SORFSL/SER/24

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

Test Booklet No. :

Series

A

00265

TEST BOOKLET

SEROLOGY AND GENERAL STUDIES

Time Allowed : 2 Hours **Full Marks : 200**

Read the following instructions carefully before you begin to answer the questions :

1. The name of the Subject, Roll Number as mentioned in the Admission Certificate, Test Booklet No. and Series are to be written legibly and correctly in the space provided on the Answer-Sheet with Black/Blue ballpoint pen.
2. **Answer-Sheet without marking Series as mentioned above in the space provided for in the Answer-Sheet shall not be evaluated.**
3. All questions carry equal marks.
   The Answer-Sheet should be submitted to the Invigilator.
   Directions for giving the answers : Directions for answering questions have already been issued to the respective candidates in the 'Instructions for marking in the OMR Answer-Sheet' along with the Admit Card and Specimen Copy of the OMR Answer-Sheet.
   Example :
   Suppose the following question is asked :
   The capital of Bangladesh is
   (A) Chennai
   (B) London
   (C) Dhaka
   (D) Dhubri
   You will have four alternatives in the Answer-Sheet for your response corresponding to each question of the Test Booklet as below :

   Ⓐ Ⓑ Ⓒ Ⓓ

   In the above illustration, if your chosen response is alternative (C), i.e., Dhaka, then the same should be marked on the Answer-Sheet by blackening the relevant circle with a Black/Blue ballpoint pen only as below :

   Ⓐ Ⓑ ● Ⓓ

   The example shown above is the only correct method of answering.
4. Use of eraser, blade, chemical whitener fluid to rectify any response is prohibited.
5. Please ensure that the Test Booklet has the required number of pages (16) and 100 questions immediately after opening the Booklet. In case of any discrepancy, please report the same to the Invigilator.
6. No candidate shall be admitted to the Examination Hall/Room 20 minutes after the commencement of the examination.
7. No candidate shall leave the Examination Hall/Room without prior permission of the Supervisor/Invigilator. No candidate shall be permitted to hand over his/her Answer-Sheet and leave the Examination Hall/Room before expiry of the full time allotted for each paper.
8. No Mobile Phone, Electronic Communication Device, etc., are allowed to be carried inside the Examination Hall/Room by the candidates. Any Mobile Phone, Electronic Communication Device, etc., found in possession of the candidate inside the Examination Hall/Room, even if on off mode, shall be liable for confiscation.
9. No candidate shall have in his/her possession inside the Examination Hall/Room any book, notebook or loose paper, except his/her Admission Certificate and other connected papers permitted by the Commission.
10. Complete silence must be observed in the Examination Hall/Room. No candidate shall copy from the paper of any other candidate, or permit his/her own paper to be copied, or give, or attempt to give, or obtain, or attempt to obtain irregular assistance of any kind.
11. This Test Booklet can be carried with you after answering the questions in the prescribed Answer-Sheet.
12. Noncompliance with any of the above instructions will render a candidate liable to penalty as may be deemed fit.
13. No rough work is to be done on the OMR Answer-Sheet. You can do the rough work on the space provided in the Test Booklet.

N.B. : There will be negative marking @ 0·25 per 1 (one) mark against each wrong answer.

SEAL

[No. of Questions : 100]

1. Which checkpoint in the cell cycle ensures DNA replication is complete before mitosis begins?

   (A) G1 checkpoint

   (B) G2 checkpoint

   (C) M checkpoint

   (D) There are no checkpoints

2. In dark-field microscopy, light is scattered by the specimen, resulting in

   (A) a bright background with dark objects

   (B) a dark background with bright objects

   (C) colored images of the specimen

   (D) increased magnification compared to bright field

3. The human leukocyte antigen (HLA) system is a group of genes that code for cell surface proteins that play a vital role in

   (A) nutrient transport

   (B) immune response and self-recognition

   (C) muscle contraction

   (D) blood clotting

4. The acrosome of the sperm is formed from the

   (A) mitochondria

   (B) centrosome

   (C) lysosome

   (D) Golgi bodies

5. By which of the following processes is the genome of bacteria prevented by its endonucleases?

   (A) Methylation at restriction sites

   (B) Immune mechanism

   (C) Nuclease resistant genome

   (D) Are not very effective on bacterial genome

6. Which test is considered as presumptive test for semen?

   (A) Lipase

   (B) Amylase

   (C) Acid phosphatase (AP)

   (D) Lactate dehydrogenase (LDH)

7. Which part of the translational modification of proteins ***does not*** occur in the lumen of ER?

   (A) Glycosylation

   (B) Ubiquitination

   (C) Conformation folding and formation of quaternary structure

   (D) Formation of disulphide bonds

8. In a zwitterion, the overall charge of the molecule is

(A) positively charged

(B) negatively charged

(C) neutrally charged

(D) It is not relevant to charge on molecule

9. The Bombay blood group is also known as

(A) hh phenotype

(B) universal recipient

(C) B positive

(D) AB positive

10. Adjuvants are added to vaccines to

(A) weaken the antigen

(B) neutralize toxins

(C) enhance the immune response to the antigen

(D) deliver the antigen directly to B lymphocytes

11. The ability to differentiate blood group in forensics was established by

(A) Alec Jeffreys

(B) Karl Landsteiner

(C) James Marsh

(D) Mathieu Orfila

12. The scope of forensic biology has expanded to include the analysis of

(A) only blood and hair

(B) fingerprints and fibers

(C) ballistics and trace evidence

(D) all biological evidence (DNA, body fluids, tissues)

13. Glycophorin A (GPA) can be used as an antigen for the detection of which body fluid?

(A) Blood

(B) Semen

(C) Urine

(D) Saliva

14. What type of samples can be collected for prostate-specific antigen (PSA) testing in forensic investigations?

(A) Only fresh blood samples

(B) Only saliva samples

(C) Both seminal fluid and dried semen stains

(D) Only hair samples

15. The active ingredient in cannabis is found in high concentrations in which part of the plant?

(A) Roots

(B) Leaves and flowers

(C) Stem

(D) Seed

16. The principle behind sterilization in an autoclave involves

(A) chemical denaturation of proteins

(B) desiccation (drying) of micro-organisms

(C) coagulation of proteins by high temperature steam

(D) disruption of cell walls by pressure

17. Haemoglobin of human foetus

(A) has a lower affinity for oxygen than that of the adult

(B) has same oxygen affinity as that of adult Hb

(C) has only 2 protein sub-units instead of 4

(D) has higher oxygen affinity than that of the adult

18. A body buried deep underground will likely experience

(A) a rapid succession of insect colonization

(B) a slower and delayed insect succession

(C) a unique set of insect species not found above ground

(D) It will not affect insect succession

19. Jaffe color test using picric acid to convert creatinine to colored creatinine picrate is used for the detection of

(A) vaginal secretion

(B) menstrual blood

(C) urine

(D) vomitus

20. Which group of insects is most commonly associated with dead bodies in the early stages of decomposition?

(A) Beetles

(B) Butterflies

(C) Flies (Diptera)

(D) Moths

21. The title of 'first transgenic insect' is attributed to which insect species?

(A) Honeybee (*Apis mellifera*)

(B) Housefly (*Musca domestica*)

(C) Diamondback moth (*Plutella xylostella*)

(D) Fruit fly (*Drosophila melanogaster*)

22. The discovery of Ti-plasmids played a significant role in the development of

(A) antibiotics production

(B) Genetically Modified Organisms (GMOs)

(C) DNA fingerprinting

(D) antiviral medications

23. Southern blotting is a technique used to detect specific

(A) proteins

(B) carbohydrates

(C) DNA sequences

(D) lipids

24. What is the full form of CRISPR?

(A) Coded Repetitive Sequences for Identifying Pathogens

(B) Clustered Regularly Interspaced Short Palindromic Repeats

(C) Cellular Recognition System for Internal Parasites

(D) Cyclic Regulatory Sequences for Inducing Protein Synthesis

25. The technique used to create Dolly Sheep (first transgenic mammal) is called

(A) parthenogenesis

(B) nuclear transfer

(C) in vitro fertilization

(D) artificial insemination

26. The T-DNA region of a bacterial plasmid codes for the production of

(A) proteins involved in bacterial replication

(B) genes beneficial to the plant host

(C) viral replication machinery

(D) toxins

27. Stem cells are characterized by their ability to

(A) perform specialized functions

(B) self-renew and differentiate into other cell types

(C) secrete large amounts of hormones

(D) have a short lifespan

28. Which is the correct order from the strongest to weakest bond?

(A) Ionic bond > Covalent bond > Hydrogen bond > Van der Waals interaction

(B) Ionic bond > Hydrogen bond > Covalent bond > Van der Waals interaction

(C) Covalent bond > Ionic bond > Hydrogen bond > Van der Waals interaction

(D) Hydrogen bond > Ionic bond > Covalent bond > Van der Waals interaction

29. Gametoclonal variation originates from

(A) mutations in somatic cells during plant growth

(B) mutations in gametes (sperm or egg cells)

(C) environmental factors affecting plant development

(D) cross-pollination between different plant species

30. During IEF, a pH gradient is established within the gel. This gradient allows proteins to migrate towards

(A) the anode (positive electrode) if they are positively charged

(B) the cathode (negative electrode) if they are negatively charged

(C) the electrode with a pH matching their pI where they stop migrating

(D) both electrodes depending on their size

31. Confirmation of menstrual blood stain is done by which method?

(A) Isoenzyme marker

(B) Protein marker

(C) Restriction enzyme

(D) Fibrin degradation product (FDP)

32. The nitrogenous bases in DNA are divided into two categories—purines and pyrimidines. Examples of purines include

(A) adenine (A) and thymine (T)

(B) adenine (A) and guanine (G)

(C) cytosine (C) and uracil (U)

(D) guanine (G) and thymine (T)

33. Towards which electrode is DNA migrated in gel electrophoresis?

(A) Cathode electrode

(B) Anode electrode

(C) Randomly migrate

(D) No movement based on electric charge

34. Who is widely recognized as the father of DNA profiling?

(A) H. G. Khorana

(B) Alec Jeffreys

(C) Kary Mullis

(D) E. M. Southern

35. The length of amelogenin locus in X-chromosome is

(A) 114 bp

(B) 106 bp

(C) 110 bp

(D) 112 bp

36. What is the full form of IUCN?

(A) Indian Union and Committee of Nature

(B) International Union for Conservation of Nature and Natural Resources

(C) International United Convention on Nature

(D) International Union for Conserving Natural Environment

37. Short tandem repeat (STR) analysis is a commonly used technique for

(A) sequencing entire genomes

(B) identifying individuals based on specific DNA markers

(C) visualizing chromosomes under a microscope

(D) detecting mutations in genes

38. Limitations of DNA typing techniques include

(A) the possibility of contamination of the sample

(B) the inability to differentiate between identical twins

(C) the high cost of the equipment

(D) All of the above

39. The value _____ of A260/A280 ratio for UV-visible spectrophotometry known to have pure DNA in sample.

(A) 1·8

(B) > 1·8

(C) 2

(D) > 2

40. The Wildlife Institute of India (WII) plays a significant role in

(A) developing and managing national parks

(B) enforcing wildlife protection laws

(C) contributing to the development of wildlife management policies in India

(D) issuing hunting licenses

41. Which of the following sequencing methods is best suited for long read sequencing?

(A) Nanopore sequencing

(B) Sanger sequencing

(C) Maxam-Gilbert sequencing

(D) Pyrosequencing

42. In India, patents are governed by the

(A) Copyright Act

(B) Trade Marks Act

(C) Patents Act, 1970

(D) Industrial Designs Act

43. Gel electrophoresis is used for

(A) rDNA by joining with cloning vector

(B) isolation of DNA molecules

(C) cutting of DNA into fragments

(D) separation of DNA fragment according to their size

44. Which organism is the source of taq polymerase?

(A) *Escherichia coli*

(B) *Saccharomyces cerevisiae*

(C) *Thermus aquaticus*

(D) *Homo sapiens*

45. Why is it important to maintain a sterile environment during DNA isolation in forensics?

(A) To prevent DNA degradation

(B) To ensure accurate quantification of DNA

(C) To avoid contamination with foreign DNA

(D) All of the above

46. The National IPR Policy aims to create an ecosystem for

(A) faster government approvals only

(B) increased innovation and creativity

(C) stricter penalties for minor copyright infringements

(D) more government control over intellectual property

47. What was the primary purpose of the DNA Bill in India?

(A) To regulate genetic modification of crops

(B) To establish a DNA data bank for identification purposes

(C) To provide funding for DNA research projects

(D) To ban the use of DNA testing in paternity suits

48. Which Ministry is responsible for the National IPR Policy?

(A) Ministry of Education

(B) Ministry of Commerce

(C) Ministry of Culture

(D) Ministry of Science and Technology

49. Blind testing, where analysts don't know the origin of a control sample, is an example of which principle of quality control?

(A) Calibration of equipment

(B) Proficiency testing with external samples

(C) Documentation and record keeping

(D) None of the above

50. Messenger RNA (mRNA) is used in some forensic tissue identification approaches. Why is this approach challenging for routine forensic laboratories?

(A) mRNA is less abundant than DNA in biological samples

(B) mRNA is more susceptible to degradation than DNA

(C) existing laboratory equipment cannot be used for mRNA analysis

(D) All of the above

51. What is the length of river Brahmaputra in Assam?

(A) 1020 kms

(B) 532 kms

(C) 670 kms

(D) 480 kms

52. The Northbrook Gate is known as Gateway of Assam was build near Sukreswar Ghat, Guwahati in the year

(A) 1850

(B) 1893

(C) 1874

(D) 1865

53. Rang Ghar situated at Sivasagar was built by

(A) Swargadeo Pramatta Singha

(B) Purandar Singha

(C) Rajeswar Singha

(D) Rudra Singha

54. World's wettest place Mawsynram is located in Meghalaya's

(A) West Khasi Hills district

(B) East Khasi Hills district

(C) East Garo Hills district

(D) Ri Bhoi district

55. Ramsar site in Assam is

(A) Chandubi Lake of Kamrup

(B) Deepor Beel of Kamrup

(C) Charan Beel of Morigaon

(D) Kapla Beel of Barpeta

56. Which of the following is the State bird of Assam?

(A) Red-vented bulbul

(B) Lesser adjutant

(C) White-throated kingfisher

(D) White-winged wood duck

57. In which North-East State of India is uranium available?

(A) Meghalaya

(B) Nagaland

(C) Manipur

(D) Mizoram

58. The States of India having border with Myanmar are

(A) Mizoram, Manipur, Nagaland and Assam

(B) Mizoram, Tripura, Meghalaya and Assam

(C) Manipur, Arunachal Pradesh, Meghalaya and Assam

(D) Mizoram, Manipur, Nagaland and Arunachal Pradesh

59. Who was the first Speaker of the Lok Sabha?

(A) G. S. Dhillon

(B) Hukum Singh

(C) Ananthasayanam Ayyangar

(D) G. V. Mavalankar

60. The Part IV of the Indian Constitution deals with which of the following?

(A) Directive Principles of State Policy

(B) Fundamental Rights

(C) The States

(D) The Union

61. In India, which of the following organizations computes national income?

(A) Finance Commission

(B) Ministry of Finance

(C) Central Statistical Organization

(D) National Development Council

62. The headquarters of the Reserve Bank of India is situated in

(A) New Delhi

(B) Mumbai

(C) Chennai

(D) Kolkata

63. Which of the following lines demarcates the boundary between India and Pakistan?

(A) Durand Line

(B) Maginot Line

(C) McMahon Line

(D) Radcliffe Line

64. The State of India which produces maximum wind energy is

(A) Tamil Nadu

(B) Gujarat

(C) Punjab

(D) Haryana

65. How many States are there in the North-Eastern Region of India?

(A) 8 States

(B) 7 States

(C) 10 States

(D) 6 States

66. The title 'Mahatma' to M. K. Gandhi was given by

(A) Jawaharlal Nehru

(B) Subhas Chandra Bose

(C) Bal Gangadhar Tilak

(D) Rabindranath Tagore

67. Which of the following was the first drama of Mahapurush Srimanta Sankardev?

(A) *Patni Prasada*

(B) *Keli Gopal*

(C) *Parijata Harana*

(D) *Chihnajatra*

68. The first Assamese film, *Joymoti* produced and directed by Jyoti Prasad Agarwala was released in the year

(A) 1930

(B) 1932

(C) 1935

(D) 1936

69. DoNER (Development of North-Eastern Region) Ministry was constituted in the year

(A) 2001

(B) 2000

(C) 2002

(D) 2005

70. Which of the following States of India has more than 90% of its area under forest?

(A) Madhya Pradesh

(B) Chhattisgarh

(C) Arunachal Pradesh

(D) Himachal Pradesh

71. The part of the earth which is a relatively thin layer of earth's surface that supports life, reaching from a few kilometers into the atmosphere to deep sea vents is known as

(A) lithosphere

(B) biosphere

(C) hydrosphere

(D) atmosphere

72. When a moving vehicle suddenly stops, passengers sitting inside lean forward because of

(A) inertia of motion

(B) inertia of rest

(C) conservation of mass

(D) velocity

73. In an adult human body, total number of bones found is

(A) 270

(B) 206

(C) 306

(D) 213

74. When water is added to quicklime, the reaction that occurs is called

(A) explosive

(B) endothermic

(C) exothermic

(D) photochemical

75. Isotopes of an element are

(A) similar physical but different chemical properties

(B) similar chemical but different physical properties

(C) similar chemical and physical properties

(D) different chemical and physical properties

76. A miscible mixture of benzene and chloroform can be separated by

(A) sublimation

(B) distillation

(C) crystallization

(D) filtration

77. The crop improvement techniques based on the concept of cellular totipotency is

(A) tissue culture

(B) grafting

(C) hybridization

(D) layering

78. The seed bearing plants where seeds develop inside tissues that get modified to form the fruit of the plant belong to group

(A) thallophyta

(B) bryophyta

(C) gymnosperms

(D) angiosperms

79. Saliva contains an enzyme called salivary lipase that breaks down

(A) starches into sugars

(B) protein into amino acids

(C) fats into fatty acids

(D) None of the above

80. The vitamin exclusively of animal origin is

(A) vitamin B_{12}

(B) vitamin B_1

(C) vitamin B_6

(D) vitamin B_2

81. A carbon sink is any reservoir, natural, that accumulates and stores some carbon containing compounds. The main natural carbon sinks are

(A) plants, animals and soil

(B) plants, the ocean and soil

(C) plants, the ocean and animal

(D) animals, the ocean and soil

82. In a uniform magnetic field, the lines of force must be

(A) convergent

(B) parallel to each other

(C) divergent

(D) None of the above

83. Which of the following instruments is used for detecting electric current?

(A) Altimeter

(B) Fathometer

(C) Galvanometer

(D) Tube tester

84. The type of nuclear reaction which is responsible for liberation of energy in a nuclear reactor is

(A) nuclear fission

(B) nuclear fusion

(C) nuclear destruction

(D) None of the above

85. Building, historic monuments which are made up of rocks like limestone and marble are damaged due to acid rain. Which of the following is the end product of the reaction?

(A) Calcium hydroxide

(B) Calcium carbonate

(C) Gypsum

(D) Quicklime

86. The chemical formula of sulphuric acid is

(A) H_2SO_4

(B) $CaCO_3$

(C) HCO_3

(D) CH_3COOH

87. Bacteria are

(A) single-celled, prokaryotic micro-organism with absence of the nucleus and other cell organelles

(B) single-celled, eukaryotic micro-organism with absence of the nucleus and other cell organelles

(C) single-celled, eukaryotic micro-organism with nucleus and other cell organelles

(D) multiple-celled, prokaryotic microorganism with nucleus and other cell organelles

88. The group of invertebrate animals having an exoskeleton, a segmented body and jointed legs are called

(A) annelids

(B) arthropods

(C) molluscs

(D) helminths

89. An excellent fuel which burns without smoke is the biogas. What is the main constituent of it?

(A) Hydrogen

(B) Carbon dioxide

(C) Methane

(D) Oxygen

90. The energy which is the result of the movement of tiny particles like atoms, molecules or ions in solids, liquids and gases is called

(A) light energy

(B) electrical energy

(C) heat energy

(D) None of the above

91. Put the verb into the correct form :

Why _____ (you/look) at me like that? Did I say something wrong?

(A) are you looking

(B) did you look

(C) do you look

(D) should you look

92. Arrange the words in the correct order to form a meaningful sentence :

have they farmhouse bought a old fabulous just.

(A) They have bought a fabulous old farmhouse just.

(B) They have just bought a fabulous old farmhouse.

(C) They have bought just a fabulous old farmhouse.

(D) They have just bought a old fabulous farmhouse.

93. Pick the correct option :

They say that it is _____ storm in ten years.

(A) by far worse

(B) most worst

(C) the worse

(D) the worst

94. Pick the correct option :

This chair looks _____ the sofa.

(A) very comfortable than

(B) the most comfortable than

(C) too comfortable than

(D) more comfortable than

95. Pick the correct option :

_____ of you should attend the conference.

(A) Any

(B) Each

(C) Every

(D) Many

96. Identify the type of the sentence :

Many brave soldiers fought in the war, and they received medals.

(A) Simple

(B) Compound

(C) Complex

(D) None of the above

97. Which word means the same as 'distinct'?

(A) Satisfied

(B) Imprecise

(C) Uneasy

(D) Separate

98. 'Tedious' is most dissimilar to

(A) stimulating

(B) alarming

(C) intemperate

(D) tranquil

99. Choose the answer that best completes the comparison :

Polite : Gracious :: Cordial : _____

(A) Courteous

(B) Confident

(C) Comfortable

(D) Bold

100. Complete the sentence with the correct option :

Lena asked, _____

(A) "Where had I been yesterday?"

(B) "Where she had been yesterday?"

(C) "Where she was the day before?"

(D) "Where she could be the day before?"

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