Roll No.----------

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

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

B.Sc. (Biotech.) (Fourth Semester) Examination, 2025-26

(NEP)

(BBT4003)

IMMUNOLOGY

K-1371

Paper Code
BBT4003

(To be filled in the OMR Sheet)

प्रश्नपुस्तिका सीरीज
Question Booklet Series
D

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.

(Remaining instructions on the last page)

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 हो या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(शेष निर्देश अन्तिम पृष्ठ पर)

1. Because of denaturation, antigens become functionless, these are called:

   (A) Cross-reactive antigens

   (B) Epitopes

   (C) Hidden epitopes

   (D) Forssman antigens

2. Basophils have receptors for antibodies

   (A) IgG

   (B) IgA

   (C) IgM

   (D) IgE

3. Plasma cells are the end cells of

   (A) T-cells

   (B) β-cells

   (C) Killer cells

   (D) NK-cells

4. The primary cells involved in immune response are

   (A) NK-cells

   (B) K-cells

   (C) Lymphocytes

   (D) None of these

5. The parts which filter Lymph are

   (A) Lymph nodes

   (B) Spleen

   (C) Thymus

   (D) Bone marrow

6. To be antigen, the chemical molecule (protein) needs

(A) High molecular weight

(B) Chemical complexity

(C) Both (A) and (B)

(D) None of these

7. Antibodies are produced from

(A) T-cells

(B) B-cells

(C) NK cells

(D) Eosinophils

8. T-cells are produced from :

(A) Bone marrow

(B) Thymus

(C) Spleen

(D) None of these

9. To prepare vaccine for small pox, the material used by Edward Jenner is

(A) Small pox material

(B) Chicken pox material

(C) Cow-pox material

(D) Measles material

10. Antibody formation depends on

(A) Age of the person

(B) Amount of antigen

(C) Wellbeing of the person

(D) All of the above

11. Delayed type of hypersensitivity is seen in :

(A) Penicillin allergy

(B) Contact dermatitis

(C) Arthus reaction

(D) Anaphylaxis

12. Active immunity is induced by :

(A) Infection

(B) Placental transfer of antibodies

(C) Injection of antibodies

(D) Injection of gamma-globulins

13. Interferon is composed of :

(A) Lipids

(B) Glycoprotein

(C) Lipoprotein

(D) Nucleic acid

14. The reaction of soluble antigen with antibody is known by

(A) Precipitation

(B) Agglutination

(C) Flocculation

(D) Complement fixation

15. Blood group antigens are

(A) Species specific

(B) Auto specific

(C) Isospecific

(D) Organ specific

16. The cellular immune response is mediated by :

(A) B cells

(B) T cells

(C) BT cells

(D) Endothelial cells

17. Which of the following can provide naturally acquired passive immunity for the new born.

(A) IgA

(B) IgE

(C) IgG

(D) IgM

18. What is the strength of the bond between antigen and antibody?

(A) Affinity

(C) Covalent

(B) Avidity

(D) None of these

19. First Line of body defence is

(A) Antibody molecules

(B) Unbroken skin

(C) Antigen molecules

(D) Phagocytic cells

20. Monoclonal antibodies are produced by

(A) Hybridoma technology

(B) Biotechnology

(C) Fermentation Technology

(D) None of these

21. Which of these is NOT a characteristic feature of adaptive immunity?
    (A) Immunogenic memory
    (B) Antigen no-specific
    (C) Self non-self-recognition
    (D) Diversity
22. Which of the following antibody gives a primary immune reaction?
    (A) IgG
    (B) IgM
    (C) IgA
    (D) IgE
23. Which of the following is NOT the characteristics of a good antigen.
    (A) Large in size
    (B) Foreignness
    (C) Highly complex
    (D) Reproduce only by binary fission
24. Name the nerve stimulator which is responsible for the pain of the inflammation.
    (A) Bradykinins
    (B) Prostaglandin
    (C) Histamines
    (D) Kinins
25. Name the first cell which recruited at the place of infection.
    (A) NK cells
    (B) Basophils
    (C) Neutrophils
    (D) Macrophages
26. Name the group of pattern recognition molecules which functions exclusively as a signaling receptor?
    (A) CRP
    (B) Toll-like receptor
    (C) MBL
    (D) LPS

27. Name the cytokines which released in response to virus infection?

(A) Interferons

(B) Monokines

(C) Lymphokines

(D) Interleukins

28. Which of the following compounds is NOT found in tears?

(A) Lysozyme

(B) Lactoferin

(C) IgA

(D) IgE

29. Innate immunity present since birth and it has no memory.

(A) True

(B) False

(C) Ambiguous Statement

(D) None of these

30. The ability of an organism to resist infections by the pathogens is called_____.

(A) Infection

(B) Hypersensitivity

(C) Immunity

(D) Allergy

31. The class of an immunoglobulin :

(A) Is determined by Class I and Class II major histocompatibility complex proteins

(B) Is determined by the carbohydrate attached to the light chain is

(C) Determined by the antigen

(D) Is determined by the heavy chain type

32. When a B-cell undergoes immunoglobulins class switching

(A) The variable region of the light chain changes, but its constant region remains the same

(B) The variable region of the light chain remains the same, but its constant region changes

(C) The variable region of the heavy chain remains the same but its constant region changes

(D) The variable region of the heavy chain changes but its constant region remains the same

33. Class switching of immunoglobulin occurs :

(A) Usually with booster immunizations, going from IgM to IgG

(B) binds complement

(C) causes the histamine release

(D) mediates immunoglobulin class switching

34. The immunoglobulin class which is the least abundant in the normal adult is

(A) IgG

(B) IgA

(C) IgM

(D) IgE

35. Which of the following statements best characterizes an antibody?

(A) An antibody contains high molecular weight RNA as its basic structure

(B) An antibody is composed of protein and cannot be distinguished from the albumin fraction of the serum proteins

(C) An antibody is composed of four identical protein subunits which may be caused to dissociate by treatment with urea

(D) An antibody contains protein as its major chemical component and its synthesis may be elicited by the administration of a foreign protein or polysaccharide

36. Individuals unable to make the J protein found in certain immunoglobulins would be expected to have frequent infections of the :

(A) Brain

(B) Blood

(C) Liver

(D) Intestinal tract

37. Which immunoglobulin is the principal one found in secretions such as milk?

(A) IgG

(B) IgM

(C) IgA

(D) IgD

38. ALL of the following are true EXCEPT :

(A) An epitope is a small portion of a macromolecule

(B) The variable region domains contain the antigen recognition site

(C) An antigenic determinant is a paratope

(D) The class of an immunoglobulin is determined by its heavy chain

39. The immunoglobulin Joining chain (J-chain) is

(A) Only produced by T-Cells

(B) Only produced by neutrophils

(C) Associated with only multimeric forms of IgM and IgA

(D) Associated with IgE for histamine release cells

40. The major immunoglobulin family to which a particular immunoglobulin belongs can be determined by sequential analysis of the 110 amino acids beginning from the :

(A) Amino terminus of the light chain

(B) Carboxy terminus of the light chain

(C) Amino terminus of the heavy chain

(D) Carboxy terminus of the heavy chain

41. All of the following are true about antibodies, EXCEPT which one?

(A) They fix complement

(B) They occur on the surface of B-lymphocyte

(C) They predominate the primary immune response to antigen

(D) They are molecule with a single, defined amino acid sequence

42. Which of the following immunoglobulins is present normally in plasma at the highest concentration?

(A) IgG

(B) IgM

(C) IgA

(D) IgD

43. All of the following are true with respect to IgE molecules, EXCEPT which one?

(A) They are the principal immunoglobulin class involved in allergic reactions

(B) They are involved in mediating anti-parasitic immune responses

(C) They will cross the placenta and fix complement

(D) They can effect the release of histamine and other chemical mediators

44. ALL of the following are true of antigen EXCEPT which one of the following?

(A) They contain epitopes

(B) They will react with antibodies

(C) They contain antigenic determinants

(D) They contain paratopes

45. T-cell receptors or antibodies react with antigens

(A) Because both are made by lymphocytes

(B) Because of complementary of molecular fit of both with antigen

(C) Because both ‘have light chain and heavy chain polypeptides

(D) Cause histamine release

46. T-cell antigen receptors are distinguished from antibodies by which of the following :

(A) T-Cell receptors are glycosylated

(B) T-Cell receptors must interact with antigen uniquely presented by other cells but not with free antigen

(C) T-Cell receptors bind various cytokines

(D) T-Cell receptors bind complement to lyse cells

47. The major role of the complement system is to work in conjunction with

(A) Antibodies to lyse cells via the C8 and C9 components

(B) The major histocompatibility complex for cell recognition

(C) Antibodies to opsonize cells

(D) The T-cell receptor for production of lymphokines

48. One principal function of the Class I and Class II major histocompatibility complex S proteins is to

(A) Transduce the signal to the T-cell interior following antigen binding

(B) Mediate immunoglobulin class switching

(C) Present antigen for recognition by the T-cell antigen receptor

(D) Stimulate production of interleukins

49. One principal function of complement is to

(A) Inactivate perforins

(B) Mediate the release of histamine

(C) Bind antibodies attached to cell surfaces and to lyse these cells

(D) Phagocytize antigens

50. All of the following are true with respect to IgM antibodies EXCEPT which one

(A) They fix complement

(B) They occur on the surface of lymphocytes

(C) They predominate in the primary response to antigen

(D) They mediate allergic reaction

51. In the technique of flow cytometry, what is used to detect and measure physical and chemical characteristics of cells?
    (A) Fluorescently tagged antibodies
    (B) Radioactive isotopes
    (C) Enzyme-linked antibodies
    (D) Chromatographic columns
52. Which immunological technique is used for the identification of specific proteins in a mixture using antibodies?
    (A) PCR
    (B) Western blotting
    (C) Flow cytometry
    (D) FACS
53. What is the principle behind the ELISA (Enzyme-Linked Immunosorbent Assay)?
    (A) Amplification of DNA
    (B) Detection of antigen-antibody interactions
    (C) Separation of proteins based on size
    (D) Detection of specific RNA sequences
54. Which of the following techniques is used to separate proteins based on their size and charge?
    (A) Flow cytometry
    (B) Western blotting
    (C) ELISA
    (D) Gel electrophoresis
55. Which term refers to antigenic differences in the constant region of antibodies between individuals of the same species?
    (A) Isotype
    (B) Idiotype
    (C) Allotype
    (D) Epitope
56. The diversity of the antibody repertoire is NOT due to:
    (A) Somatic recombination
    (B) Junctional diversity
    (C) RNA splicing
    (D) Somatic hyper mutation

57. Allelic exclusion ensures that:
    (A) Each B cell expresses multiple antibody types
    (B) Only one allele of the heavy and light chain genes is expressed
    (C) T cells produce antibodies
    (D) Both alleles produce antibodies
58. Which region of the immunoglobulin undergoes class switching?
    (A) Variable region
    (B) Light chain
    (C) Constant region of the heavy chain
    (D) J region
59. What happens to the antigen-binding specificity after class switch recombination?
    (A) It changes completely
    (B) It remains the same
    (C) It binds different antigens
    (D) It loses affinity
60. Somatic hypermutation occurs in:
    (A) Bone marrow
    (B) Thymus
    (C) Germinal centers of lymph nodes
    (D) Spleen red pulp
61. Which part of the immune system is primarily responsible for Long-term immunity after vaccination?
    (A) Red blood cells
    (B) Plasma cells
    (C) Memory B and T cells
    (D) Neutrophils
62. Which of the following vaccines is an example of a subunit vaccine?
    (A) MMR (measles, mumps, rubella)
    (B) Polio (inactivated)
    (C) Hepatitis B
    (D) Varicella (chicken pox)

63. Which of the following is a characteristic of Live attenuated vaccines?

(A) They are made from bacteria only

(B) They provide long-lasting immunity with fewer doses

(C) They contain completely inactive pathogens

(D) They require a booster dose every few months

64. What is the primary purpose of vaccination?

(A) To cure an infection

(B) To provide active immunity against a pathogen

(C) To reduce inflammation

(D) To replace lost immune cells

65. Which type of vaccine contains an inactivated form of a virus or bacterium?

(A) Live attenuated vaccine

(B) Subunit vaccine

(C) Inactivated vaccine

(D) DNA vaccine

66. The Loss of self-tolerance in autoimmune disorders is due to failure of:

(A) Complement proteins

(B) Inflammatory cytokines

(C) Immunoglobulin production

(D) Central or peripheral tolerance mechanisms

67. Which of the following is NOT typically considered an autoimmune disorder?

(A) Graves' disease

(B) Asthma

(C) Vitiligo

(D) Celiac disease

68. Rheumatoid arthritis primarily involves autoimmunity against:

(A) Skin cells

(B) Synovial joints

(C) Muscle fibers

(D) Blood cells

69. Hashimoto's thyroiditis primarily affects which organ?

(A) Liver

(B) Heart

(C) Thyroid gland

(D) Kidneys

70. Autoimmune diseases occur when the immune system:

(A) Fails to recognize pathogens

(B) Attacks its own body tissues

(C) Becomes completely inactive

(D) Overproduces red blood cells

71. Which class of MHC is involved in presenting antigens during organ transplant rejection?

(A) Class II only

(B) Class I only

(C) Both Class I and II

(D) Neither

72. In humans, the genes for MHC molecules are Located on which chromosome?

(A) Chromosome 6

(B) Chromosome 11

(C) Chromosome 14

(D) Chromosome X

73. The MHC Class I molecule is composed of:

(A) Two identical heavy chains

(B) One alpha chain and one beta-2 macroglobulin

(C) Two light chains and one heavy chain

(D) Three alpha chains

74. Which of the following cells is NOT a professional antigen-presenting cell?

(A) Macrophage

(B) Dendritic cell

(C) B cell

(D) Neutrophil

75. The source of peptides for MHC Class II molecules is:

(A) Intracellular proteins

(B) Viral proteins only

(C) Extracellular antigens

(D) MHC receptors

76. The peptides presented by MHC Class I molecules are derived from:

(A) Extracellular proteins

(B) Nuclear DNA

(C) Cytosolic (intracellular) proteins

(D) Mitochondrial RNA

77. Which cells recognize antigens presented by MHC Class II molecules?

(A) CD4+ T cells

(B) CD8+ T cells

(C) NK cells

(D) Dendritic cells

78. Which cells recognize antigens presented by MHC Class I molecules?

(A) B cells

(B) CD4+ T cells

(C) CD8+T cells

(D) NK cells

79. MHC Class II molecules are primarily expressed on:

(A) All body cells

(B) Neutrophils and red blood cells

(C) Antigen-presenting cells (APCs)

(D) Cytotoxic T cells

80. MHC Class I molecules are expressed on:

(A) All nucleated cells

(B) B cells only

(C) Macrophages only

(D) Erythrocytes only

81. Which T cells remain in the body after an infection to provide faster response next time?

(A) Naive T cells

(B) Cytotoxic T cells

(C) Regulatory T cells

(D) Memory T cells

82. Cell-mediated immunity is especially important for defending against:

(A) Bacterial toxins

(B) Extracellular bacteria

(C) Viruses and intracellular pathogens

(D) Allergens

83. Which of the following cells kill infected cells without antigen specificity?

(A) Helper T cells

(B) Cytotoxic T cells

(C) Natural Killer (NK) cells

(D) Memory T cells

84. Which molecules are secreted by cytotoxic T cells to destroy infected cells?

(A) Interleukins and interferons

(B) Histamine and serotonin

(C) Perforin and granzymes

(D) Antibodies

85. Which of the following is NOT involved in the cell-mediated immune response?
(A) Cytotoxic T cells
(B) Helper T cells
(C) B cells
(D) Macrophages

86. The CD4+ T cells are also known as:
(A) Cytotoxic T cells
(B) Suppressor T cells
(C) Helper T cells
(D) Natural killer cells

87. Out of the following which are the examples of autoimmune disease?
(A) Acquired Hemolytic anemia
(B) Rheumatoid arthritis
(C) Hashimoto disease
(D) All of these

88. What is the technique for quantitative estimation of immunoglobulin?
(A) Single diffusion in one dimension
(B) Single diffusion in two dimensions
(C) Double diffusion in one dimension
(D) Double diffusion in two dimensions

89. What is the similarity between IgM & IgG?
(A) A compliment fixation
(B) Placental transport
(C) Heat stability at 56^{o}C
(D) Sedimentation coefficient

90. Natural killer cells
(A) Belongs to B-cell lineage
(B) Belongs to T-cell lineage
(C) Display cytotoxic effect on tumour cell
(D) Require previous antigen exposure for activation

91. Passive immunity lasts for the period of about

(A) 10 days

(B) 2-3 months

(C) 10 years

(D) None of the above

92. Example for Live vaccine is

(A) Rubella & BCG

(B) Polio &TAB

(C) Diphtheria & Tetanus

(D) Hepatitis A & Rabies

93. Vaccines are prepared from killed microbes, they are

(A) Inactivated (killed) vaccine

(B) Attenuated vaccines

(C) Autogenous vaccine

(D) None of these

94. If more than one kind of immunizing agent is included in the vaccine, it is

(A) Cellular vaccine

(B) Recombinant vaccine

(C) Mixed vaccine

(D) Toxoid vaccine

95. Killed, polio vaccine is

(A) Sabin vaccine

(B) Salk

(C) BCG

(D) TAB

96. Immediate type of hypersensitivity reactions are mediated by

(A) T-cells

(B) β-cells

(C) Mast cells

(D) Macrophages

97. Very effective, less time consuming and at a time so many samples can be detected by

(A) ELISA

(B) CFT

(C) Neutralization

(D) Agglutination

98. When a particular antigen is mixed with antibody in the presence of an electrolyte at suitable temperature and pH the particles are clumped; this is called:

(A) Precipitation

(B) Agglutination

(C) Electrophoresis

(D) CIE

99. Antigenic specificity is due to

(A) Chemical complexity

(B) Solubility

(C) Steric configuration

(D) All of these

100. Capacity of antigen to breakdown into small fragments each with a single epitopic region is known as

(A) Solubility

(B) Froeignness

(C) Denaturation

(D) None of these

******

Rough Work / रफ कार्य

Rough Work / रफ कार्य

4. Four alternative answers are mentioned for each question as – A, B, C & D in the question 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 एक 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, उत्तर 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।