Roll No. .....

Question Booklet Number

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

M. Sc. (Fourth Semester)

(NEP) EXAMINATION, 2025-26

ZOOLOGY

(Clinical Cytogenetics) (Elective)

Paper Code							
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Questions Booklet Series

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Time : 1:30 Hours] [*Maximum Marks : 75*

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 75 questions in the OMR Answer-Sheet provided and not in the question booklet. 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 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। 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. Klinefelter's syndrome inherits which type of sex chromosome ?

(A) 44 + *xy*

(B) 44 + *xxy*

(C) 44 + *xo*

(D) 44 + *yo*

2. What are the components of blood ?

(A) RBC, Platelets

(B) WBC, Plasma

(C) RBC, WBC, Platelets

(D) Plasma

3. Linkage maps are also known as :

(A) Physical maps

(B) Chemical maps

(C) Chromosomal maps

(D) Simple maps

4. 'Chromosomal theory of sex determination' given by :

(A) McLung

(B) Bernstein

(C) Galton

(D) Weinberg

5. Which abbreviation stands for a genetic trait in man ?

(A) pH

(B) FSH

(C) Rh

(D) LH

6. Inheritance of total colourblindness is :

(A) *y*-linked

(B) *xy*-linked

(C) *x*-linked

(D) None of the above

7. Satellite DNA is considered :

(A) *m*-RNA

(B) Carbohydrate

(C) Heterochromatin

(D) *r*-RNA

8. In human cytogenic nomenclature, the letter '*p*' stands for :

(A) Primary

(B) Protein

(C) Post

(D) Petite (Short arm)

9. Which term describes a chromosome with the centromere located exactly in the middle ?

(A) Metacentric

(B) Acrocentric

(C) Submetacentric

(D) Telocentric

10. A boy is of blood group 'O'. His mother is of 'A' and father of 'B' groups. How many of the children of these parents will have 'O' blood group ?

(A) 4 out of 4

(B) 2 out of 4

(C) 1 out of 4

(D) 3 out of 4

11. Sex-chromosomes in human males are :

(A) Homozygous

(B) Heterozygous

(C) Autosomal

(D) None of the above

12. A child with an IQ of 140 belongs to the category :

(A) Genius

(B) Superior

(C) Average

(D) Dull

13. ABO blood groups were discovered by :

(A) Landsteiner

(B) Huxley

(C) Darwin

(D) W. Harvey

14. Barr-body is found in :

(A) Female somatic cells

(B) Male somatic cells

(C) Ova

(D) Sperms

15. Which kind of disease is 'Down Syndrome' ?

(A) Sex-linked

(B) Autosomal

(C) Viral

(D) Bacterial

16. An unfertilized human ovum contains :

(A) One pair of '*x*' chromosomes

(B) *xy* chromosomes

(C) *yy* chromosomes

(D) One *x*-chromosome

17. People with 'albinism' are at higher risk for :

(A) Cardiovascular diseases

(B) Diabetes

(C) Skin cancer

(D) Arthritis

18. Universal recipient in blood transfusion, belongs to the group :

(A) 'O'

(B) 'A'

(C) 'AB'

(D) 'B'

19. Traits whose genes are located on *x* chromosomes are known as :

(A) Sex-limited

(B) Sex-linked

(C) Sex-influenced

(D) None of the above

20. Number of autosomes in man is :

(A) 22

(B) 23

(C) 44

(D) 46

21. Rh-factor is concerned with :

(A) Blood grouping

(B) Blood clotting

(C) Protein synthesis

(D) Carbohydrate synthesis

22. Theory of mutations was first proposed by :

(A) Robert Brown

(B) Lamarck

(C) Hugo de Vries

(D) William Harvey

23. Mutations may be caused by X-ray due to changes in :

(A) Chromosomes

(B) Genes

(C) DNA

(D) All of the above

24. Species belonging to different geographical areas are called :

(A) Neotropic

(B) Sympatric

(C) Allopatric

(D) Sibling

25. Sudden heritable change is called :

(A) Meiosis

(B) Mutation

(C) Mitosis

(D) Segregation

26. Physical basis of life is :

(A) Nucleus

(B) Cell

(C) Protoplasm

(D) None of the above

27. In DNA, the nitrogenous bases found are :

(A) ATUC

(B) AUGC

(C) UTGC

(D) ATGC

28. DNA is found in eukaryotes in :

(A) Nucleus only

(B) Cytoplasm only

(C) Both (A) and (B)

(D) None of the above

29. Simple sugar of blood is :

(A) Sucrose

(B) Lactose

(C) Glucose

(D) Galactose

30. Polytene chromosomes were first observerd in :

(A) Drosophilla

(B) Housefly

(C) Mosquitoes

(D) None of the above

31. Blood cancer is known as :

(A) Thrombosis

(B) Fever

(C) Leukemia

(D) Haemophilia

32. Division of cytoplasm is called :

(A) Karyokinesis

(B) Cytokinesis

(C) Pinocytosis

(D) Histolysis

33. Chromosomes are composed of :

(A) Proteins only

(B) DNA only

(C) DNA and proteins

(D) RNA only

34. Which of the following is responsible for sex determination in humans ?

(A) Only '*x*' chromosome

(B) Autosomes

(C) Size of ovum

(D) Only '*y*' chromosome

35. Which type of chromatin is transcriptionally inactive ?

(A) Heterochromatin

(B) Euchromatin

(C) Both (A) and (B)

(D) None of the above

36. Who is known as the 'Father of Genetics' ?

(A) Morgan

(B) Mendel

(C) Bateson

(D) Watson

37. Viruses are :

(A) Obligate parasites

(B) Plants

(C) Protozoans

(D) Fungi

38. Viral genome can be :

(A) Single-stranded

(B) Double-stranded

(C) Both (A) and (B)

(D) None of the above

39. Genome mapping identifies :

(A) Gene location

(B) Protein

(C) Lipid

(D) RNA

40. Which of the following is a hereditary disease ?

(A) Fever

(B) Cholera

(C) Polio

(D) Haemophilia

41. Alu elements can be used in :

(A) Protein folding

(B) Movement

(C) Genome mapping

(D) Respiration

42. LINEs use :

(A) Reverse transcriptase

(B) Ligase

(C) DNA polymerase only

(D) Helicase

43. Eukaryotes show :

(A) Low variation

(B) High variation in genome size

(C) No DNA

(D) Same DNA

44. The study of the relationship between chromosomal variations and medical condition is :

(A) Biology

(B) Clinical cytogenetic

(C) Physiology

(D) Phytochemistry

45. Which organism passes transposable elements ?

(A) Only bacteria

(B) Only plants

(C) Only animals

(D) All organisms (bacteria, plants and animals)

46. DNA fingerprinting recognizes the differences in :

(A) Bulk DNA

(B) Satellite DNA

(C) Repetitive DNA

(D) Both (B) and (C)

47. The *m*-RNA of which eukaryotic protein lacks Introns ?

(A) Histone

(B) Myoglobin

(C) Haemoglobin

(D) Polymerase

48. Which of the following organisms have overlapping genes ?

(A) Bacteria

(B) Virus

(C) Fungi

(D) Yeast

49. Non-coding sequence in *m*-RNA is known as :

(A) Non-template

(B) Template

(C) Intron

(D) Exon

50. Which of the following is a classic example of a pseudogene cluster ?

(A) Histone genes

(B) Globin gene clusters

(C) *r*-RNA genes

(D) *t*-RNA genes

51. In Sickle cell anemia, RBCs are :

(A) Crescent moon shaped

(B) Full moon shaped

(C) Square shaped

(D) Diamond shaped

52. Which process reduces variation in a gene pool ?

(A) Genetic drift

(B) Mutation

(C) Migration

(D) None of the above

53. Relative fitness compares :

(A) One species to another

(B) Mutation rates

(C) Individuals based on reproductive success

(D) Alleles with the same population

54. In 'IQ', Q stands for :

(A) Qualified

(B) Quotient

(C) Queen

(D) Question

55. Down's syndrome is also called :

(A) Neigro Idiocy

(B) Mongoloid Idiocy

(C) African Idiocy

(D) None of the above

56. The C-value paradox is mainly explained by the presence of :

(A) Ribosomal RNA

(B) Histone proteins

(C) Non-coding DNA

(D) Transfer RNA

57. SINE activity can contribute to :

(A) Genome evolution

(B) Disease

(C) Genetic diversity

(D) All of the above

58. The most common SINE in human is :

(A) ATP

(B) RBC

(C) Alu element

(D) Bone

59. Which syndrome shows 'webbed neck' ?

(A) Turner syndrome

(B) Down syndrome

(C) Klinefelter syndrome

(D) Marfan syndrome

60. Which factor can affect IQ test-performance ?

(A) Motivation

(B) Health

(C) Education

(D) All of the above

61. IQ tests mainly assess :

(A) Physical strength

(B) Social skills

(C) Intellectual ability

(D) Financial strength

62. Chronological age means :

(A) Age since birth

(B) Age of mother only

(C) Age of father only

(D) None of the above

63. Psychiatric symptoms in Huntington disease include :

(A) Mania only

(B) Depression

(C) Phobia only

(D) None of the above

64. Huntington disease usually presents in :

(A) Infancy

(B) Childhood

(C) Adulthood

(D) Old age above 80 years

65. Which organ is most severely affected in Galactosemia ?

(A) Heart

(B) Lungs

(C) Kidney

(D) Liver

66. Albinos are very sensitive to :

(A) Bright light

(B) Low temperature

(C) Dim light

(D) Snowfall

67. Defective haemoglobin (HbS) is useless for :

(A) Oxygen transportation

(B) Zinc transportation

(C) Water transportation

(D) Nitrogen transportation

68. Which blood group has no antigens on the RBCs ?

(A) 'A'

(B) 'O'

(C) 'B'

(D) 'AB'

69. Turner's syndromes are :

(A) Sterile female

(B) Normal female

(C) Sterile male

(D) Normal male

70. Mutagens can cause :

(A) Ultration

(B) Nutrition

(C) Mutation

(D) Selection

71. Alu elements are found in :

(A) Human genome

(B) Fish genome

(C) Aves genome

(D) Amphibian genome

72. Human Genome project is :

(A) State project

(B) Water project

(C) International project

(D) Solar project

73. Which system established the first International standards for human chromosome nomenclature in 1960 ?

(A) Paris system

(B) Denver system

(C) Chicago system

(D) London system

74. DuPraw's model of chromosome structure is known as the :

(A) Folded fiber model

(B) Solenoid model

(C) Radial loop model

(D) Zig-zag model

75. Facultative heterochromatin is a type of :

(A) Full body

(B) Half body

(C) Barr body

(D) None of the above

76. Genetic drift is strongest in :

(A) Small Population

(B) Large Population

(C) Migrating Population

(D) None of the above

77. The 'Royal disease' is also called as which one of the following disorders ?

(A) Malaria

(B) Dengue

(C) Haemophilia

(D) Typhoid

78. Which one is a female carrier ?

(A) $x^h y$

(B) xy

(C) xx

(D) xx^h

79. Which of the following is another name for colourblindness ?

(A) Daltonism

(B) Bone disease

(C) Lungs disease

(D) Joint pain

80. Colourblindness is seen in :

(A) Males only

(B) Females only

(C) Mostly males are rare in females

(D) None of the above

81. Thalassemia is caused by which of the following defects ?

(A) Defects in WBCs

(B) Defect in plasma

(C) Defects in RBCs

(D) Defect in mind

82. In which of the following groups of organisms sex-determination occurs due to environmental temperature ?

(A) Few reptiles

(B) Human being

(C) All birds

(D) All of the above

83. Which procedure is used to detect genetic abnormalities in a fetus by sampling amniotic fluid ?

(A) *x*-Ray

(B) Amniocentesis

(C) Ultrasound

(D) None of the above

84. PKU is inherited as an :

(A) Autosomal recessive trait

(B) Autosomal dominant trait

(C) *x*-linked recessive trait

(D) *x-y* linked recessive trait

85. Correct Hardy-Weinberg equation is :

(A) $p^2 + q^2 = 1$

(B) $p + q = 1$

(C) $p^2 + q^2 + 2pq = 1$

(D) $p + q + 2pq = 0$

86. Small population leads to :

(A) Stability

(B) Genetic drift

(C) Migration

(D) None of the above

87. External environmental factor is :

(A) Sunlight

(B) Hormones

(C) Enzymes

(D) Blood flow

88. Which of the following represents heterozygous frequency in Hardy Weinberg equation ?

(A) p^2

(B) q^2

(C) R^2

(D) $2pq$

89. Inbreeding leads to :

(A) Increased variation

(B) Decreased variation

(C) No change in variation

(D) None of the above

90. Which of the following does NOT affect gene pool ?

(A) Recombination

(B) Photosynthesis

(C) Genetic drift

(D) Mutation

91. Stability in internal environment is called :

(A) Mutation

(B) Adaptation

(C) Rejection

(D) Homeostasis

92. Malignancy refers to :

(A) Cancer

(B) Typhoid

(C) AIDS

(D) Diarrhoea

93. Allele frequency changes due to :

(A) Mutation

(B) Migration

(C) Selection

(D) All of the above

94. Population genetics studies :

(A) Cells

(B) Organs

(C) Bones

(D) Evolution in populations

95. Which of the histones below binds to linker DNA ?

(A) H_1

(B) H_3

(C) H_2A

(D) H_2B

96. Transcriptionally active chromatin is termed as :

(A) Prechromatin

(B) Heterochromatin

(C) Euchromatin

(D) None of the above

97. In population genetics, the bottleneck effect is a type of :

(A) Gene flow

(B) Mutation

(C) Natural selection

(D) Genetic drift

98. Erythroblastosis fetailis is a disease connected with :

(A) Lh factor

(B) Mh factor

(C) Rh factor

(D) TSh factor

99. Each species has a fixed chromosomal complement called its :

(A) Microtype

(B) Macrotype

(C) Neurotype

(D) Karyotype

100. Colour blindness defect is also called :

(A) Red-white blindness

(B) Red-blue blindness

(C) Red-yellow blindness

(D) Red-green blindness

(Only for Rough Work)

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct 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 any 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 सही 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।