Roll No. .....

Question Booklet Number

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

B. Sc. (Biotechnology) (Second Semester)

EXAMINATION, July, 2022

GENE ORGANIZATION, EXPRESSION & REGULATION

Paper Code								
BBT	2	0	0	4	/	GE	0	2	(A)

Questions Booklet Series
B

Time : 1:30 Hours] [*Maximum Marks : 100*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer any 75 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 75 questions are attempted by student, then the first attempted 75 questions will be considered for evaluation. All questions carry equal marks.
3. 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 :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को किन्हीं 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 75 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 75 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। 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) (शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. The primers are excised by DNA polymerase :

(A) II

(B) III

(C) I

(D) δ

2. Gene consists of :

(A) only exons

(B) only introns

(C) Both exon and intron

(D) Neither exon nor intron

3. One of the following is not a non-coding gene :

(A) rRNA

(B) tRNA

(C) microRNA

(D) mRNA

4. The proteins are synthesized in :

(A) Ribosomes

(B) Mitochondria

(C) Golgi body

(D) Lysosomes

5. Exons are sequences carrying :

(A) no genetic information

(B) all the genetic information

(C) only information for mitochondria

(D) only information for ribosomes

6. The percent of human genome responsible for coding proteins is :

(A) 5-6%

(B) 1-2%

(C) 15-20%

(D) 3-4%

7. The introns are removed by splicing during :

(A) replication

(B) translation

(C) transcription

(D) mutation

8. Primase is found in :

(A) fungi

(B) amoeba

(C) pea

(D) bacteria

9. The number of nucleotides in Okazaki fragments :

(A) 1000-2000

(B) 2000-3000

(C) 3000-4000

(D) 4000-5000

10. A gene is a segment of :

(A) RNA

(B) DNA

(C) Protein

(D) Glucose units

11. The central dogma of molecular biology :

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

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

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

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

12. Reverse Transcription occurs in :

(A) Virus

(B) Bacteria

(C) Chlorella

(D) Yeast

13. Pseudogenes form as a result of :

(A) Replication

(B) Transcription

(C) Mutation

(D) Recombination

14. The information in DNA is a sequence of :

(A) ribose sugars

(B) deoxyribose sugars

(C) phosphate groups

(D) bases

15. The DNA strand copied as mRNA is :

(A) sense strand

(B) antisense strand

(C) maybe sense or antisense

(D) neither sense nor antisense

16. The transcription continues till RNA polymerase reaches :

(A) promoter

(B) inducer

(C) terminator

(D) origin of transcription

17. The chain termination occurs by addition of :

(A) poly U

(B) poly T

(C) poly G

(D) poly A

18. The process of removal of intervening gene sequences is :

(A) Ligation

(B) Supercoiling

(C) Splicing

(D) Proofreading

19. The addition of guanosine residue at 5′ end is :

(A) termination

(B) excision

(C) splicing

(D) capping

20. The genetic code is :

(A) two lettered

(B) single lettered

(C) three lettered

(D) four lettered

21. One of the following does not code for protein :

(A) UGA

(B) GUU

(C) GCU

(D) UUU

22. The number of codons specifying proteins :

(A) 65

(B) 64

(C) 61

(D) 63

23. The number of proteins specified by one codon :

(A) twenty

(B) one

(C) two

(D) ten

24. Which is not a feature of genetic code ?

(A) overlapping

(B) unambiguous

(C) degeneracy

(D) commaless

25. The protein synthesis is directed by :

(A) rRNA

(B) tRNA

(C) mRNA

(D) rRNA and tRNA

26. Exception to universal genetic code is :

(A) Mycoplasma

(B) Amoeba

(C) Hydra

(D) Virus

27. The secondary structure of tRNA is :

(A) a crescent

(B) clover leaf

(C) triangle

(D) helix

28. The following does not have synonymous codon :

(A) Serine

(B) Arginine

(C) Methionine

(D) Leucine

29. Who of the following is not associated with deduction of genetic code ?

(A) H. G. Khorana

(B) Watson

(C) Nirenberg

(D) Ochoa

30. Aminoacyl-tRNA synthetases help in attachment of amino acid to :

(A) rRNA

(B) mRNA

(C) tRNA

(D) DNA

31. Ribosomes are absent in :

(A) macrophages

(B) leukocytes

(C) platelets

(D) RBCs

32. The A & P site of ribosomes bind to :

(A) amino acid

(B) amino-acyl-tRNA

(C) mRNA

(D) tRNA

33. The peptide bond is formed only on occupation of :

(A) A site

(B) P site

(C) Both A and P site

(D) Neither A nor P site

34. The translation initiation complex in eukaryotes contains :

(A) methionine

(B) leucine

(C) formyl-methionine

(D) arginine

35. The amino-acids are added to polypeptide chain by :

(A) termination factors

(B) initiation factors

(C) elongation factors

(D) GTP

36. The bond formed between carboxyl group at P site and aminoacyl-tRNA at A site is called :

(A) hydrogen bond

(B) peptide bond

(C) phosphate bond

(D) sulphide bond

37. Enzymes of ..... are clustered together in a bacterial operon.

(A) metabolic pathway

(B) transcription

(C) transfusion

(D) transformation

38. When was the operation mechanism of a bacterial operon first elucidated ?

(A) 1961

(B) 1971

(C) 1981

(D) 1991

39. The lac operon consists of ..... structural genes.

(A) 4

(B) 1

(C) 3

(D) 2

40. The number of histones in the core of a nucleosome is :

(A) 4

(B) 1

(C) 3

(D) 2

41. RNA interference helps in :

(A) cell proliferation

(B) cell defence

(C) cell differentiation

(D) micropropagation

42. Genes essentials for cell function are :

(A) inducible genes

(B) tissue-specific genes

(C) house-keeping genes

(D) promoter genes

43. The structural genes of lac operon encode enzymes for breakdown of :

(A) Fructose

(B) Galactose

(C) Lactose

(D) Sucrose

44. The expression of structural genes occurs when operator binds to :

(A) repressor

(B) inducer

(C) promoter

(D) None of the above

45. Operon model was proposed by :

(A) Hershey and Chase

(B) Meselson and Stahl

(C) Watson and Crick

(D) Jacob and Monad

46. Initiation of transcription is prevented if promoter sequences fall in :

(A) introns

(B) linker DNA

(C) nucleosomes

(D) split genes

47. The enzyme Dicer creates :

(A) siRNAs

(B) rRNA

(C) tRNA

(D) mRNA

48. Transition is a change from :

(A) $A \rightarrow G$

(B) $A \rightarrow C$

(C) $G \rightarrow C$

(D) $A \rightarrow T$

49. Which of the following dimer formation is more common ?

(A) Thymidine dimer

(B) Cytidine dimer

(C) Both (A) and (B)

(D) None of the above

50. Dimer repair mechanism includes :

(A) Excision

(B) Photoactivation

(C) Recombination repair

(D) All of the above

51. The enzyme involved in light induced DNA repair mechanism :

(A) photoligase

(B) photolyase

(C) DNA glycosylase

(D) All of the above

52. The first base sequence of tRNA was reported by :

(A) H. G. Khorana

(B) R Holley

(C) Nirenberg

(D) Ochoa

53. The enzyme which initiates base excision repair mechanism :

(A) photolyase

(B) DNA glycosylase

(C) DNA polymerase

(D) RNA polymerase

54. Who proposed holiday model for homologous recombination ?

(A) Govind Khorana

(B) Louis Pasteur

(C) Robin Holiday

(D) Niels Bohr

55. What is the other name of DSB repair pathway ?

(A) RecBAD pathway

(B) RecBCD pathway

(C) RecABD pathway

(D) RecDCB pathway

56. What is resolution ?

(A) Cleavage of holiday junction

(B) Regeneration of duplex DNA molecule

(C) Exchange of DNA fragments

(D) Heterochromatin structure formation

57. Which of the following is not a function of reverse transcriptase ?

(A) RNA dependent DNA polymerase

(B) DNA dependent DNA polymerase

(C) RNase H

(D) Exonuclease

58. In trp operon the co-repressor is :

(A) tryptophan

(B) lactose

(C) glucose

(D) β-galactoside

59. The operon consists of :

(A) operator and structural genes

(B) operator, regulator, repressor

(C) promoter and all of the above

(D) only structural genes

60. In lac operon system lac gene z codes for :

(A) permease

(B) repressor

(C) transacetylase

(D) 3-galactosidase

61. Regulation of the lac operon by repressor is referred to as :

(A) positive

(B) negative

(C) feedback

(D) None of the above

62. Regulatory genes are :

(A) code for repressor proteins

(B) transcribed continuously

(C) not contained in the operon they control

(D) All of the above

63. An antibiotic that inhibits translation in both eukaryotes and prokaryotes :

(A) tetracycline

(B) actinomycin D

(C) chloromycetin

(D) puromycin

64. RNA polymerase is capable of catalyzing :

(A) initiation

(B) elongation

(C) termination

(D) All of the above

65. Transcription takes place in :

(A) cytoplasm

(B) nucleus

(C) matrix

(D) cytosol

66. Sequence-specific DNA-binding proteins generally interact with major group of :

(A) B-DNA

(B) A-DNA

(C) Z-DNA

(D) C-DNA

67. Structural proteins organize the DNA into a compact structure called :

(A) chromosomes

(B) chromatin

(C) ribosomes

(D) organelles

68. Hypoxanthine is the nucleobase of :

(A) cytosine

(B) inosine

(C) trypsin

(D) valine

69. Degeneracy of code results because there are more codons than :

(A) decodable amino acids

(B) encodable amino acids

(C) encodable DNA

(D) encodable RNA

70. In transcription, the particular segment of DNA is copied to RNA by the enzyme :

(A) DNA polymerase

(B) RNA polymerase

(C) gyrase

(D) helicase

71. In prokaryotes, the small 30S ribosomal subunit contains the :

(A) 16S rRNA

(B) 20S rRNA

(C) 24S rRNA

(D) 28S rRNA

72. The intervening sequences, present in split genes are called :

(A) exon

(B) intron

(C) primer

(D) promoter

73. The main function of tRNA with regards to protein synthesis is :

(A) Proofreading

(B) Identification and transport of amino acids to ribosomes

(C) Inhibit protein synthesis

(D) All of the above

74. Which of these subunits is essential to initiate transcription ?

(A) alpha

(B) sigma

(C) omega

(D) beta

75. Transcription in eukaryotes is initiated when :

(A) RNA strand is present

(B) RNA polymerase is present

(C) Core promoter sequence is present

(D) None of the above

76. Transcription occurs in :

(A) mitochondria

(B) ribosome

(C) nucleus

(D) cytoplasm

77. DNA is the genetic material was proved by :

(A) Griffith

(B) Mendel

(C) Newton

(D) Darwin

78. The double helix model of DNA was given by :

(A) Meselson and Stahl

(B) Watson and Crick

(C) Morgan and Meselson

(D) Muller and Stahl

79. Translation occurs in :

(A) mitochondria

(B) ribosome

(C) nucleus

(D) cytoplasm

80. Hershey and Chase conducted experiments on :

(A) fungi

(B) pea

(C) bacteriophage

(D) bacteria

81. The isotope of nitrogen used in genetic experiments :

(A) N^{13}

(B) N^{14}

(C) N^{12}

(D) N^{15}

82. Replication starts at origin of :

(A) replication

(B) translation

(C) transcription

(D) both replication and transcription

83. The replication fork moves in :

(A) one direction

(B) two directions

(C) both (A) and (B) are correct

(D) does not move

84. The replication starts with DNA :

(A) unwinding

(B) supercoiling

(C) no change in coiling

(D) coiling is not important in replication

85. Helicases use the energy of :

(A) ATP

(B) GTP

(C) Neither ATP nor GTP

(D) helicases are themselves energy molecules

86. DNA replication is semi-conservative was proved by :

(A) Meselson and Stahl

(B) Watson and Crick

(C) Morgan and Meselson

(D) Muller and Stahl

87. DNA coiling is affected by :

(A) single strand binding proteins

(B) helicases

(C) polymerases

(D) primases

88. DNA polymerases can synthesise DNA only in :

(A) $3' \rightarrow 5'$

(B) $5' \rightarrow 3'$

(C) Both $3' \rightarrow 5'$ and $5' \rightarrow 3'$

(D) Neither $3' \rightarrow 5'$ nor $5' \rightarrow 3'$

89. DNA ligase forms :

(A) sulphur bonds

(B) hydrogen bonds

(C) phosphodiester bonds

(D) peptide bonds

90. Primases create :

(A) DNA segment

(B) RNA segment

(C) protein segment

(D) lipid segment

91. Which of the following polymerases facilitates DNA replication in prokaryotes ?

(A) Polymerase I

(B) Polymerase II

(C) Polymerase III

(D) Polymerase δ

92. The segments of lagging strand are known as :

(A) Klenow fragments

(B) Okazaki fragment

(C) Restriction fragment

(D) Recombinant fragment

93. Nucleotides add to :

(A) 3′- NH_2 end

(B) 3′-COO end

(C) 3′-OH end

(D) 3′-CO end

94. The Okazaki fragments are joined by :

(A) primases

(B) ligases

(C) polymerases

(D) hydrolases

95. The replication of plasmids starts :

(A) under control of chloroplast DNA

(B) under control of mitochondrial DNA

(C) under control of genomic DNA

(D) independently of genomic DNA

96. The bacterial genome is limited to :

(A) cell wall

(B) nucleus

(C) nucleoid

(D) ribosomes

97. Rolling circle replication occurs in :

(A) fungi

(B) bacteria

(C) algae

(D) lichens

98. DNA replication occurs in :

(A) Prophase

(B) Telpohase

(C) M phase

(D) S phase

99. ..... does not occur in replication.

(A) Initiation

(B) Elongation

(C) Synapsis

(D) Termination

100. The viruses have only :

(A) DNA

(B) RNA

(C) Both RNA and DNA

(D) Either RNA or DNA

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

Example :

Question :

Q. 1 (A) ● (C) (D)
Q. 2 (A) (B) ● (D)
Q. 3 (A) ● (C) (D)

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.

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

उदाहरण :

प्रश्न :

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

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

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।

6. 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।

7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।

8. 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।

10. 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।

12. 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 भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।