Roll. No. .....

O.M.R. Serial No. | | | | | | | | |

Question Booklet Number

07

B.Sc. (PART-II) EXAMINATION, 2021

BIOTECHNOLOGY

[PAPER : Third (BBT-203)]

(Molecular Biology)

Paper ID		
5	0	5

Question Booklet Series
D

Time : 1 : 30 Hours **Max. Marks : 150**

Instructions to the Examinee :

1. Do not open this Booklet untill you are told to do so.

2. Candidates should fill their roll number, subject and series of question booklet details correctly, otherwise, in case of any discrepancy in the evaluation, it will be the responsibility of the examinee himself.

3. There are 100 questions in the booklet. Examinee is required to answer only 75 questions in the OMR Answer Sheet provided. Four alternative answer to each question are given below the question, out of these four only one answer is correct. The answer which you think is correct or most appropriate, completely fill in the circle containing its letter in your answer sheet (O.M.R. Answer Sheet) with black or blue ball point pen.

परीक्षार्थियों के लिए निर्देश :

1. जब तक कहा न जाये, इस प्रश्नपुस्तिका को न खोलें।

2. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सिरीज का विवरण यथास्थान सही-सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।

3. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को केवल 75 प्रश्नों का उत्तर दी गई OMR उत्तर-पत्रक में देना है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर-पत्रक (O.M.R. Answer Sheet) में उसके अक्षर वाले वृत्त को काले या नीले बॉल प्वाइंट पेन से पूरा भर दें।

(Remaining instructions on last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

Rough Work

1. The sequence of structural genes in the lac operon is :

(A) lac A - lac Z - lac Y

(B) lac Z – lac Y – lac A

(C) lac Z – lac A – lac Y

(D) lac A – lac Y – lac Z

2. lac operon is an example of :

(A) Only positive regulation

(B) Only negative regulation

(C) Both positive and negative regulation

(D) Sometimes positive and sometimes negative regulation

3. Expression of prokaryotic operons leads to the generation of :

(A) Polycistronic mRNA

(B) Monocistronic mRNA

(C) Polycistronic tRNA

(D) Monocistronic tRNA

4. In the trp operon, the tryptophan acts as the :

(A) Repressor

(B) Activator

(C) Co-repressor

(D) Co-activator

5. The regulation of trp operon by binding of tryptophan to trp repressor is termed as :

(A) Repression

(B) Induction

(C) Anti termination

(D) Attenuation

6. How many structural genes are present in the trp operon of E. coli ?

(A) 3

(B) 4

(C) 5

(D) 6

7. Attenuation is regulatory mechanism of bacterial operons, it is present in :

(A) lac operon

(B) trp operon

(C) Both lac and trp operons

(D) None of the above

8. Which of the following element is not present in DNA ?

(A) Nitrogen

(B) Phosphorus

(C) Carbon

(D) Sulphur

9. During DNA replication, okazaki fragments are synthesized on :

(A) Leading strand

(B) Lagging strand

(C) Both on leading and lagging strands

(D) Sometimes on leading and sometime on lagging strand

10. Telomerase enzyme is active in :

(A) Liver cells

(B) Kidney cells

(C) Embryonic cells

(D) All of the above

11. Telomerase enzyme contains :

(A) RNA and protein

(B) DNA and protein

(C) Protein only

(D) Protein and Carbohydrate

12. Primosome has :

(A) Polymerase activity

(B) Exonuclease activity

(C) Endonuclease activity

(D) Primase and helicase activity

13. During DNA replication, supercoiling of DNA molecule is removed by :

(A) Primase

(B) Topoisomerase

(C) Helicase

(D) Polymerase

14. During prokaryotic DNA replication, RNA primers are removed by :

(A) Primase

(B) Helicase

(C) Ligase

(D) DNA polymerase I

15. In prokaryotes, the main DNA replicating enzyme is :

(A) DNA Polymerase I

(B) DNA Polymerase II

(C) DNA Polymerase III

(D) DNA Polymerase IV

16. RNA primers required for prokaryotic DNA replication are synthesized by :

(A) DNA polymerase I

(B) DNA polymerase alpha

(C) Primase

(D) Ligase

17. Synthesis of mRNA from DNA is called :

(A) Translation

(B) Replication

(C) Transcription

(D) Reverse Transcription

18. TATA box is found in :

(A) Promoter

(B) Operator

(C) Terminator

(D) Shine Dalgarno Sequence

19. Reverse Transcription means :

(A) Synthesis of DNA from DNA

(B) Synthesis of RNA from DNA

(C) Synthesis of DNA from RNA

(D) Synthesis of protein from RNA

20. Introns are found in :

(A) Prokaryotic mRNA

(B) Eukaryotic mRNA

(C) rRNA

(D) All of the above

21. Poly A tail is present in :

(A) rRNA

(B) tRNA

(C) Prokaryotic mRNA

(D) Eukaryotic mRNA

22. Splicing occurs in :

(A) rRNA

(B) Prokaryotic mRNA

(C) Eukaryotic mRNA

(D) All of the above

23. U RNA is found in :

(A) Spliceosome

(B) Nucleosome

(C) Primosome

(D) Ribosome

24. Rho protein is involved in :

(A) Termination of replication

(B) Termination of transcription

(C) Termination of translation

(D) All of the above

25. A nucleotide contains :

(A) Pentose sugar and phosphate

(B) Pentose sugar and nitrogen base

(C) Nitrogen base and phosphate

(D) Nitrogen base, pentose sugar and phosphate

26. Barbara McClintock conducted her experiments on :

(A) Maize

(B) Pea

(C) Sugarcane

(D) Drosophila

27. Jumping genes discovered by Barbara McClintock were :

(A) Mutated genes

(B) Inactive genes

(C) Transposons

(D) Junk DNA

28. Transposons are :

(A) Mobile DNA elements

(B) Non-mobile DNA elements

(C) Highly mutated DNA

(D) Methylated DNA

29. Transposons are found in :

(A) Bacteria

(B) Yeast

(C) Drosophila

(D) All of the above

30. Retrotransposons created due to :

(A) Transcription

(B) Translation

(C) Replication

(D) Reverse Transcription

31. Thymidine dimers in DNA are formed due to exposure of :

(A) UV rays

(B) β-rays

(C) Gamma rays

(D) X-rays

32. Mutagens are :

(A) Mutation causing substances

(B) Cancer causing substances

(C) Antiviral substances

(D) Cell death inducing substances

33. Polysomes are :

(A) Aggregation of ribosomes

(B) Aggregation of lysosomes

(C) mRNA molecule to which many ribosomes are attached simultaneously

(D) All of the above

34. Which is energy rich molecule required for initiation of translation ?

(A) ATP

(B) GTP

(C) CTP

(D) AMP

35. In eukaryotes, translation is initiated by binding of ribosome to the :

(A) Pribnow box

(B) Hogness box

(C) 5' cap

(D) Poly A tail

36. Which one of the following is not the gene of lac operon ?

(A) lac X

(B) lac Z

(C) lac Y

(D) lac A

37. Inducer of lac operon is :

(A) Glucose

(B) Lactose

(C) cAMP

(D) Fructose

38. Which of the following gene encodes for repressor protein of lac operon ?

(A) lac Z

(B) lac Y

(C) lac A

(D) lac I

39. Repressor protein of lac operon binds to :

(A) Promoter

(B) Operator

(C) Pribnow box

(D) SD sequence

40. lac Z gene of lac operon encodes for :

(A) Permease

(B) Beta galactosidase

(C) Transacetylase

(D) Repressor protein

41. In lac operon, RNA polymerase binds to :

(A) Promoter

(B) Operator

(C) SD sequence

(D) lac Z

42. An operon is made up of :

(A) Promoter

(B) Operator

(C) Structural genes

(D) All of the above

43. Eukaryotic mRNA is synthesized by :

(A) RNA polymerase I

(B) RNA polymerase II

(C) RNA polymerase III

(D) Reverse Transcriptase

44. Spliceosomes are involved in :

(A) RNA editing

(B) Polyadenylation

(C) Splicing

(D) RNA degration

45. Which of the following process does not occur in prokaryotes ?

(A) Replication

(B) Transcription

(C) Translation

(D) Splicing

46. At promoter site of DNA :

(A) Replication starts

(B) Transcription starts

(C) Translation starts

(D) Termination of transcription

47. Sigma factor is component of :

(A) Prokaryotic RNA polymerase

(B) Eukaryotic RNA polymerase

(C) Reverse Transcriptase

(D) DNA polymerase alpha

48. Which of the following RNA is involved in protein synthesis ?

(A) mRNA

(B) rRNA

(C) tRNA

(D) All of the above

49. How many RNA polymerases are found in eukaryotes ?

(A) 1

(B) 2

(C) 3

(D) 4

50. CTD tail is found in :

(A) RNA polymerase I

(B) RNA polymerase II

(C) RNA polymerase III

(D) All of the above

51. In prokaryotes, ribosome binds to mRNA at :

(A) Shine Dalgarno Sequence

(B) Pribnow box

(C) CAAT box

(D) TATA box

52. Which of the following RNA constitutes maximum percentage of cellular RNA ?

(A) mRNA

(B) tRNA

(C) rRNA

(D) hnRNA

53. Which RNA has a structure similar to clover leaf ?

(A) mRNA

(B) tRNA

(C) rRNA

(D) hn RNA

54. fMet-tRNA is translation initiator tRNA in :

(A) Prokaryotes

(B) Eukaryotes

(C) Both prokaryotes and eukaryotes

(D) Viruses

55. The initiation codon is :

(A) UAA

(B) UGA

(C) UAG

(D) AUG

56. Which one of the following is not a characteristic of genetic code ?

(A) Universal

(B) Degenerate

(C) Non-overlapping

(D) Ambiguous

57. Which of the following is not the component of prokaryotic rRNA ?

(A) 23S rRNA

(B) 18S rRNA

(C) 16S rRNA

(D) 5S rRNA

58. During translation, the role of enzyme peptidyl transferase is :

(A) Transfer of phosphate group

(B) Amino acid activation

(C) Peptide bond formation between adjacent amino acids

(D) Binding to ribosome subunits to mRNA

59. DNA is found in which of the following eukaryotic cell organelle ?

(A) Ribosome

(B) Golgi body

(C) Mitochondria

(D) Lysosome

60. Histone protein is part of :

(A) Nucleosome

(B) Spliceosome

(C) Primosome

(D) Ribosome

61. How many hydrogen bonds are found in between Guanine and Cytosine of DNA double helix ?

(A) 1

(B) 2

(C) 3

(D) 4

62. Histone protein is not found in :

(A) Eukaryotes

(B) Prokaryotes

(C) Both Eukaryotes and Prokaryotes

(D) Mammalian Cells

63. Which of the following base pairing rule in DNA is correct ?

(A) G=C, A=T

(B) G=A, C=T

(C) A=C, T=G

(D) T=C, G=A

64. Which of the following nitrogen bases found in DNA belongs to pyrimidines ?

(A) Adenine and Guanine

(B) Cytosine and Thymine

(C) Adenine and Cytosine

(D) Guanine and Thymine

65. Which of the following molecule can self replicate ?

(A) DNA

(B) RNA

(C) Both DNA and RNA

(D) Proteins

66. Double helical model of DNA structure was proposed by :

(A) Franklin and Wilkinson

(B) Watson and Crick

(C) Robin Holliday

(D) A. Kornberg

67. Homologous recombination occurs during :

(A) Mitosis

(B) Meiosis

(C) Cytokinesis

(D) Amitosis

68. In prokaryotes, DNA replication starts at :

(A) Promoter

(B) Operator

(C) Ori

(D) ARS

69. DNA replication occurs in :

(A) 3'-5' direction

(B) 5'–3' direction

(C) Can occur in both 5'–3' and 3'–5' directions

(D) DNA replication is directionless

70. Which enzyme joins the nicks in DNA strand ?

(A) Primase

(B) DNA polymerase

(C) DNA ligase

(D) Endonuclease

71. During DNA replication, unwinding of DNA helix occurs due to :

(A) Helicase

(B) Lipase

(C) Topoisomerase

(D) Exonuclease

72. During DNA replication, the single strand binding proteins (SSBPs) :

(A) helps to rewind the DNA

(B) maintains the unwound DNA in single stranded condition

(C) activates the protein DnaA

(D) binds with okazaki fragments

73. Which of the following prokaryotic DNA polymerase is involved in replication of damaged DNA ?

(A) DNA polymerase I

(B) DNA polymerase II

(C) DNA polymerase III

(D) DNA polymerase IV and V

74. Proofreading activity of DNA polymerase is :

(A) 3'–5' exonuclease

(B) 5'–3' exonuclease

(C) 3'–5' polymerase

(D) 5'–3' polymerase

75. Speed of DNA replication is greater on :

(A) Leading strand

(B) Lagging strand

(C) Same on both leading and lagging strands

(D) Depends on enzyme

76. In which cell cycle stage of eukaryotes, DNA replication occurs ?

(A) G_1

(B) S

(C) G_2

(D) M

77. In eukaryotic cells, during DNA replication the RNA primers are synthesized by :

(A) Primase

(B) DNA polymerase alpha

(C) DNA polymerase beta

(D) DNA polymerase delta

78. During DNA replication, two adjacent nucleotides are joined to each other by :

(A) Peptide bond

(B) Glycosidic bond

(C) Phosphodiester bond

(D) Covalent bond

79. The Central Dogma Statement is usually written as :

(A) DNA $\rightarrow$ mRNA $\rightarrow$ Protein

(B) mRNA $\rightarrow$ DNA $\rightarrow$ Protein

(C) Protein $\rightarrow$ mRNA $\rightarrow$ DNA

(D) DNA $\rightarrow$ Protein $\rightarrow$ mRNA

80. RNA processing does not occur in :

(A) Prokaryotic mRNA

(B) Eukaryotic mRNA

(C) tRNA

(D) rRNA

81. Splicing of RNA involves :

(A) Removal of exons

(B) Removal of introns

(C) Formation of poly A tail

(D) 5' – capping

82. 5' cap of eukaryotic mRNA is :

(A) Methylated Adenine

(B) Methylated Guanine

(C) Methylated Cytosine

(D) Methylated Thymine

83. Deoxyribose sugar is found in :

(A) DNA

(B) RNA

(C) Both DNA and RNA

(D) Ribozyme

84. DNA replication is :

(A) Conservative

(B) Semi-conservative

(C) Dispersive

(D) All of the above

85. Uracil is found in :

(A) DNA

(B) RNA

(C) Both DNA and RNA

(D) None of the above

86. Semi-conservative mode of DNA replication was experimentally proved by :

(A) Mesolson and Stahl

(B) Watsen and Crick

(C) Franklin and Wilkinson

(D) Griffith

87. Griffith experiment proved that :

(A) DNA is genetic material

(B) RNA is genetic material

(C) Both can be genetic material

(D) Only viral genetic material enters inside the host cell

88. RNA can be genetic material in :

(A) Bacteria

(B) Virus

(C) Lichen

(D) Eukaryotes

89. Unusual modified bases are found in :

(A) mRNA

(B) rRNA

(C) tRNA

(D) DNA

90. Plasmids are found in :

(A) Viruses

(B) Bacteria

(C) Fungus

(D) Mammalian cell line

91. Eukaryotic mRNA contains :

(A) 5' cap

(B) 3' tail

(C) Introns

(D) All of the above

92. Translation is :

(A) Synthesis of RNA from DNA

(B) Synthesis of DNA from RNA

(C) Synthesis of protein from RNA

(D) Synthesis of protein from DNA

93. A codon of genetic code contains :

(A) 1 nucleotide

(B) 2 nucleotide

(C) 3 nucleotide

(D) 4 nucleotide

94. Genetic code is comprised of :

(A) 16 codons

(B) 32 codons

(C) 64 codons

(D) 128 codons

95. Ribosomes are involved in :

(A) Lipid synthesis

(B) Protein synthesis

(C) Glycogen synthesis

(D) Nucleic acid synthesis

96. Which of the following group of codons are termination codons ?

(A) UAG, UGA, UAA

(B) AUG, GUA, UAC

(C) AUA, AGA, ACA

(D) GAG, GAC, GAA

97. What is role of tRNA in protein synthesis ?

(A) Activation of amino acids

(B) Delivery of amino acids

(C) Peptide bond formation

(D) All of the above

98. Which site of tRNA molecule bonds to mRNA molecule ?

(A) Anticodon

(B) Codon

(C) 3' end

(D) 5' end

99. In prokaryotes, the first amino acid of polypeptide chain is :

(A) Tryptophan

(B) Leucine

(C) Valine

(D) Methionine

100. Which of the following enzyme is involved is activation of amino acids during translation ?

(A) Peptidyl transferase

(B) Amino acetyl tRNA synthetase

(C) Amino acid activase

(D) Amino acid synthetase

Rough Work

Example :

Question :

Q.1 Ⓐ ● Ⓒ Ⓓ
Q.2 Ⓐ Ⓑ ● Ⓓ
Q.3 Ⓐ ● Ⓒ Ⓓ

If more than 75 questions are attempted by candidate, then the first attempted 75 questions will be considered for evaluation.

4. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
5. 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.
6. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
7. After the completion of the examination, candidates should leave the examination hall only after providing their question booklet and OMR Answer Sheet separately to the invigilator.
8. There will be no negative marking.
9. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
10. To bring and use of log-book, calculator, pager & cellular phone in examination hall is prohibited.
11. 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 any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

उदाहरण :

प्रश्न :

प्रश्न 1 Ⓐ ● Ⓒ Ⓓ
प्रश्न 2 Ⓐ Ⓑ ● Ⓓ
प्रश्न 3 Ⓐ ● Ⓒ Ⓓ

यदि परीक्षार्थी द्वारा 75 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 75 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा।

4. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
5. सभी उत्तर केवल ओ०एम०आर० 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।
6. ओ०एम०आर० उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
7. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक-पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
8. निगेटिव मार्किंग नहीं है।
9. कोई भी रफ कार्य, प्रश्न-पुस्तिका में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
10. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
11. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्णः प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।