

Roll No.-----

प्रश्नपुस्तिका क्रमांक  
Question Booklet No.

O.M.R. Serial No.

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

(NEP)

**(BBT4004)**

**MOLECULAR DIAGNOSTICS**

**K-1372**

**Paper Code**

**BBT4004**

(To be filled in the  
OMR Sheet)

प्रश्नपुस्तिका सीरीज  
Question Booklet Series

**B**

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

**(Remaining instructions on the last page)**

**(शेष निर्देश अन्तिम पृष्ठ पर)**



1. What is it a diastase reaction?
  - (A) Modification of PAS reaction based on two slides. One of these slides is pretreated by an enzyme which digest a DNA
  - (B) Modification of PAS reaction based on two slides. One of these slides is pretreated by an enzyme which digest a glycogen
  - (C) Modification of Feulgen's reaction based on two slides. One of these slides is pretreated by an enzyme which digest a DNA
  - (D) Modification of Feulgen's reaction based on two slides. One of these slides is pretreated by an enzyme which digest a glycogen
2. What is it an indirect methods of immunohistochemistry?
  - (A) Label is used indirectly
  - (B) Label is bound to the primary antibody
  - (C) Label is bound to the secondary antibody
  - (D) Label is not bound to the primary antibody
3. What is it a negative control if the enzyme histochemistry is performed?
  - (A) Result of second staining which is again negative
  - (B) Sample in the workflow which surely lacks the analyzed structure
  - (C) Sample in the workflow which surely contains the analyzed structure
  - (D) Result of second staining which is negative, in contrast to the result of first staining
4. Which factors most strongly influence primer melting temperature ( $T_m$ )?
  - (A) Primer length, GC content and salt concentration in the buffer
  - (B) Polymerase type and dNTP concentration
  - (C) Template secondary structure only
  - (D) Number of PCR cycles and annealing time
5. What is it a positive control if the enzyme histochemistry is performed?
  - (A) Result of second staining which is again positive
  - (B) Sample in the workflow which surely lacks the analyzed structure
  - (C) Sample in the workflow which surely contains the analyzed structure
  - (D) Result of second staining which is positive, in contrast to the result of first staining

6. What is it a direct method in immunohistochemistry?
  - (A) Label is bound to the primary antibody
  - (B) Label is bound to the secondary antibody
  - (C) Label is bound directly to the active site of the antibody
  - (D) Label is bound directly to the structure which should be demonstrated
7. Which chemical compound is usually main part of chemical fixatives?
  - (A) Acetone
  - (B) Formic acid
  - (C) Formaldehyde
  - (D) Osmium tetroxide
8. Which definition of a fixation is the best?
  - (A) Freezing of the sample
  - (B) Intense and careful drying up of the tissue
  - (C) Submersion the sample into the fixative fluid
  - (D) Fixation stops gently and quickly activity of enzymes inside the tissue
9. Which embedding medium is the most common?
  - (A) Agar
  - (B) Resin
  - (C) Gelatin
  - (D) Paraffin
10. How do you choose a fluorophore?
  - (A) By its excitation and emission wavelengths
  - (B) By its name
  - (C) By the laser and detectors/filters present in the cytometer
  - (D) Both (A) and (C)
11. Which is common color of nuclei after staining with hematoxylin eosin?
  - (A) Cherry-like red
  - (B) Blue to magenta
  - (C) Pink to red
  - (D) Pale pink

12. Which is color of the collagen if the AZAN is used?
- (A) Red
  - (B) Blue
  - (C) Green
  - (D) Yellow
13. Which label is the most widely used in immunohistochemistry for the electron microscopy?
- (A) Hematoxylin
  - (B) Metal particles
  - (C) Enzyme labeling
  - (D) Fluorescent dye
14. Which label is the most widely used in immunohistochemistry for the light microscopy?
- (A) Enzyme labeling
  - (B) Fluorescent dye
  - (C) Metal particles
  - (D) Hematoxylin
15. Which statement about a histochemistry is the most accurate? (i.e., “Select the best definition!”)
- (A) Histochemistry is an identification and visualization of chemical compounds inside cells and tissues
  - (B) Histochemistry is a measurement of concentration of chemical compounds inside tissues
  - (C) Histochemistry is an analysis of chemical reaction inside cells
  - (D) Histochemistry is a research method only

16. Which statement is the most accurate?
- (A) Chemical fixation can be based on either induction of cross-linking or denaturation
  - (B) Chemical fixation can be performed only if the solution has room temperature
  - (C) Chemical fixation is based on acting of formaldehyde on protein.
  - (D) Chemical fixation is used only exceptionally
17. Which part of the cytometer converts the light signal to voltage so it can be interpreted through computer software?
- (A) Fluidics
  - (B) Electronics
  - (C) Optics
  - (D) All
18. Which statement about the physical fixation describes it the best?
- (A) Physical fixation is based on cessation of transporting function of water
  - (B) Physical fixation is based on effects of microwave radiation
  - (C) Physical fixation is based on effects of high temperature
  - (D) Physical fixation is based on effects of low temperature
19. Which of following statements describes the curettage?
- (A) Brush away free cells from the surface of a mucosa
  - (B) Scrape of the tissue using a special tool
  - (C) Surgical removing of whole organ
  - (D) None of these
20. Why are histological samples stained?
- (A) Tissues are colored to chaotically, we have to reduce the number of colors
  - (B) In fact, do dye is used, the term “staining” is a historical mistake
  - (C) Reason is purely aesthetic, true colors of tissues are too ugly
  - (D) Tissues are usually colorless, we have to add some colors

21. For amplification of long targets (>5 kb), which strategy is recommended?
- (A) Use high-fidelity, highly processive polymerases and optimized buffers
  - (B) Reduce extension time per cycle to prevent over-extension
  - (C) Use only Taq polymerase at very high  $Mg^{2+}$  concentration
  - (D) Perform nested PCR with short amplicons to infer long target presence
22. Why are trichromatic methods called “trichromatic”?
- (A) True reason is hidden in history, now it makes no sense
  - (B) There are used three dyes, one basic and two acidic
  - (C) There are used three dyes, all three acidic
  - (D) There are used three dyes
23. Which Part Of The Cytometer Consists Of The Excitation Sources And Detectors?
- (A) Optics
  - (B) Electronics
  - (C) Fluidics
  - (D) All
24. Which method is widely used to prevent PCR carryover contamination?
- (A) dUTP/uracil-N-glycosylase (UNG) system to degrade carryover PCR products
  - (B) Using lower annealing temperatures to reduce non-specific priming
  - (C) Adding RNase to all reactions before amplification
  - (D) Substituting  $Mg^{2+}$  with  $Ca^{2+}$  in the reaction buffer
25. Why is AZAN called AZAN?
- (A) AZAN is an abbreviation of main principle - AZocoupling Anthracite Neutralization
  - (B) AZAN is an abbreviation of two main dyes - AZocarmine and ANiline blue
  - (C) AZAN is an abbreviation (from German) - Alle Zellen Azurblau Nichfarbige
  - (D) AZAN is a cool trade name only

26. Which part of the cytometer brings the cells to the interrogation point where the cells meet the laser?
- (A) Electronics
  - (B) Fluidics
  - (C) Optics
  - (D) None of these
27. Primary type of IF (immunofluorescence) technique uses two antibodies in association with fluorescent dye.
- (A) True
  - (B) False
  - (C) Ambiguous Statement
  - (D) None of these
28. Why is embedding of fixed sample important?
- (A) Embedding increases hardness without increasing the fragility
  - (B) Embedding increases durability of the sample
  - (C) Embedded samples can be easily stored
  - (D) All
29. Which of the following is used in electron microscope?
- (A) Electron beams
  - (B) Magnetic fields
  - (C) Light waves
  - (D) Electron beams and magnetic fields
30. RPA is
- (A) Recombinase Polymerase Amplification
  - (B) Reaction temperature: 37°C
  - (C) DNA product: short, discrete
  - (D) All

31. PCR is used to detect \_\_\_\_\_ in patients having AIDS.
- (A) pneumonia
  - (B) fever
  - (C) HIV
  - (D) cough
32. High pressure liquid chromatography can be performed only in columns.
- (A) True
  - (B) False
  - (C) Ambiguous Statement
  - (D) None of these
33. A \_\_\_\_\_ of a disease helps to suspect the presence of pathogen within the body.
- (A) disease
  - (B) symptom
  - (C) consequence
  - (D) effect
34. A low concentration of any pathogen can be detected by \_\_\_\_\_ of their nucleic acid.
- (A) cutting
  - (B) amplification
  - (C) joining
  - (D) denaturation
35. Which of the following is NOT a component of flow cytometer?
- (A) Fluidics system
  - (B) Optical system
  - (C) Electronic system
  - (D) Chemical system

36. Electron Microscope can give a magnification up to \_\_\_\_\_
- (A) 400,000X
  - (B) 10,000X
  - (C) 1500X
  - (D) 100X
37. NASBA stands for
- (A) Nucleic Acid Sequences Based Amplification
  - (B) Nucleic Acid Sequences base alignment
  - (C) Nitric acid silver base amalgam
  - (D) None
38. Which of the following is not true about High pressure liquid chromatography (HPLC)?
- (A) It requires high pressure for the separation of the species
  - (B) There is no need to vaporize the samples
  - (C) It is performed in columns
  - (D) It has high sensitivity
39. Which of the following is added to improve the visualization of virions in immunoelectron microscopy?
- (A) Silver
  - (B) Platinum
  - (C) Gold
  - (D) Bronze
40. Negative Staining is used for examining \_\_\_\_\_
- (A) virus particles
  - (B) protein molecules
  - (C) bacterial flagella
  - (D) virus particles, protein molecules and bacterial flagella

41. Flow cytometry is used to for which cell population?
- (A) Homogenous population of cells
  - (B) Heterogeneous population of cells
  - (C) Both homogenous and heterogeneous population of cells
  - (D) Heterotopic population of cells
42. Which of the following method is used for the detection of antigen?
- (A) EIA
  - (B) PCR
  - (C) Dot-blot hybridization
  - (D) Boiling lysis
43. How many DNA duplexes are obtained from one DNA duplex after 12 cycles of PCR?
- (A) 24
  - (B) 4096
  - (C) 128
  - (D) 3096
44. Which of the following are true for electron microscopy?
- (A) Specimen should be thin and dry
  - (B) Image is obtained on a phosphorescent screen
  - (C) Electron beam must pass through evacuated chamber
  - (D) Specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber
45. Which of the following is NOT considered as a parameter for their analysis by Flow Cytometry?
- (A) Functional analysis
  - (B) Cell viability
  - (C) Clonality
  - (D) Cell cycle analysis

46. RCA is
- (A) A robust and highly sensitive approach for continuously amplifying circular DNA to generate long, repetitive copies of the circular template.
  - (B) The polymerase extends from the 3' end of a primer and continues around the circular template, displacing the nascent strand as it continuously utilizes the initial template.
  - (C) RCA can be used to amplify plasmids for downstream long-read or Illumina sequencing or for amplifying assembled constructs for cell-free protein expression.
  - (D) All above
47. Which of the following is not a property of an ideal vaccine?
- (A) It should be genetically stable
  - (B) It should have private support
  - (C) It should be affordable
  - (D) It should not have any side effects
48. The secondary electrons radiated back in scanning microscope is collected by?
- (A) Specimen
  - (B) Detector
  - (C) Vacuum chamber
  - (D) Cathode
49. LAMP is
- (A) Loop-Mediated Isothermal Amplification
  - (B) Linear amplification of monophosphate
  - (C) Linear amplification mediated polymerization
  - (D) None
50. What are fluorescent molecules and fluorescent dyes also termed as?
- (A) Fluorophores
  - (B) Molephores
  - (C) Fluorescent molephores
  - (D) Cytochromes

51. Immobilization of antibody-antigen is mediated by which type of interaction?
- (A) Hydrophilic interaction
  - (B) Hydrophobic interaction
  - (C) Non-covalent interaction
  - (D) Chemical interaction
52. Which antibodies are used for ELISA technique?
- (A) Primary antibodies
  - (B) Secondary antibodies
  - (C) Primary as well as secondary antibodies
  - (D) Primary, secondary and tertiary antibodies
53. Which of the following is NOT a type of data output expected in ELISA assay?
- (A) Quantitative analysis
  - (B) Qualitative analysis
  - (C) Semi-quantitative analysis
  - (D) Semi-qualitative analysis
54. Which of the following is NOT an advantage of Sandwich ELISA?
- (A) Offers high sensitivity compared to direct or indirect ELISA
  - (B) Introduces highly specific reaction due to the involvement of two antibodies for antigen detection
  - (C) Both direct and indirect technique is implemented in detection
  - (D) It is cheaper as there is a requirement of fewer labelled antibodies
55. What is the optimal range (moles/lit) for proteins to be detected by ELISA assay?
- (A)  $10^2$  to  $10^6$  moles/lit
  - (B)  $10^{-12}$  to  $10^{-9}$  moles/lit
  - (C)  $10^{12}$  to  $10^9$  moles/lit
  - (D)  $10^{-2}$  to  $10^{-6}$  moles/lit

56. All statements below are less or more related to the autolysis. Which of them is the best?
- (A) Autolysis is decay of tissues caused mainly by bacteria
  - (B) Autolysis is decay of tissues caused mainly by action of the immune system
  - (C) Autolysis is decay of tissues caused mainly by enzymes produced inside the tissue
  - (D) Autolysis is decay of tissues caused by chemical compounds into which is the sample placed after harvesting
57. Steps of PCR in sequence are?
- (A) Denature DNA, Extend DNA, Anneal Primers
  - (B) Anneal Primers, Extend DNA, Denature DNA
  - (C) Extend DNA, Anneal Primers, Denature DNA
  - (D) Denature DNA, Anneal Primers, Extend DNA
58. Azokoupling reaction (azocoupling method) is a proof of enzymatic activity. Which enzyme is usually detected?
- (A) Alkaline phosphatase
  - (B) Alcohol dehydrogenase
  - (C) Non-specific esterase
  - (D) Horseradish peroxidase
59. Degradation of a biological material caused by bacteria is called:
- (A) Apoptosis
  - (B) Autolysis
  - (C) Liquefaction
  - (D) Putrefaction
60. How is removed the water out of tissues during common histological processing?
- (A) We use baths with xylene of subsequently higher and higher concentration
  - (B) We use baths with ethanol of subsequently higher and higher concentration
  - (C) We use baths with acetone of subsequently higher and higher concentration
  - (D) We use baths with benzene of subsequently higher and higher concentration

61. Which compound is detected by Feulgen's staining?
- (A) DNA
  - (B) RNA
  - (C) Proteins
  - (D) Polysaccharides
62. DNA amplification is done by all, except:
- (A) DNA sequencing
  - (B) Loop-mediated isothermal amplification (LAMP)
  - (C) Ligase chain reaction
  - (D) Polymerase chain reaction
63. How is called harvesting (collecting) of biological material from deceased?
- (A) Necropsy
  - (B) Necromancy
  - (C) Necrocomion
  - (D) Material from deceased is not called "biological material"
64. Which of the statement is true for Reverse transcriptase PCR?
- (A) Amplification of RNA samples is not required for knowing the abundance of mRNA
  - (B) Both the start and the end primers are used
  - (C) Only a single cDNA strand is synthesized before the PCR
  - (D) The primer used is always specific
65. How is called harvesting (collecting) of biological material?
- (A) Fine needle aspirational biopsy
  - (B) Core cut biopsy
  - (C) Trepanobiopsy
  - (D) Biopsy

66. How thick are usually slices of the sample which are being glued on the underlying slide for light microscopy.
- (A) 1-10nm
  - (B) 1-2mm
  - (C) 4-10 $\mu$ m
  - (D) 50-100 $\mu$ m
67. Which type of a microscope has to use laser as a source of light?
- (A) Confocal microscope
  - (B) Polarization microscope
  - (C) Phase contrast microscope
  - (D) Scanning electron microscope
68. Which structure is demonstrated (stained) by luxol blue?
- (A) Mucopolysaccharides
  - (B) Phospholipids
  - (C) Glycogen
  - (D) Lipids
69. What is main principle of visualization of PAS reaction? (i.e., “How it works in a nutshell?”)
- (A) Purple and insoluble product of reaction of Schiff’s reagent with an aldehyde
  - (B) Green and insoluble product of reaction of Schiff’s reagent with an aldehyde
  - (C) Purple and insoluble product of reaction of Lugol’s reagent with an aldehyde
  - (D) Green and insoluble product of reaction of Lugol’s reagent with an aldehyde
70. Which type of chemical interaction is main principle of basic (overview) staining methods?
- (A) Van der Waals interactions between charged biomolecules and charged molecules of dyes
  - (B) Electrostatic interaction between charged biomolecules and charged molecules of dyes
  - (C) Covalent bonds between charged biomolecules and charged molecules of dyes
  - (D) It depends on the staining technique, different principles can be dominant

71. Among following dyes, only one is not acidic. Which one?
- (A) Eosin
  - (B) Orange G
  - (C) Anilin blue
  - (D) Hematoxylin
72. Which of following dyes is not basic?
- (A) Hematein
  - (B) Orange G
  - (C) Hematoxylin
  - (D) Methylene blue
73. Which macromolecules are proven by PAS reaction?
- (A) RNA
  - (B) DNA
  - (C) Proteins
  - (D) Polysaccharides
74. How is called technique which is able to detect specific sequence of nucleic acid on the tissue section?
- (A) In situ hybridization
  - (B) Lectin histochemistry
  - (C) Immunohistochemistry
  - (D) Feulgen's method
75. Which characteristic correctly describes Taq DNA polymerase commonly used in PCR?
- (A) Thermostable DNA polymerase from *Thermus aquaticus* lacking 3'→5' exonuclease activity
  - (B) High-fidelity polymerase from *Pyrococcus* with intrinsic proofreading
  - (C) Reverse transcriptase that synthesizes DNA from RNA templates
  - (D) Endonuclease that digests single-stranded DNA during PCR

76. Which structure is highlighted using silver impregnation?
- (A) Mukopolysaccharides
  - (B) Reticular fibers
  - (C) Elastic fibers
  - (D) Mucus
77. What is the primary advantage of hot-start PCR?
- (A) Reduce non-specific amplification by preventing polymerase activity until initial denaturation
  - (B) Allow continuous isothermal amplification at a single temperature
  - (C) Enable direct sequencing of PCR products without purification
  - (D) Increase the melting temperature ( $T_m$ ) of primers
78. Which compound is stained by alcian blue?
- (A) Mukopolysaccharides
  - (B) Phospholipids
  - (C) Glycogen
  - (D) Lipids
79. Which cellular structure is stained by aldehyde fuchsin?
- (A) Reticular fibers
  - (B) Polysaccharides
  - (C) Elastic fibers
  - (D) Mucus
80. Which statement best describes the role of  $Mg^{2+}$  in a PCR reaction?
- (A) Cofactor for DNA polymerase and affects primer-template binding and fidelity
  - (B) Acts as a chelating agent to remove inhibitors from the sample
  - (C) Serves as the fluorescent reporter in real-time detection
  - (D) Denatures double-stranded DNA at high temperature

81. In quantitative PCR, what does the Ct (threshold cycle) value represent?
- (A) The cycle number at which fluorescence exceeds the threshold; inversely proportional to initial template amount
  - (B) The absolute number of target copies present in the reaction
  - (C) The final plateau fluorescence intensity after all cycles
  - (D) The melting temperature of the amplified product
82. What is a main advantage of digital droplet PCR (ddPCR) over conventional qPCR?
- (A) Absolute quantification of target molecules without the need for a standard curve
  - (B) Faster thermal cycling due to continuous flow
  - (C) Lower sensitivity to inhibitors but only qualitative results
  - (D) Generates longer amplicons (>10 kb) efficiently
83. Which primer type is most selective for synthesizing cDNA from polyadenylated mRNA?
- (A) Oligo(dT) primers anneal to poly(A) tails and preferentially prime mRNA
  - (B) Random hexamers prime uniformly across all RNA species
  - (C) Gene-specific primers only prime rRNA and tRNA
  - (D) Ribosomal RNA primers increase mRNA yield selectively
84. What stains orcein?
- (A) Reticular fibers
  - (B) Polysaccharides
  - (C) Elastic fibers
  - (D) Mucus
85. What is the main purpose of nested PCR?
- (A) Increase sensitivity and specificity by using internal primers in a second amplification
  - (B) Allow amplification of circular DNA without denaturation
  - (C) Simultaneously amplify RNA and DNA targets in one reaction
  - (D) Reduce the need for primer design by using universal primers

86. Dyes of Sudan group are usually used as a staining for:
- (A) Polysaccharides
  - (B) Nucleoid acids
  - (C) Proteins
  - (D) Lipids
87. What effect can excessively high dNTP concentrations have in PCR?
- (A) Reduce fidelity and chelate  $Mg^{2+}$  leading to decreased polymerase accuracy
  - (B) Prevent primer annealing by increasing melting temperature dramatically
  - (C) Enhance proofreading activity of Taq polymerase
  - (D) Stabilize secondary structures and improve specificity
88. What is another term for Immunofluorescence?
- (A) Cell imaging
  - (B) Imaging antibodies
  - (C) Fluorophores
  - (D) Antigen imaging
89. Which basic (overview) staining technique is used the most often?
- (A) Weigert - Van Gieson
  - (B) Mallory's trichrome
  - (C) Hematoxylin - eosin
  - (D) Masson's trichrome
90. In quantitative PCR, reporter-quencher set up is used. Which of the statement holds true for this methodology?
- (A) It allows detection of all double stranded molecules
  - (B) The reporter and quencher are the molecules present on the same probe
  - (C) The quencher is having a fluorescent group
  - (D) Fluorescence is observed only when both the groups are present in proximity to each other

91. Trichromatic methods (trichrome) are used for visualization of collagen. On which property of collagen is based this staining?
- (A) Collagen fibers are basophilic
  - (B) Collagen fibers are eosinophilic
  - (C) Collagen fibers are amphiphilic
  - (D) Trichromes cannot be used for this purpose
92. What is main purpose of a cryotome?
- (A) Slicing of frozen samples
  - (B) Slicing of desiccated samples
  - (C) Slicing of samples embedded into water soluble media
  - (D) Slicing of samples embedded into water insoluble media
93. Which DNA polymerase is commonly chosen when high fidelity (proofreading) is required?
- (A) Pfu DNA polymerase with 3'→5' exonuclease proofreading activity
  - (B) Taq polymerase lacking exonuclease activity
  - (C) Reverse transcriptase derived polymerase
  - (D) Endonuclease I that cleaves mispaired bases
94. What does it mean a metachromatic staining?
- (A) Metachromatic structure actively repulses molecules of the dye
  - (B) Stained structure has different color than the color of the dye
  - (C) Metachromatic structure actively accumulates molecules of the dye
  - (D) Stained structure reacts chemically with the dye and this reaction changes substantially the chemical nature of the dye
95. What is the primary application of CHIP-PCR in regulatory gene studies?
- (A) Chromatin immunoprecipitation followed by PCR to detect protein-bound DNA regions
  - (B) Quantitative measurement of mRNA expression using chromatin markers
  - (C) Amplification of entire chromosomes to study copy number variations
  - (D) High-throughput sequencing library preparation without enrichment

96. What does it mean an excision?
- (A) Surgical removing of part of organ
  - (B) Surgical removing of several organs
  - (C) Brush away free cells from the surface
  - (D) Harvesting of small cylinder of the tissue using a needle
97. What does it mean mounting of the slide?
- (A) Final gluing of the covering slide
  - (B) Gluing of the slice on the underlying slide
  - (C) Covering the block of tissue by the paraffin
  - (D) Labeling of final slide by a bar- or QR code
98. In flow cytometry, what is side-scatter a measure of?
- (A) Fluorescence intensity
  - (B) Size
  - (C) Complexity of the cell
  - (D) Shape
99. What information do you need to know when choosing which fluorophores to use in your flow cytometry experiments? Select all that apply ?
- (A) The lasers and filters available on your flow cytometer
  - (B) Which sheath fluid you will be using
  - (C) The granularity of your target cell type
  - (D) None
100. What does light emit as forward side scatter (FSC) measure?
- (A) Cell size
  - (B) Cell granularity! complexity
  - (C) Cell surface marker fluorescence
  - (D) None

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## **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 छॉटना 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 सिरिज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।