  - (D) Non-homologous end joining (NHEJ)
- 41. What is transcription ?
  - (A) The process of synthesizing RNA from DNA
  - (B) The process of synthesizing DNA from RNA
  - (C) The process of DNA replication
  - (D) The process of protein synthesis
- 42. Which enzyme is responsible for catalyzing the synthesis of RNA during transcription ?
  - (A) DNA polymerase
  - (B) RNA polymerase
  - (C) DNA ligase
  - (D) DNA helicase

- 43. Which of the following is NOT a type of RNA molecule synthesized during transcription ?
  - (A) Messenger RNA (mRNA)
  - (B) Transfer RNA (tRNA)
  - (C) Ribosomal RNA (rRNA)
  - (D) DNA polymerase
- 44. What is the function of the promoter region in transcription ?
  - (A) It signals the end of transcription.
  - (B) It signals the start of transcription.
  - (C) It encodes the RNA molecule.
  - (D) It facilitates translation.
- 45. Which DNA strand serves as the template for RNA synthesis during transcription ?
  - (A) The leading strand
  - (B) The lagging strand
  - (C) Both strands are used simultaneously
  - (D) The coding strand

- 46. What is the role of transcription factors in transcription ?
  - (A) They unwind the DNA double helix.
  - (B) They terminate transcription.
  - (C) They recognize and bind to the promoter region.
  - (D) They catalyze RNA synthesis.
- 47. Which of the following is a characteristic of the coding region in a gene ?
  - (A) It contains introns.
  - (B) It is transcribed into RNA.
  - (C) It is located upstream of the promoter region.
  - (D) It is involved in protein folding.
- 48. What is the purpose of the poly(A) tail added to the mRNA molecule during transcription ?
  - (A) It protects the mRNA from degradation.
  - (B) It signals the start of translation.
  - (C) It promotes DNA replication.
  - (D) It stabilizes the DNA double helix.

- 49. What is the function of RNA processing in transcription ?
  - (A) To remove introns and join exons.
  - (B) To repair damaged DNA.
  - (C) To facilitate DNA replication.
  - (D) To generate genetic diversity.
- 50. Which statement accurately describes the relationship between transcription and translation ?
  - (A) Transcription occurs in the cytoplasm, while translation occurs in the nucleus.
  - (B) Transcription produces DNA molecules, while translation produces RNA molecules.
  - (C) Transcription and translation occur simultaneously.
  - (D) Transcription produces RNA molecules, while translation produces proteins.
- 51. Where does translation occur in prokaryotic cells ?
  - (A) Nucleus
  - (B) Cytoplasm
  - (C) Endoplasmic reticulum
  - (D) Golgi apparatus

- 52. What is the role of ribosomes in translation ?
  - (A) They serve as the site of protein synthesis.
  - (B) They unwind the DNA double helix.
  - (C) They synthesize RNA molecules.
  - (D) They remove introns from the mRNA.
- 53. Which of the following is the start codon in prokaryotic translation ?
  - (A) AUG
  - (B) UAA
  - (C) UAG
  - (D) UGA
- 54. Which molecule carries the amino acids

to the ribosome during translation ?

- (A) tRNA (transfer RNA)
- (B) mRNA (messenger RN(A)
- (C) rRNA (ribosomal RN(A)
- (D) DNA (deoxyribonucleic acid)

- 55. Which of the following is NOT a component of the ribosome ?
  - (A) Large subunit
  - (B) Small subunit
  - (C) Aminoacyl-tRNA synthetase
  - (D) tRNA binding sites (A, P, and E sites)
- 56. What is the role of the Shine-Dalgarno sequence in prokaryotic translation ?
  - (A) It acts as the start codon.
  - (B) It signals the termination of translation.
  - (C) It serves as the ribosome binding site on mRNA.
  - (D) It catalyzes the formation of peptide bonds.
- 57. What is the function of initiation factors in prokaryotic translation ?
  - (A) They promote the termination of translation.
  - (B) They catalyze the formation of peptide bonds.
  - (C) They facilitate the binding of mRNA to the ribosome.
  - (D) They remove introns from the mRNA.

- 58. Which step of translation involves the formation of a peptide bond between two adjacent amino acids ?
  - (A) Initiation
  - (B) Elongation
  - (C) Termination
  - (D) Translocation
- 59. Which codon serves as the stop codon in prokaryotic translation ?
  - (A) AUG
  - (B) UAA
  - (C) UAG
  - (D) UGA
- 60. What is the role of release factors in prokaryotic translation ?
  - (A) They initiate translation.
  - (B) They catalyze the formation of peptide bonds.
  - (C) They promote the termination of translation.
  - (D) They bind to the Shine-Dalgarno sequence.

- 61. Where does translation occur in eukaryotic cells ?
  - (A) Nucleus
  - (B) Cytoplasm
  - (C) Endoplasmic reticulum
  - (D) Golgi apparatus
- 62. Which organelle is responsible for the synthesis of proteins that are destined for secretion or membrane insertion ?
  - (A) Nucleus
  - (B) Ribosome
  - (C) Endoplasmic reticulum
  - (D) Golgi apparatus
- 63. What is the role of the 5' cap on eukaryotic mRNA during translation ?
  - (A) It signals the start of translation.
  - (B) It protects the mRNA from degradation.
  - (C) It promotes the termination of translation.
  - (D) It binds to ribosomes directly.
- 64. Which molecule carries the amino acids to the ribosome during eukaryotic translation ?
  - (A) tRNA (transfer RNA)
  - (B) mRNA (messenger RNA)
  - (C) rRNA (ribosomal RNA)
  - (D) DNA (deoxyribonucleic acid)

- 65. Which of the following is NOT a component of the eukaryotic ribosome?
  - (A) Large subunit
  - (B) Small subunit
  - (C) Aminoacyl-t-RNA synthetase
  - (D) t-RNA binding sites (A, P, and E sites)
- 66. Which sequence on eukaryotic mRNA serves as the start codon for translation ?
  - (A) AUG
  - (B) UAA
  - (C) UAG
  - (D) UGA
- 67. What is the function of initiation factors in eukaryotic translation ?
  - (A) They promote the termination of translation.
  - (B) They catalyze the formation of peptide bonds.
  - (C) They facilitate the binding of mRNA to the ribosome.
  - (D) They remove introns from the mRNA.

- 68. Which step of translation involves the translocation of the ribosome along the mRNA molecule ?
  - (A) Initiation
  - (B) Elongation
  - (C) Termination
  - (D) Initiation codon recognition
- 69. What is the role of release factors in eukaryotic translation ?
  - (A) They initiate translation.
  - (B) They catalyze the formation of peptide bonds.
  - (C) They promote the termination of translation.
  - (D) They bind to the 5' cap of mRNA.
- 70. Which codons serve as the stop codons in eukaryotic translation ?
  - (A) AUG
  - (B) UAA
  - (C) UAG
  - (D) UGA
- 71. What is the primary role of transcription factors in gene expression regulation ?
  - (A) They catalyze the synthesis of mRNA.
  - (B) They facilitate translation of mRNA into protein.
  - (C) They bind to DNA and control the transcription of genes.
  - (D) They degrade mRNA molecules.

- 72. Which of the following is an example of post-transcriptional regulation of gene expression ?
  - (A) DNA methylation
  - (B) Histone acetylation
  - (C) Alternative splicing
  - (D) Promoter binding
- 73. Which type of RNA molecule is involved in RNA interference (RNAi), a mechanism for gene regulation ?
  - (A) mRNA (messenger RNA)
  - (B) tRNA (transfer RNA)
  - (C) rRNA (ribosomal RNA)
  - (D) miRNA (microRNA)
- 74. What is the function of enhancers in gene expression regulation ?
  - (A) They inhibit the transcription of genes.
  - (B) They activate the transcription of genes.
  - (C) They catalyze the translation of mRNA into protein.
  - (D) They stabilize mRNA molecules.

- 75. What is the purpose of epigenetic modifications in gene expression regulation ?
  - (A) To permanently change the DNA sequence of genes.
  - (B) To control the accessibility of genes for transcription.
  - (C) To facilitate DNA replication.
  - (D) To stabilize mRNA molecules.
- 76. Which enzyme is responsible for adding a poly(A) tail to the 3' end of mRNA molecules ?
  - (A) DNA polymerase
  - (B) RNA polymerase
  - (C) RNA helicase
  - (D) Poly(A) polymerase
- 77. Which process allows cells to selectively degrade mRNA molecules and regulate gene expression ?
  - (A) DNA replication
  - (B) Transcription
  - (C) Translation
  - (D) RNA degradation

- 78. What is the role of repressor proteins in gene expression regulation ?
  - (A) They bind to DNA and activate gene transcription.
  - (B) They bind to DNA and inhibit gene transcription.
  - (C) They catalyze the synthesis of mRNA.
  - (D) They degrade mRNA molecules.
- 79. Which of the following is NOT an example of a post-translational modification that regulates protein function?
  - (A) Phosphorylation
  - (B) Glycosylation
  - (C) Alternative splicing
  - (D) Ubiquitination
- 80. What is the purpose of the lac operon in gene expression regulation in bacteria ?
  - (A) To control the expression of genes involved in lactose metabolism.
  - (B) To control the expression of genes involved in DNA replication.
  - (C) To regulate the expression of genes involved in protein synthesis.
  - (D) To regulate the expression of genes involved in cell division.

- 81. Which of the following is the first step in mRNA processing in eukaryotic cells ?
  - (A) Addition of a 5' cap
  - (B) Addition of a poly(A) tail
  - (C) Splicing of introns
  - (D) Transcription
- 82. What is the purpose of adding a 5' cap to mRNA during processing ?
  - (A) It marks the end of transcription.
  - (B) It stabilizes the mRNA and enhances its translation.
  - (C) It promotes the splicing of introns.
  - (D) It removes the exons from the mRNA.
- 83. Which enzyme is responsible for adding the poly(A) tail to the 3' end of mRNA during processing ?
  - (A) DNA polymerase
  - (B) RNA polymerase
  - (C) RNA helicase
  - (D) PoIy(A) polymerase

- 84. What is the function of the poly(A) tail in mRNA ?
  - (A) It promotes the transcription of genes.
  - (B) It protects the mRNA from degradation and enhances translation.
  - (C) It removes introns from the mRNA.
  - (D) It marks the start codon for translation.
- 85. Which process involves the removal of non-coding regions called introns from pre-mRNA ?
  - (A) Splicing
  - (B) Transcription
  - (C) Translation
  - (D) Replication
- 86. What is the role of the spliceosome in mRNA processing ?
  - (A) It adds the poly(A) tail to the mRNA.
  - (B) It removes introns and joins exons in pre-mRNA.
  - (C) It adds a 5' cap to the mRNA.
  - (D) It promotes the initiation of translation.

- 87. What is alternative splicing ?
  - (A) The process of removing introns and exons from pre-mRNA.
  - (B) The process of joining multiple pre-mRNAs to form a mature mRNA.
  - (C) The process of adding a poly(A) tail to the mRNA.
  - (D) The process of selecting different combinations of exons during splicing.
- 88. Which molecule recognizes the specific splicing sites in pre-mRNA during alternative splicing ?
  - (A) DNA polymerase
  - (B) RNA polymerase
  - (C) Small nuclear ribonucleoproteins (snRNPs)
  - (D) Ribosomes
- 89. Which of the following is NOT a product of mRNA processing ?
  - (A) Mature mRNA
  - (B) tRNA
  - (C) Introns
  - (D) Lariate structure
- 90. What is the final product of mRNA processing in eukaryotic cells ?
  - (A) Pre-mRNA
  - (B) Mature mRNA
  - (C) Ribosome
  - (D) tRNA

- 91. Which experiment provided the first conclusive evidence that DNA is the genetic material ?
  - (A) Avery-MacLeod-McCarty experiment
  - (B) Griffith's experiment
  - (C) Hershey-Chase experiment
  - (D) Meselson-Stahl experiment
- 92. What did the Avery-MacLeod-McCarty experiment demonstrate ?
  - (A) The transforming principle in bacteria is DNA.
  - (B) The transforming principle in bacteria is RNA.
  - (C) The transforming principle in bacteria is protein.
  - (D) The transforming principle in bacteria is carbohydrates.
- 93. In Griffith's experiment, what happened when heat-killed pathogenic bacteria were mixed with live non-pathogenic bacteria and injected into mice ?
  - (A) The mice survived.
  - (B) The mice died.
  - (C) The mice showed no response.
  - (D) The mice developed a mild illness.

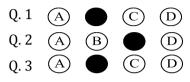
- 94. What was the conclusion drawn from the Hershey-Chase experiment ?
  - (A) DNA is the genetic material in viruses.
  - (B) RNA is the genetic material in viruses.
  - (C) Proteins are the genetic material in viruses.
  - (D) Carbohydrates are the genetic material in viruses.
- 95. Which type of bacteriophage was used in the Hershey-Chase experiment ?
  - (A) T4 phage
  - (B) Lambda phage
  - (C) Adenovirus
  - (D) Retrovirus
- 96. What is the significance of the Meselson-Stahl experiment ?
  - (A) It demonstrated that DNA replication is semiconservative.
  - (B) It showed that DNA replication is conservative.
  - (C) It proved that DNA replication is dispersive.
  - (D) It confirmed that DNA replication is random.
- 97. Which technique was used in the Meselson-Stahl experiment to label DNA ?
  - (A) Autoradiography
  - (B) Centrifugation
  - (C) X-ray crystallography
  - (D) Polymerase chain reaction (PCR)

- 98. What is the role of the DNA polymerase enzyme in DNA replication ?
  - (A) It unwinds the DNA double helix.
  - (B) It adds nucleotides to the growing DNA strand.
  - (C) It proofreads the newly synthesized DNA strand.
  - (D) It separates the two DNA strands.
- 99. Which experiment provided evidence for the existence of telomeres at the ends of eukaryotic chromosomes ?
  - (A) Southern blotting
  - (B) Polymerase chain reaction (PCR)
  - (C) Telomerase activity assay
  - (D) Gel electrophoresis
- 100. What did the Griffith's experiment with Streptococcus pneumoniae demonstrate ?
  - (A) The transformation of bacteria can occur with DNA.
  - (B) The transformation of bacteria can occur with RNA.
  - (C) The transformation of bacteria can occur with protein.
  - (D) The transformation of bacteria can occur with lipids.

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

#### Example :

#### Question :

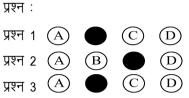


Illegible answers with cutting and over-writing or half filled circle will be cancelled.

- 5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
- 6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
- 7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
- 8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
- 9. There will be no negative marking.
- 10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
- 11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
- 12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.
- **Impt.** : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is ny discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

 प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर –
A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :





अपटनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

- प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
- सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
- ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
- परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
- 9. निगेटिव मार्किंग नहीं है।
- कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
- 11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
- प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।
- महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीमाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।