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
D

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 enzyme involved in light induced DNA repair mechanism :

(A) photoligase

(B) photolyase

(C) DNA glycosylase

(D) All of the above

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

(A) H. G. Khorana

(B) R Holley

(C) Nirenberg

(D) Ochoa

3. The enzyme which initiates base excision repair mechanism :

(A) photolyase

(B) DNA glycosylase

(C) DNA polymerase

(D) RNA polymerase

4. Who proposed holiday model for homologous recombination ?

(A) Govind Khorana

(B) Louis Pasteur

(C) Robin Holiday

(D) Niels Bohr

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

(A) RecBAD pathway

(B) RecBCD pathway

(C) RecABD pathway

(D) RecDCB pathway

6. What is resolution ?

(A) Cleavage of holiday junction

(B) Regeneration of duplex DNA molecule

(C) Exchange of DNA fragments

(D) Heterochromatin structure formation

7. 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

8. In trp operon the co-repressor is :

(A) tryptophan

(B) lactose

(C) glucose

(D) β-galactoside

9. The operon consists of :

(A) operator and structural genes

(B) operator, regulator, repressor

(C) promoter and all of the above

(D) only structural genes

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

(A) permease

(B) repressor

(C) transacetylase

(D) 3-galactosidase

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

(A) positive

(B) negative

(C) feedback

(D) None of the above

12. Regulatory genes are :

(A) code for repressor proteins

(B) transcribed continuously

(C) not contained in the operon they control

(D) All of the above

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

(A) tetracycline

(B) actinomycin D

(C) chloromycetin

(D) puromycin

14. RNA polymerase is capable of catalyzing :

(A) initiation

(B) elongation

(C) termination

(D) All of the above

15. Transcription takes place in :

(A) cytoplasm

(B) nucleus

(C) matrix

(D) cytosol

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

(A) B-DNA

(B) A-DNA

(C) Z-DNA

(D) C-DNA

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

(A) chromosomes

(B) chromatin

(C) ribosomes

(D) organelles

18. Hypoxanthine is the nucleobase of :

(A) cytosine

(B) inosine

(C) trypsin

(D) valine

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

(A) decodable amino acids

(B) encodable amino acids

(C) encodable DNA

(D) encodable RNA

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

(A) DNA polymerase

(B) RNA polymerase

(C) gyrase

(D) helicase

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

(A) 16S rRNA

(B) 20S rRNA

(C) 24S rRNA

(D) 28S rRNA

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

(A) exon

(B) intron

(C) primer

(D) promoter

23. 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

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

(A) alpha

(B) sigma

(C) omega

(D) beta

25. 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

26. Transcription occurs in :

(A) mitochondria

(B) ribosome

(C) nucleus

(D) cytoplasm

27. DNA is the genetic material was proved by :

(A) Griffith

(B) Mendel

(C) Newton

(D) Darwin

28. 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

29. Translation occurs in :

(A) mitochondria

(B) ribosome

(C) nucleus

(D) cytoplasm

30. Hershey and Chase conducted experiments on :

(A) fungi

(B) pea

(C) bacteriophage

(D) bacteria

31. The isotope of nitrogen used in genetic experiments :

(A) N^{13}

(B) N^{14}

(C) N^{12}

(D) N^{15}

32. Replication starts at origin of :

(A) replication

(B) translation

(C) transcription

(D) both replication and transcription

33. The replication fork moves in :

(A) one direction

(B) two directions

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

(D) does not move

34. The replication starts with DNA :

(A) unwinding

(B) supercoiling

(C) no change in coiling

(D) coiling is not important in replication

35. Helicases use the energy of :

(A) ATP

(B) GTP

(C) Neither ATP nor GTP

(D) helicases are themselves energy molecules

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

(A) Meselson and Stahl

(B) Watson and Crick

(C) Morgan and Meselson

(D) Muller and Stahl

37. DNA coiling is affected by :

(A) single strand binding proteins

(B) helicases

(C) polymerases

(D) primases

38. 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 $5' \rightarrow 3'$

39. DNA ligase forms :

(A) sulphur bonds

(B) hydrogen bonds

(C) phosphodiester bonds

(D) peptide bonds

40. Primases create :

(A) DNA segment

(B) RNA segment

(C) protein segment

(D) lipid segment

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

(A) Polymerase I

(B) Polymerase II

(C) Polymerase III

(D) Polymerase δ

42. The segments of lagging strand are known as :

(A) Klenow fragments

(B) Okazaki fragment

(C) Restriction fragment

(D) Recombinant fragment

43. Nucleotides add to :

(A) $3'\text{-}NH_2$ end

(B) 3′-COO end

(C) 3′-OH end

(D) 3′-CO end

44. The Okazaki fragments are joined by :

(A) primases

(B) ligases

(C) polymerases

(D) hydrolases

45. 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

46. The bacterial genome is limited to :

(A) cell wall

(B) nucleus

(C) nucleoid

(D) ribosomes

47. Rolling circle replication occurs in :

(A) fungi

(B) bacteria

(C) algae

(D) lichens

48. DNA replication occurs in :

(A) Prophase

(B) Telpohase

(C) M phase

(D) S phase

49. ..... does not occur in replication.

(A) Initiation

(B) Elongation

(C) Synapsis

(D) Termination

50. The viruses have only :

(A) DNA

(B) RNA

(C) Both RNA and DNA

(D) Either RNA or DNA

51. The primers are excised by DNA polymerase :

(A) II

(B) III

(C) I

(D) δ

52. Gene consists of :

(A) only exons

(B) only introns

(C) Both exon and intron

(D) Neither exon nor intron

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

(A) rRNA

(B) tRNA

(C) microRNA

(D) mRNA

54. The proteins are synthesized in :

(A) Ribosomes

(B) Mitochondria

(C) Golgi body

(D) Lysosomes

55. Exons are sequences carrying :

(A) no genetic information

(B) all the genetic information

(C) only information for mitochondria

(D) only information for ribosomes

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

(A) 5-6%

(B) 1-2%

(C) 15-20%

(D) 3-4%

57. The introns are removed by splicing during :

(A) replication

(B) translation

(C) transcription

(D) mutation

58. Primase is found in :

(A) fungi

(B) amoeba

(C) pea

(D) bacteria

59. The number of nucleotides in Okazaki fragments :

(A) 1000-2000

(B) 2000-3000

(C) 3000-4000

(D) 4000-5000

60. A gene is a segment of :

(A) RNA

(B) DNA

(C) Protein

(D) Glucose units

61. 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) $RNA \rightarrow Protein \rightarrow DNA$

62. Reverse Transcription occurs in :

(A) Virus

(B) Bacteria

(C) Chlorella

(D) Yeast

63. Pseudogenes form as a result of :

(A) Replication

(B) Transcription

(C) Mutation

(D) Recombination

64. The information in DNA is a sequence of :

(A) ribose sugars

(B) deoxyribose sugars

(C) phosphate groups

(D) bases

65. The DNA strand copied as mRNA is :

(A) sense strand

(B) antisense strand

(C) maybe sense or antisense

(D) neither sense nor antisense

66. The transcription continues till RNA polymerase reaches :

(A) promoter

(B) inducer

(C) terminator

(D) origin of transcription

67. The chain termination occurs by addition of :

(A) poly U

(B) poly T

(C) poly G

(D) poly A

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

(A) Ligation

(B) Supercoiling

(C) Splicing

(D) Proofreading

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

(A) termination

(B) excision

(C) splicing

(D) capping

70. The genetic code is :

(A) two lettered

(B) single lettered

(C) three lettered

(D) four lettered

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

(A) UGA

(B) GUU

(C) GCU

(D) UUU

72. The number of codons specifying proteins :

(A) 65

(B) 64

(C) 61

(D) 63

73. The number of proteins specified by one codon :

(A) twenty

(B) one

(C) two

(D) ten

74. Which is not a feature of genetic code ?

(A) overlapping

(B) unambiguous

(C) degeneracy

(D) commaless

75. The protein synthesis is directed by :

(A) rRNA

(B) tRNA

(C) mRNA

(D) rRNA and tRNA

76. Exception to universal genetic code is :

(A) Mycoplasma

(B) Amoeba

(C) Hydra

(D) Virus

77. The secondary structure of tRNA is :

(A) a crescent

(B) clover leaf

(C) triangle

(D) helix

78. The following does not have synonymous codon :

(A) Serine

(B) Arginine

(C) Methionine

(D) Leucine

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

(A) H. G. Khorana

(B) Watson

(C) Nirenberg

(D) Ochoa

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

(A) rRNA

(B) mRNA

(C) tRNA

(D) DNA

81. Ribosomes are absent in :

(A) macrophages

(B) leukocytes

(C) platelets

(D) RBCs

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

(A) amino acid

(B) amino-acyl-tRNA

(C) mRNA

(D) tRNA

83. 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

84. The translation initiation complex in eukaryotes contains :

(A) methionine

(B) leucine

(C) formyl-methionine

(D) arginine

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

(A) termination factors

(B) initiation factors

(C) elongation factors

(D) GTP

86. 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

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

(A) metabolic pathway

(B) transcription

(C) transfusion

(D) transformation

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

(A) 1961

(B) 1971

(C) 1981

(D) 1991

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

(A) 4

(B) 1

(C) 3

(D) 2

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

(A) 4

(B) 1

(C) 3

(D) 2

91. RNA interference helps in :

(A) cell proliferation

(B) cell defence

(C) cell differentiation

(D) micropropagation

92. Genes essentials for cell function are :

(A) inducible genes

(B) tissue-specific genes

(C) house-keeping genes

(D) promoter genes

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

(A) Fructose

(B) Galactose

(C) Lactose

(D) Sucrose

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

(A) repressor

(B) inducer

(C) promoter

(D) None of the above

95. Operon model was proposed by :

(A) Hershey and Chase

(B) Meselson and Stahl

(C) Watson and Crick

(D) Jacob and Monad

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

(A) introns

(B) linker DNA

(C) nucleosomes

(D) split genes

97. The enzyme Dicer creates :

(A) siRNAs

(B) rRNA

(C) tRNA

(D) mRNA

98. Transition is a change from :

(A) $A \rightarrow G$

(B) $A \rightarrow C$

(C) $G \rightarrow C$

(D) $A \rightarrow T$

99. 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

100. Dimer repair mechanism includes :

(A) Excision

(B) Photoactivation

(C) Recombination repair

(D) All of the above

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।