

**M.Sc. LABORATORY TECHNOLOGY (MSc LT)
SEMESTER -II EXAMINATION, AUGUST-2026**

MSc LT-203- GENETICS & CYTOPATHOLOGY

[Time allotted: Three Hours]

[Max Marks: 100]

Note: Read all the instructions carefully

Answer all questions in serial order, Draw suitable diagrams wherever necessary

Q. 1. Objective type questions: (Attempt All)**(10 x 02 = 20)**

(Very short/ Short answer/ MCQ/ One liners/ Fill in the blanks/ True/False)

- a. FISH is primarily used to detect:
 - i. Serum proteins
 - ii. Chromosomal abnormalities
 - iii. Blood glucose
 - iv. Enzyme activity
- b. Which chromosomal abnormality is most commonly associated with chronic myeloid leukemia (CML)?
 - i. t(8;14)
 - ii. t(9;22)
 - iii. t(15;17)
 - iv. del(5q)
- c. Which PCR technique is most suitable for measuring gene expression?
 - i. Conventional PCR
 - ii. Multiplex PCR
 - iii. RT-PCR
 - iv. Nested PCR
- d. The major advantage of Next-Generation Sequencing (NGS) over Sanger sequencing is:
 - i. Lower accuracy
 - ii. High-throughput sequencing
 - iii. Lower sensitivity
 - iv. No need for DNA extraction
- e. Which molecular marker consists of short tandem repeats of DNA sequences?
 - i. SNP
 - ii. STR
 - iii. RFLP
 - iv. VNTR protein
- f. The definitive prenatal diagnostic procedure performed after 15 weeks of gestation is:
 - i. NIPT
 - ii. Amniocentesis
 - iii. Chorionic villus sampling
 - iv. Ultrasound
- g. According to the Bethesda System, HSIL indicates:
 - i. Benign inflammation
 - ii. Low-grade dysplasia
 - iii. High-grade squamous intraepithelial lesion
 - iv. Invasive adenocarcinoma
- h. The preferred screening test for cervical cancer in asymptomatic women is:
 - i. Endometrial biopsy
 - ii. Pap smear
 - iii. FNAC
 - iv. Colposcopy alone
- i. A major advantage of the cell block technique is:
 - i. Faster staining only
 - ii. Preservation of tissue architecture for immunohistochemistry
 - iii. Elimination of fixation
 - iv. Lower cellularity
- j. Small cell carcinoma of the lung typically shows:
 - i. Large polygonal cells with abundant cytoplasm
 - ii. Small cells with nuclear molding
 - iii. Keratin pearls
 - iv. Mucin-filled cells

Q. 2. Short notes/ Short answer type questions (Attempt any Five)**(05 x 04 = 20)**

- a. Comparative genomic hybridization (CO1, PO1)
- b. DNA microarray and its applications (CO1, PO2)
- c. Klinefelter Syndrome (CO1, PO2)
- d. Urine cytology (CO3, PO1)
- e. Philadelphia chromosome (CO1, PO1)
- f. Benign vs malignant effusion (CO3, PO3)
- g. Cytological features of LSIL (CO4, PO5)

Q. 3. Structured questions (Attempt any Three)**(03 x 10 = 30)**

- a. Define aneuploidy. Explain the clinical features and laboratory diagnosis of Down syndrome. (CO1, PO1)
- b. Define LSIL and HSIL. Explain the importance of HPV testing in cervical cancer screening (CO3, PO2)
- c. Describe the genetic basis and clinical features of sickle cell anaemia (CO2, PO1)
- d. Benign vs Malignant breast cytology (CO3, PO2)

Q. 4. Long Answer/ Essay type questions (Attempt any Two)**(02 x 15 = 30)**

- a. Discuss the principles and applications of molecular cytogenetic techniques in clinical diagnosis. (CO1, PO1)
- b. Explain quality assurance in cytology. (CO3, PO1)
- c. Describe chromosomal abnormalities in hematological malignancies (CO2, PO2)