Roll. No. .....

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

Question Booklet Number

12

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

BIOTECHNOLOGY

[PAPER : Fifth (BBT-305)]

(Genomics & Proteomics Patening, Product Regulation, Entrepreneurship Development etc.)

Paper ID		
6	0	5

Question Booklet Series
A

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. Genomic organization refers to the linear order of DNA elements and their divisions into chromosomes :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

2. The distinct zig-zag appearance of the chromatin fibre is due to :

(A) Nucleosome

(B) Histone H1

(C) Histone Core

(D) Linker DNA

3. Which of the following regions promote Histone–DNA association ?

(A) C,T

(B) G,C

(C) A,T

(D) A,G

4. Genomic DNA exist as single linear pieces of DNA that are associated with a protein called :

(A) Helical complex

(B) Helical DNA

(C) Nucleoprotein chromosomes

(D) Nucleoprotein complex

5. What marks the difference between the solenoid and the zig-zag models of 30 nm fibres ?

(A) Linker histone molecule

(B) Nucleosome structure

(C) Linker DNA

(D) 10 nm fibre

6. Genome organization does not refer to the 3-D structure of chromosome and the positioning of DNA sequence within the nucleus :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

7. How many types of histone molecules are found in nature ?

(A) 3

(B) 4

(C) 5

(D) 6

8. Only 1.2 % of the mammalian genome thus encodes for protein function :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

9. In the beads on a string model, the bead is made up of :

(A) 6 histone proteins

(B) 6 histone proteins and DNA

(C) 8 histone proteins and DNA

(D) 8 histone proteins

10. The human genome is :

(A) all of our genes

(B) all of our DNA

(C) all of the DNA and RNA in our cells

(D) responsible for all our physical characteristics

11. How many chromosomes do human have ?

(A) 46

(B) 48

(C) 54

(D) 56

12. Genes are made up of :

(A) DNA

(B) RNA

(C) Proteins

(D) Enzymes

13. When a gene is 'expressed' it is :

(A) transported around the body to make proteins

(B) used as a blueprint to assemble the proteins it codes for

(C) passed on from parents to children

(D) replicated with the cell

14. Which was the last human chromosome to be completely sequenced ?

(A) Chromosome 21

(B) Chromosome X

(C) Chromosome 1

(D) Chromosome 11

15. In genetic fingerprinting, the 'probe' refers to :

(A) a radioactively labelled ds DNA molecule

(B) a radioactively labelled ss DNA molecule

(C) stranded RNA molecule

(D) none of the above

16. One of the fundamental events that occur in meiosis is crossing over in which homologous chromosomes exchange segments causing a reshuffling of genes :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

17. In medical applications, the ultimate goal of gene mapping is to disease genes map :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

18. Cytologic map can be considered to be of _____ resolution and hence some what ____ physical maps.

(A) very high, inaccurate

(B) very low, accurate

(C) very high, accurate

(D) very low, inaccurate

19. Physical maps are constructed by using a chromosome walking technique :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

20. One centimorgan is defined as _____ percentage of the total recombination events.

(A) One

(B) Ten

(C) 0.1

(D) 0.01

21. How many human mitochondrial proteins are encoded in the mitochondrial genome and synthesized within mitochondria ?

(A) 11

(B) 12

(C) 13

(D) 14

22. What is Mitochondrial DNA ?

(A) Simple, ss linear DNA molecule

(B) Simple, ss circular DNA molecule

(C) Simple, ds linear DNA molecule

(D) Simple, ds circular DNA molecule

23. Oxysomes or f0-f1 particles occur on :

(A) Inner mitochondrial membrane

(B) Chloroplast surface

(C) Mitochondrial surface

(D) Thylakoids

24. What is the size of human mitochondrial DNA ?

(A) 16 kb

(B) 200 kb

(C) 2500 kb

(D) 100 kb

25. Mitochondrial DNA is one of the best marker tools for population biologist and evolutionary biologist because :

(A) Absence of genetic recombination in mtDNA

(B) mtDNA are specific to mt-genes

(C) It can be easily isolated

(D) It undergoes spontaneous mutation

26. The human genome contains approx. :

(A) 6 billion base pairs

(B) 5 billion base pairs

(C) 3 billion base pairs

(D) 4 billion base pairs

27. Which of the following tool is used for the identification of motifs ?

(A) BLAST

(B) COPIA

(C) PROSPECT

(D) Pattern hunter

28. What is the deposition of cDNA into the inert structure called ?

(A) DNA probes

(B) DNA polymerase

(C) DNA microarrays

(D) DNA fingerprinting

29. The identification of drugs through the genomic study is called :

(A) Genomics

(B) Pharmacogenomics

(C) Pharmacogenetics

(D) Cheminformatics

30. The term 'invitro' is the latin word which refers to ____ .

(A) Within the lab

(B) Within the glass

(C) Outside the lab

(D) Outside the glass

31. ____ is the large scale study of proteins.

(A) Genomics

(B) Proteomics

(C) Both (A) and (B)

(D) None of the above

32. Ubiquitin is a small protein that may be affixed to certain protein substrates by enzymes called E3 Ubiquitin ligases :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

33. A cell may make different sets of proteins at different times or under different conditions :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

34. The collection of proteins that can be produced by a given species is :

(A) considered that species 'genetic' complement

(B) correlated with the size of the organism

(C) all of these

(D) called the proteome

35. Which would be best to separate a protein that binds strongly to its substrate ?

(A) Gel filtration

(B) Affinity chromatography

(C) Cation exchange chromatography

(D) Anion exchange chromatography

36. In the α-helix the hydrogen bonds :

(A) are roughly parallel to the axis of the helix

(B) are roughly perpendicular to the axis of the helix

(C) occur mainly between electronegative atom of the R groups

(D) occur only between some of the amino acid of the helix

37. Two amino acid of the standard 20 contain sulphur atom. They are :

(A) Cysteine and serine

(B) Cysteine and threonine

(C) Methionine and cysteine

(D) Methionine and serine

38. In a mixture of the four protein listed below, which should elute 2nd in size-exclusion chromatography ?

(A) Cytochrome C M_r=13,000

(B) IgG M_r = 145,000

(C) Ribonuclease A M_r =13,700

(D) RNA polymerase M_r = 450,000

39. Myoglobin and subunits of hemoglobin have :

(A) no obvious structural relationship

(B) very different primary and tertiary structures

(C) very similar primary and tertiary structures

(D) very similar tertiary structures but different primary structures

40. Which of the following enzyme can be used for proteolytic digestion ?

(A) Chymotrypsin

(B) Trypsin

(C) Pepsin

(D) All of the above

41. Which of the following criteria is used to select the matrix for sample analysis in MALDI-TOF/TOF ?

(A) Charge on the sample

(B) Molecular weight and nature of sample

(C) Iso-electric point of sample

(D) All of the above

42. The mass spectrometry could be used for :

(A) Protein identification

(B) Protein characterization

(C) Protein quantification

(D) All of the above

43. Which of the following is the correct sequence of events in case of mass spectrometer ?

(A) Acceleration $\rightarrow$ deflection $\rightarrow$ detection $\rightarrow$ ionisation

(B) Ionisation $\rightarrow$ acceleration $\rightarrow$ deflection $\rightarrow$ detection

(C) Acceleration $\rightarrow$ deflections $\rightarrow$ ionisation $\rightarrow$ detection

(D) Acceleration $\rightarrow$ ionisation $\rightarrow$ deflection $\rightarrow$ detection

44. Which of the following mass spectrometric technique, the sample is introduced in solution form, which is eventually nebulized under a rapid electrical potential ?

(A) Electron ionization (EI)

(B) Electrospray ionization (ESI)

(C) Matrix assisted laser desorption and ionization (MALDI)

(D) None of the above

45. The path of ions after deflection depends on :

(A) Only the mass of the ion

(B) Only the charge on the ion

(C) Both the charge and mass of the ion

(D) None of the above

46. In a native-PAGE, proteins are separated on the basis of :

(A) net negative charge

(B) net charge and size

(C) net positive charge

(D) net positive charge and size

47. The sub-unit molecular weight as well as the number of sub-units in the quaternary structure can be determined by :

(A) SDS-PAGE electrophoresis

(B) Gel filtration chromatography

(C) Combining information from (A) and (B)

(D) Isoelectric focusing

48. In an SDS- PAGE :

(A) Proteins are denatured by the SDS

(B) Proteins have the same charge to mass ratio

(C) Smaller proteins migrate more rapidly through the gel

(D) All of the above

49. Protein can be visualized directly in gels by :

(A) Staining them with the dye

(B) Using electron microscope only

(C) Measuring their molecular weight

(D) None of the above

50. In Isoelectric focusing, proteins are, separated on the basis of their :

(A) Relative content of positively charged residue only

(B) Relative content of negatively charged residue only

(C) Size

(D) Relative content of positively and negatively charged residue

51. Which one of the following is referred to as three dimensional shape of a protein ?

(A) 2^0 structure

(B) Primary structure

(C) Tertiary structure

(D) Quaternary structure

52. Which technique prompted the gene therapy ?

(A) DNA transform

(B) Germline manipulation

(C) Retroviral gene manipulation

(D) Electroporation

53. Which of the following are example of genetic polymorphisms ?

(A) Glutathione S- transferase

(B) Dihydropyrimidine dehydrogenase

(C) UDP- glucuronosyltransferase

(D) All of these

54. Successful gene therapy face which of the following obstacle ?

(A) Lack of research effort

(B) Inefficient gene delivery

(C) Inability to identify genetic defects

(D) None of the above

55. Which of the following is most commonly occurring variant in human genome ?

(A) Defective gene splicing

(B) Premature stop codon

(C) Nucleotide base insertion

(D) Single-nucleotide polymorphism

56. Among all of these which of the following gene increases the risk of thrombosis ?

(A) Tamothrombin

(B) Mecathrombin

(C) Prothrombin

(D) Vorithrombin

57. CYP2D6 polymorphism can affect :

(A) drug delivery

(B) toxicity

(C) drug interaction potential

(D) all of the above

58. Which of the following are the sites for gene variations ?

(A) Drug target protein

(B) Drug transport protein

(C) Drug metabolize enzyme

(D) All of the above

59. In which of the following mutation repeat involve ?

(A) Large deletions

(B) Nonsense mutations

(C) Splicing mutations

(D) Missense mutations

60. Which mutation occurs due to UV exposure ?

(A) Chromosome breakage

(B) Chromosome inversion

(C) Thymidine dimer

(D) None of the above

61. What protects the intellectual property created by artists ?

(A) Copyright

(B) Geographical indications

(C) Patents

(D) Trademarks

62. What protects the intellectual property created by designers ?

(A) Copyright

(B) Patents

(C) Registered designs

(D) Trademarks

63. What protects the intellectual property created by inventors ?

(A) Copyright

(B) Patents

(C) Registered designs

(D) Trademarks

64. What does a trademark protects ?

(A) An invention

(B) A work of art

(C) Logos, names and brands

(D) A secret formula

65. In most countries how long does copyright last for ?

(A) 10 years after the creation of the work

(B) 50 years after the creation of the work

(C) 10 years after the death of the person, who created that work

(D) 50 years after the death of the person, who created that work

66. How long do patents usually last for ?

(A) 10 years

(B) 20 years

(C) 40 years

(D) 60 years

67. If you write an original story, what type of intellectual property gives you the right to decide who can make and sell copies of your work ?

(A) Copyright

(B) Patents

(C) Trademarks

(D) None of the above

68. What does an IP right entitle a person ?

(A) Right to file a suit in case of an infringement

(B) Right to exclude others

(C) Right to transfer

(D) All of the above

69. If Stephen, invents a new process/ product for recording music, he will most likely apply for :

(A) Patents

(B) Copyright

(C) Trademark

(D) Trade secret

70. Intellectual property is mostly a type of :

(A) Tangible property

(B) Intangible property

(C) Real property

(D) None of the above

71. Which of the following system does not relate to intellectual property ?

(A) Paris Convention

(B) TRIPS Agreement

(C) Berne Convention

(D) Kyoto Protocol

72. Which of the following entity can seek registration for Geographical indications ?

(A) An individual

(B) A company

(C) Government

(D) Producers

73. Following person/ persons are entitled to apply for patents :

(A) a person claiming to be first inventor of the invention

(B) a legal representative of the first inventor of the invention

(C) Any person who is the assignee of the first inventor of the invention

(D) All of the above

74. Every application for a patent shall be for ____ invention only.

(A) Two

(B) Four

(C) One

(D) Three

75. How long is a patent valid in India ?

(A) 30 years

(B) 20 years

(C) 40 years

(D) 60 years

76. What cannot be patented in India ?

(A) A computer program

(B) Scientific theory

(C) Mathematical method

(D) All of the above

77. What can be patented under Patents Act, 1970 ?

(A) Playing a game

(B) An invention

(C) A scheme

(D) An aesthetic creation

78. How many types of compulsory licenses are provided for under the Indian Patent Act?

(A) Two

(B) Four

(C) One

(D) Three

79. Which of the following shows the process of creating something new ?

(A) Business model

(B) Modeling

(C) Creative flexibility

(D) Innovation

80. The entrepreneur was distinguished from capital provider in :

(A) Middle ages

(B) 17th century

(C) 18th century

(D) 19th and 20th century

81. Family business is always interested to handover the charge of his business to :

(A) Indian Administration officers

(B) Professional managers

(C) Next generation

(D) None of the above

82. EDP (Entrepreneurship Development Programmes) is required to help :

(A) Existing entrepreneurs

(B) First generation entrepreneurs

(C) Future generation entrepreneurs

(D) None of the above

83. PPE is :

(A) Personal Protective Equipment

(B) Public Protective Equipment

(C) Possible Protective Equipment

(D) All of the above

84. Which of the following items is considered sharp ?

(A) Needles

(B) Scalpels

(C) Microscopic slides and coverslips

(D) All of the above

85. UV light can be utilized as the sole form of decontamination in a biological safety cabinet :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

86. Hands should be washed before and after working in a biological safety cabinet :

(A) True

(B) False

(C) Can be true or false

(D) Cannot say

87. Which of the following practices are not allowed in the laboratory ?

(A) Eating and drinking

(B) Applying cosmetics

(C) Handling contact lenses

(D) All of the above

88. When working with infectious biological material, the best place to perform the work would be :

(A) In a biological safety cabinet

(B) On the laboratory bench

(C) On a clean bench wearing of a dust mask

(D) In a fume hood

89. Which of the following procedures could generate aerosols ?

(A) Cell sorters

(B) Pipetting

(C) Sonicating tissue culture cells

(D) All of the above

90. The acronym HEPA (as in HEPA filter) stands for :

(A) High- Efficiency Particulate Air

(B) High- Energy Particles in Air

(C) High- Evaluation Protection

(D) Hepatitis A

91. The first plant that was modified by genetic engineering was produced in a laboratory in year :

(A) 1954

(B) 1964

(C) 1974

(D) 1984

92. Will insects develop resistance to the toxins produced in Bt corn ?

(A) It is impossible for the insects to develop resistance to Bt Corn

(B) It is unlikely that insects will develop resistance to Bt Corn

(C) It is almost certain that insects will develop resistance to Bt Corn

(D) None of the above

93. Does Bt Corn or Bt Cotton only kill specific pests that damage the crop ?

(A) The Bt toxin kills all insects

(B) The Bt toxin kills the European corn borer and its close relatives

(C) The Bt toxin kills the insects for which it is targeted

(D) The Bt toxin repels but doesn't kill insects

94. When did crops become resistant to herbicides ?

(A) Crops have always been resistant to some herbicides

(B) After the introduction of Bt Corn in 1997

(C) After the introduction of round-up ready soybeans in 1996

(D) Crops are not resistant to herbicides

95. Can genes from genetically modified crops jump to other plants ?

(A) Yes, and often do

(B) Only to some crops, but those crops aren't genetically modified

(C) Only during rare climatic conditions

(D) No, genes cannot move from species to species without human intervention

96. Can agricultural biotechnology reduce our dependence on petroleum ?

(A) Most of it

(B) Some of it

(C) No effect on petroleum use

(D) None of the above

97. Which biosafety level is appropriate for research with microbes or infectious agent that pose moderate risk to laboratory workers and the community, and are typically indigenous ?

(A) BSL-1

(B) BSL-2

(C) BSL-3

(D) BSL-4

98. Which of the following is currently the most common chronic blood borne infection ?

(A) Hepatitis B virus

(B) Hepatitis C virus

(C) HIV

(D) None of the above

99. Which type of gloves offer superior protection from blood with good tactile sensation ?

(A) Nitrile gloves

(B) Powdered latex gloves

(C) Vinyl gloves

(D) Unpowdered latex

100. Hazardous materials should be stored :

(A) In the sink

(B) On the floor

(C) Below eye level

(D) None of the above

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।