Roll. No. .....

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

Question Booklet Number

B.Sc. (PART-III) EXAMINATION, 2021
BIOTECHNOLOGY
[PAPER FIRST (BBT-301)]
(Recombiant DNA Technology)

Paper ID		
6	0	1

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. Which enzyme is involved in the synthesis of cDNA from an mRNA ?

(A) DNA polymerase

(B) Klenow fragment

(C) Reverse transcriptase

(D) RNA polymerase

2. The ordered steps for the construction of library involves :

(I) Vector preparation

(II) Amplification

(III) Ligation and introduction into the host

(IV) Isolation of genomic DNA

(V) Fragmentation of DNA

(A) IV, V, I, III, II

(B) I, II, III, IV, V

(C) V, IV, I, III, II

(D) II, III, IV, V, I

3. Which of the following gene therapy can prevent the disease in his future generation ?

(A) in vivo gene therapy

(B) ex vivo gene therapy

(C) Somatic gene therapy

(D) Germline gene therapy

4. What is the significance of S1 nuclease ?

(A) Cleavage of ss DNA hooks

(B) Degrades RNA

(C) Annealing the primer

(D) None of these

5. When nick occus in DNA strand, it :

(A) exposes 3' – OH termini and 5'- PO_4 termini

(B) exposes 3'- PO_4^- termini and 5'-OH termini

(C) addition of nucleotide to free –OH group

(D) none of the above

6. Agarose gel is used to separate :

(A) DNA

(B) RNA

(C) Nucleic acids

(D) Protein

7. mRNA can be readily separated from lysed eukaryotic cells adding magnetic beads. What is the sequence of this magnetic bead ?

(A) oligo G

(B) oligo T

(C) oligo C

(D) oligo A

8. The process by which a probe is used to screen a DNA library is called :

(A) Hybridization

(B) Colony hybridization

(C) Western blotting

(D) Southern blotting

9. Which of the following is not an essential feature for being a perfect vector ?

(A) Origin of replication

(B) Selectable marker

(C) MCS

(D) Virulent gene

10. What does the gene (LEU2) code for ?

(A) Lactose

(B) Leucine

(C) Dehydrogenase (β-Isopropyl-malate dehydrogenase)

(D) Oxidase

11. The process by which every type of transformant can be identified is :

(A) Western blotting

(B) Insertional inactivation

(C) Replica plating

(D) All of the above

12. DNA solution injected directly into the cell using micromanipulator is known as :

(A) Macroinjection

(B) Micromanipulation

(C) Microinjection

(D) Microinfection

13. With respect to RAPD which of the following is false ?

(A) 10 base long

(B) G/C rich

(C) Has inverted repeats

(D) Random sequences are used

14. Which of the following does not affect hybridization of DNA ?

(A) Pressure

(B) Ionic strength

(C) Temperature

(D) Homologous DNA

15. What is a Probe ?

(A) Chemically synthesized DNA

(B) Purified DNA

(C) Fragmented DNA duplex

(D) Either purified or synthesized single stranded labelled DNA molecule

16. The vector commonly used for sequencing human genome is :

(A) YAC

(B) pUC 18

(C) CaMV

(D) YEP

17. Which of the following is not a restriction endonuclease ?

(A) EcoR I

(B) Sal I

(C) DNase I

(D) Sau 3A I

18. Which of the following statements are true ?

(A) Vir genes are essential for gene transfer

(B) T-DNA borders are essential for gene transfer

(C) Both (A) and (B)

(D) None of the above

19. The principle of Sanger's method relies on :

(A) Use of chemicals for base specific cleavage

(B) Use of dNTPs

(C) Use of ddNTPs

(D) None of the above

20. The injection of DNA into developing inflorescence using a hypodermic syringe is known as :

(A) Macroinjection

(B) Microfection

(C) Microinjection

(D) Microtransformation

21. Creation of a mutant protein with novel properties is known as :

(A) Cloning

(B) Protein engineering

(C) Mutagenesis

(D) Sequencing

22. All the Primer extension methods of mutagenesis require __ template.

(A) Double stranded

(B) Single stranded

(C) Degraded

(D) Any one of the above

23. Which of the following is a biological method for gene transfer ?

(A) Electroporation

(B) Microinjection

(C) Baculoviral vector system

(D) Gene Gun method

24. ARS is characteristic feature of :

(A) Plasmid Vectors

(B) Phage Vectors

(C) Yeast Vectors

(D) M13 Vectors

25. Vectors designed to replicate in cells of two different species are known as :

(A) Phasmids

(B) Transfer Vectors

(C) Shuttle Vectors

(D) Phagemids

26. Polymerase generally used for PCR is extracted from :

(A) Escherichia Coli

(B) Thermus aquaticus

(C) S. Aureus

(D) S. Cerevisiae

27. At what temperature do denaturation of DNA double helix takes place ?

(A) 60ºC

(B) 72ºC

(C) 98ºC

(D) 94ºC

28. Which DNA is restricted for making a genomic library ?

(A) Plasmid

(B) Genomic

(C) rDNA

(D) cDNA

29. The Clarke and Carbon formula relates the _____ of including a DNA fragment in a random library.

(A) Effects

(B) Probability

(C) Vector requirement

(D) None of the above

30. The 'Charan Series' belongs to :

(A) Genes

(B) Vectors

(C) Host

(D) Enzymes

31. The removal of tumor causing genes from Ti plasmid is known as :

(A) gene replacement

(B) disarming

(C) insertion

(D) gene displacement

32. p BIN 19 is :

(A) binary vector

(B) widely used plant transformation vector

(C) zero copy no. plasmid vector

(D) all of these

33. Autoradiography is a :

(A) Detection technique

(B) Blotting technique

(C) Immobilization technique

(D) Hybridization technique

34. The first type II enzyme isolated was :

(A) EcoR I

(B) Hend III

(C) Bam HI

(D) Sal I

35. Ligation takes place between :

(A) Adaptor and linker

(B) Linker and vector

(C) 5'-P terminus 3'-OH terminus

(D) Adaptor and vector

36. Digoxigenin is widely used for :

(A) Nucleic acid labelling

(B) Nick translation

(C) Both (A) and (B)

(D) None of these

37. E.coli β –galactosidase gene is used :

(A) as a reporter gene

(B) for α-complementation

(C) in blue-white screening

(D) All of these

38. Which one is not a GMO ?

(A) Dolly

(B) Tetra

(C) Golden Rice

(D) Cry genes

39. Libraries using phage cloning vectors are often kept as :

(A) Unpackaged phage

(B) Packaged phage

(C) Both packaged and unpackaged phage

(D) None of these

40. To avoid self ligation of digested plasmid DNA, which of the enzyme is used ?

(A) Phosphatase

(B) Kenase

(C) Ligase

(D) EcoR I

41. A plasmid :

(A) is a CCC DNA

(B) always contains an ori

(C) usually contains one or more restriction sites

(D) all of the above

42. Which of the following is the genetically engineered insulin ?

(A) Humulin

(B) Rumulin

(C) H-insulin

(D) R-insulin

43. Active Insulin consists of how many polypeptide chains ?

(A) 1

(B) 2

(C) 3

(D) 4

44. Pick the odd one out :

(A) Somatotropin

(B) Insulin

(C) Somatostatin

(D) β-endorphin

45. The major enzyme required for the production of a chimeric protein is :

(A) Integrase

(B) Reverse transcriptase

(C) Polymerase

(D) Restriction endonuclease

46. Pick the odd one out :

(A) Vitamins

(B) Antibodies

(C) Antibiotics

(D) Ethanol

47. Which of the following is not a DNA sequencing method ?

(A) LMPCR

(B) Edman's method

(C) Sanger's method

(D) Maxam-Gilbert method

48. The insulin 'A' vector does not contain :

(A) Lac Z

(B) Amp^R

(C) Lac promoter

(D) β–Chain

49. T4 DNA ligase is used to legate :

(A) Cohesive ends

(B) Blunt ended termini

(C) Synthetic linkers or Adaptors

(D) All of these

50. Full length cDNA can be obtained by :

(A) Affinity capture method using eIF-4E

(B) Biotinylated CAP Trapper

(C) Oligo-caping method

(D) All of these

51. Taq Man® Probe is :

(A) Radiolabelled ds DNA of 50 bases

(B) ss oligonucleotide of 20-26 bases with fluorophore

(C) ds oligonucleotide of 50 bases with florophore

(D) All of these

52. Restriction enzymes :

(A) are present in bacteria and are involved in host restriction system

(B) cleave viral DNA inside bacterium

(C) are enzymes involved in defence against bacteriophage

(D) All of these

53. The insert size for YAC vector is :

(A) < 40 Kbp

(B) > 40 Kbp

(C) < 20 Kbp

(D) > 20 Kbp

54. CAPS stands for :

(A) Cluster Amplified Polymorphic Sequence

(B) Cleaved – Abundant Polymorphic Sequence

(C) Cleaved – Amplified Polymorphic Sequence

(D) None of these

55. p EMBL is a :

(A) Plasmid vector

(B) Phagemid vector

(C) Fosmids

(D) None of these

56. Vectors used for genomic-library are :

(A) λ gt 10

(B) λ ZAP

(C) BACs

(D) pUC 18

57. Green fluorescent protein (gfp) gene is a :

(A) Marker gene

(B) Pseudo gene

(C) Reporter gene

(D) Split gene

58. Immobilization of Nucleic acid by baking is carried out at :

(A) 50ºC

(B) 80ºC

(C) 60ºC

(D) 72ºC

59. The gene formed by the Joining of DNA segments from two different sources are known as :

(A) Joined gene

(B) Chimeric gene

(C) Foreign gene

(D) Recombinant gene

60. Who discovered restriction enzymes ?

(A) Watson, Crick and Wilkins in 1970

(B) Nathan, Arber and Smith in 1970

(C) Paul Berg

(D) Boyer and Cohen

61. Any DNA molecule that has the ability to replicate in an appropriate host cell, to which the desired gene are integrated for cloning, is called as :

(A) Plasmid

(B) Phage

(C) Vector

(D) None of the above

62. The process or phenomenon of intake of DNA fragment from the surrounding medium by a cell is known as :

(A) Transduction

(B) Transfection

(C) Conjugation

(D) Transformation

63. Which of the following enzyme is used to cut DNA molecule in rDNA technology ?

(A) Ligase

(B) Polymerase

(C) Restriction endonuclease

(D) Transcriptase

64. Taq Polymerase is used in PCR because of its :

(A) high fidelity

(B) high processivity

(C) high thermal stability

(D) none of the above

65. Introduction of rDNA into Bacterial cell by using current is known as :

(A) Transformation

(B) Electroporation

(C) Transduction

(D) Microinjection

66. Alkaline Phosphatase removes :

(A) Terminal Phosphate from 3' end

(B) Terminal Phosphate from 5' end

(C) Terminal Phosphate from both the end

(D) None of the above

67. The transformation method that uses tungsten or gold particle coated with DNA accelerated at high velocity is called :

(A) DNA particle delivery method

(B) Particle gun delivery method

(C) Lipofection

(D) Microinjection

68. Yeast episomal plasmids have the following features :

(A) two origin of replication ori of ColE1 and 2 μ plasmid

(B) ARS and 2 μ ori

(C) ARS and CEN

(D) CEN and URA3

69. The virus mediated gene transfer using genetically engineered λ phage is known as :

(A) Transduction

(B) Transfection

(C) Transformation

(D) Conjugation

70. Which of the following bacterium is known as 'natural genetic engineer ?

(A) Agrobacterium tumefaciens

(B) Agrobacterium radiobactor

(C) Thermus aquaticus

(D) S. aureus

71. During electrophoresis denaturation of dsDNA is carried out by :

(A) Treatment with alkali

(B) Application of current

(C) Application of heat

(D) None of the above

72. The inheritance pattern of RFLP is :

(A) Dominant

(B) Recessive

(C) Co-dominant

(D) Random

73. The type of DNA amplification where region of DNA amplified lies on either side of a known segment :

(A) RT-PCR

(B) Anchored -PCR

(C) Inverse- PCR

(D) Nested – PCR

74. Northern blotting is performed for :

(A) Determining the size of DNA

(B) Determining the size of RNA

(C) Quantification of RNA

(D) Sequencing of RNA

75. The method, which utilizes liposomes for in-vitro transformation of animal cell culture is known as :

(A) Lipomodulation

(B) Lipofection

(C) Lipotransformation

(D) None of the above

76. How many DNA duplex is obtained from one DNA duplex after 4 cycles of PCR ?

(A) 4

(B) 16

(C) 8

(D) 32

77. Chemicals used for gene transfer methods include :

(A) PEG

(B) $CaCl_2$

(C) Dextran

(D) All of the above

78. Which of the following is a mismatched ?

(A) Polymerase – Taq polymerase

(B) Template – Double stranded DNA

(C) Primer – Oligonucleotide

(D) Synthesis – 5' to 3' direction

79. How an expression vector differ from a primary cloning vector ?

(A) Presence of MCS

(B) Presence of Ori

(C) Presence of Promoter

(D) Presence of Selectable marker

80. When insertion of a foreign 'gene of interest' at a particular site of vector causes inactivation of a specific marker gene then the process known as :

(A) Insertional Inactivation

(B) Insertional mutagenesis

(C) Transfection

(D) None of the above

81. Which selection system is generally used in a yeast plasmid vector ?

(A) Antibiotic

(B) Lac

(C) Auxotrophic mutant gene

(D) CI gene

82. Different restriction enzymes that recognize the same sequence but cut at different location are known as :

(A) Isocaudomers

(B) Neoschizomers

(C) Isochizomers

(D) None of the above

83. Primers used in PCR are :

(A) ss DNA oligonucleotide

(B) ds DNA oligonucleotide

(C) ss RNA oligonucleotide

(D) ds RNA oligonucleotide

84. Which of the following chemical enhances vir gene expression ?

(A) Cyanidin

(B) Glutennin

(C) Acetosyringone

(D) Dextran

85. The DNA segment to be cloned is called :

(A) Gene segment

(B) DNA fragment

(C) DNA insert

(D) All of these

86. The enzyme which is used for Phosphorylation of polynucleotide is called :

(A) CIP

(B) PNK

(C) RT

(D) TdT

87. The sequence recognized by the restriction enzyme to cut DNA is known as :

(A) recognition site

(B) restriction site

(C) binding site

(D) cleavage site

88. Which is the final step in the construction of a recombinant molecule ?

(A) Plasmid isolation

(B) Restriction digestion

(C) Gene amplification

(D) Ligation

89. Which of the following will have more efficient ligation ?

(A) Sticky ends

(B) Blunt ends

(C) Blunt end and high concentration of DNA

(D) Blunt end and low concentration of DNA

90. Which of the following is not a method for joining sticky ends to a blunt ended DNA fragment to be cloned ?

(A) Homopolymer tailing

(B) Linkers

(C) Restriction digestion

(D) Adaptors

91. Which enzyme is used in homopolymer tailing ?

(A) Terminal deoxynucleotidyl transferase

(B) Alkaline Phosphatase

(C) DNA polymerase

(D) Polynucleotide Kinase

92. Libraries constructed in plasmid vectors can be maintained as :

(A) Plasmid containing cells

(B) Naked DNA

(C) Both Plasmid containing cells and Naked DNA

(D) None of these

93. Monoclonal antibodies are produced by :

(A) Recombinant DNA technology

(B) Transformation

(C) Transfection

(D) Hybridoma technology

94. Genetically manufactured GH is not effective for :

(A) Burns

(B) Ulcers

(C) Infections

(D) Fractures

95. Which of the following statements are true regarding restriction enzymes ?

(A) Type I and III enzymes cuts far away from the restriction sites

(B) Type II cuts DNA within restriction sites

(C) EcoRI is a type II restriction enzyme

(D) All of the above

96. Klenow fragment lacks :

(A) 5' $\rightarrow$ 3' exonuclease

(B) 5' $\rightarrow$ 3' polymerase

(C) 3' $\rightarrow$ 5' exonuclease

(D) None of these

97. RNase H is specific for degrading :

(A) RNA in a RNA : DNA hybrid

(B) RNA in a RNA : RNA hybrid

(C) DNA in a RNA: DNA hybrid

(D) None of these

98. Gene therapy in human was first practiced to cure :

(A) Cystic fibrosis

(B) Severe Combind immunodeficiency syndrome

(C) Cancer

(D) Muscular dystrophy

99. CaMY35S promoter of cauliflower mosaic virus is a :

(A) Constitutive Promoter

(B) Inducible Promoter

(C) Tissue Specific Promoter

(D) Synthetic Promoter

100. Single stranded unpaired extensions formed by restriction enzyme upon cleavage is known as :

(A) Blunt ends

(B) Sticky ends

(C) Flush ends

(D) None of these

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।