Roll No. .....

Question Booklet Number

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

M. Sc. (Biochemistry) (Fourth Semester)

EXAMINATION, July, 2022

(Elective)

HUMAN GENETICS

Paper Code					
BCH	4	0	0	3	(B)

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 60 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 50 questions are attempted by student, then the first attempted 50 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 60 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 50 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 50 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. Chromosome walking :

(A) is used in FISH

(B) is important component of genetic mapping

(C) requires a genomic DNA library

(D) occurs in mitosis

2. Holocentric condition of chromosomes is commonly present in :

(A) Bugs

(B) Insects

(C) Plants

(D) All vertebrates

3. Which of the following statements is not true ?

(A) Homologous recombination can be used to disrupt genes

(B) Transposons can be directed to disrupt specific genes

(C) Transcriptomes can be characterized by Serial Analysis of Gene Expression (SAGE)

(D) Open reading frames are only found in protein-coding genes

4. Limnaea shell coiling is due to :

(A) Maternal inheritance

(B) Cytoplasmic inheritance

(C) Extranuclear inheritance

(D) All of the above

5. Microarrays are :

(A) used for analysis of transcriptomes

(B) made up of only glass and silica

(C) very much smaller than DNA chip

(D) can often be detected by histochemical assays

6. A codon bias :

(A) is not found in prokaryotes

(B) is found in genome mapping

(C) is found in functional RNA

(D) is used to identify genes

7. Mark the correct statement :

(I) Holocentric chromosomes have hole in the centre

(II) Histonic proteins initiate RNA transcription

(III) Chiasmata are the results, not a cause of crossing over

(IV) Females can act as carrier of sex-linked traits.

Codes :

(A) I, IV

(B) II, III

(C) III, IV

(D) II, IV

8. Fluorescent *in-situ* hybridization (FISH) :

(A) requires a DNA polymerase

(B) requires a labelled probe

(C) can be used in physical mapping of the genome

(D) Both (B) and (C)

9. Which of the following is a co-dominant marker ?

(A) RAPD

(B) RFLP

(C) AFLP

(D) RFLP and RAPD

10. Mapping technique used to determine the position of restriction sites in a DNA molecule is

(A) DNA markers

(B) Biochemical markers mapping

(C) Restriction mapping

(D) Genetic map

11. Two linked genes a and b show 20% recombination. The individuals of a dihybrid cross between ++/++ × ab/ab show gametes :

(A) ++ 80 : ab 20

(B) ++ 50 : ab 50

(C) ++ 40 ab : 40 : + a10 : +b10

(D) ++ 30 : ab 30 : + a20 : + b20

12. Genetic variation can be introduced into bacteria by all of the following methods except :

(A) mutation

(B) DNA amplification

(C) transformation

(D) transduction

13. Somatic hybridization is achieved through ..... .

(A) Grafting

(B) Protoplast fusion

(C) Conjugation

(D) Recombinant DNA technology

14. The cloning that has provoked the most public consternation and media attention is :

(A) Research cloning

(B) Animal/plant cloning

(C) Intervention cloning

(D) Reproductive cloning

15. Which one of the following is a mutagen ?

(A) Oxygen

(B) Acetic acid

(C) Mustard gas

(D) Pectin

16. The term 'allele' was proposed by :

(A) Morgan

(B) Bateson

(C) Johannsen

(D) Mendel

17. A cross between F1 generation and one of the recessive parents is :

(A) Back cross

(B) Reciprocal cross

(C) Monohybrid cross

(D) Test cross

18. A haploid set of all the genes present in a gamete is called :

(A) Genotype

(B) Phenotype

(C) Genome

(D) Linkage

19. Which is the non-Mendelian cross when both phenotypic and genotypic ratio obtained is same ?

(A) Incomplete dominance

(B) Multiple alleles

(C) Polygeny

(D) Pleotropism

20. The concept of phenotype and genotype was given by :

(A) Bateson

(B) Morgan

(C) Johannsen

(D) Punnet

21. Gamete normally contains :

(A) Many alleles of a gene

(B) Two alleles of a gene

(C) All alleles of a gene

(D) One alleles of a gene

22. Inhibiting genes which suppress the other genes are called :

(A) Epistatic genes

(B) Hypostatic genes

(C) Recessive genes

(D) Complementary genes

23. Gene pool is the sum total of genes present in :

(A) Cell

(B) Organism

(C) Population

(D) Ecosystem

24. Intragenic non-Mendelian inheritance includes :

(A) Dominance, codominance, incomplete dominance

(B) Codominance, multiple alleles, incomplete dominance

(C) Epistasis, multiple alleles, dominance

(D) Polygene, pleotropism, codominance

25. A pair of white sheep are mated and the offspring is black. What is the probability for next generation being black ? (White is dominant to black).

(A) 25%

(B) 50%

(C) 75%

(D) 0%

26. The ultimate source of variation is :

(A) Mitosis

(B) Mutation

(C) Fertilization

(D) Meiosis

27. Marriages between close relatives are avoided because. It induces more :

(A) Blood group abnormalities

(B) Multiple births

(C) Mutations

(D) Recessive alleles to come together

28. Human skin colour is controlled by three separate genes. What will be the genotype of intermediate (Mulatto) skin colour organism ?

(A) AABbCc

(B) AaBbCc

(C) AABBCC

(D) aabbcc

29. Informosome is :

(A) mRNA + protein

(B) rDNA + Histone

(C) DNA + Histone

(D) RNA + DNA

30. Which is a sex-linked trait ?

(A) Colourblindness, haemophilia

(B) Nightblindness, albinism

(C) Myxoedema, beri-beri

(D) Deafness tylosis

31. Haemophilia is more common in males because it is :

(A) Recessive character carried by X-chromosome

(B) Dominant character carried by Y-chromosome

(C) Dominant trait carried by X-chromosome

(D) Recessive trait carried by Y-chromosome

32. Mutations are induced mostly by :

(A) UV radiations

(B) Beta rays

(C) Alpha rays

(D) Gamma rays

33. Metacentric chromosomes have :

(A) Unequal arms

(B) Equal arms

(C) Only one arm

(D) Elongated arm

34. Balbiani rings are structural feature of :

(A) Lampbrush chromosomes

(B) Potytene chromosomes

(C) Allosomes

(D) Autosomes

35. The small part of chromosomes arm beyond secondary constriction is called :

(A) Centromere

(B) Satellite

(C) Chromonemata

(D) Kinetochore

36. The prevention or treatment of diseases through methods such as genetic testing, abortion of defective embryos, and germ-line therapy is known as :

(A) Positive eugenics

(B) Negative eugenics

(C) Reverse genetics

(D) Pro-eugenics

37. Which of the following women is the legal mother of a child ?

(A) A woman who commissions a surrogate where the surrogate uses that woman's egg

(B) A woman who commissions a surrogate where the surrogate uses her own egg

(C) A surrogate mother

(D) None of the above

38. Research ethics committees are :

(A) Committees of scientists and researchers.

(B) Convened by organisations to monitor the ethical standards of research projects carried out under their auspices, under their name.

(C) Committees of researchers concerned with ethics.

(D) Concerned only with research conducted in the medical and paramedical sciences.

39. Holandric genes are present on :

(A) Salivary gland chromosomes

(B) X-chromosomes

(C) Y-chromosomes

(D) Lampbrush chromosome

40. Mitochondria myopathy example :

(A) Leigh syndrome

(B) Mitochondrial DNA depletion syndrome

(C) Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes

(D) All of the above

41. Differential expression of the genetic material depending on its parentage of inheritance gives ..... .

(A) Penetrance

(B) Expressivity

(C) Imprinting

(D) Non-penetrance

42. The functional unit of DNA undergoing mutation is :

(A) Cistron

(B) Muton

(C) Recon

(D) Genophore

43. A boy with normal brother and colour-blind sister has his parents :

(A) Father normal, mother colourblind

(B) Both normal

(C) Both colourblind

(D) Father colourblind, mother normal

44. Drosophila having both male and female trait is :

(A) Homomorphic

(B) Homozygous

(C) Gynandromorph

(D) Hemizygous

45. Extranuclear chromosomes in eukaryotes are present in :

(A) All organelles

(B) Membraneless organelles

(C) Semiautonomous organelles

(D) Plasmids

46. Enzymes used to regulate de novo methylation :

(A) DNMT1

(B) DNMT3a

(C) DNMT3b

(D) Both (B) and (C)

47. A man receives X-chromosome from his :

(A) Mother

(B) Father

(C) Partially from mother and partially from father

(D) Either from mother or from father

48. Chromosome cohesion :

(A) established during S phase

(B) dissolved in metaphase

(C) cohesion close to the centromere facilitates bi-orientation of chromosomes

(D) All of the above

49. The first complete, gapless sequence of a human genome came through :

(A) T2F consortium

(B) T3T consortium

(C) T2T consortium

(D) T2Q consortium

50. The chemical composition of chromosome is :

(A) DNA, histonic protein, non-histonic protein, ions

(B) RNA, histonic protein, ions

(C) DNA, lipids, carbohydrates

(D) DNA, RNA, pectin

51. Which of these is dominant genetically ?

(A) Haemophilia

(B) Colourblindness

(C) Albinism

(D) Polydactyly

52. Y-chromosomes which determine male sex of the individual are :

(A) Androgen

(B) Androsome

(C) Gynosperm

(D) Androecium

53. Which of the following is not a site on internet for alignment of sequence pairs ?

(A) BLASTN

(B) BCM Search Launcher

(C) SIM

(D) BLASTX

54. Expression of genes can be analyzed by :

(A) Southern analysis

(B) Northern analysis

(C) RNA interference techniques

(D) Comparative genomics

55. Opponents of gene therapy insist that :

(A) Germ-line therapy is permissible

(B) Gene therapy is harmless

(C) Reproductive freedom has limits

(D) Reproductive freedom is a personal right

56. Heterochromatin is :

(A) Darkly Stained band

(B) Genetically inactive DNA

(C) Replicating late in the S phase

(D) All of the above

57. Exchange of segment between non-sister chromatids of homologous chromosome is :

(A) Non-disjunction

(B) Crossing over

(C) Translocation

(D) Transition

58. The extrachromosomal, circular DNA having genes for sexuality are :

(A) Plasmids

(B) Plastids

(C) Nucleoid

(D) Mesosomes

59. Protein coding genes can be identified by :

(A) ORF scanning

(B) Transposon scanning

(C) Zoo-tan blotting

(D) Nuclease S22 mapping

60. All sex-linked traits always show :

(A) Linkage

(B) Crossing over

(C) Criss-cross inheritance

(D) Dominance

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।