

To be filled by the candidate)

Booklet S. No. _____

Roll No. (In figures) _____

Roll No. (In words) _____

Name of the Candidate : _____

Father's Name : _____

Center of Examination : _____

Total No. of Questions : 50

Paper Code- 2603

**Name of Examination- Senior Resident/Specialist Tutor Entrance 2026
Specialty-Biochemistry**

Time Allowed : 90 Minutes

Maximum Marks : 200

IMPORTANT NOTE:

- (i) OMR Answer Sheet will be supplied by the Examination Centre Superintendent for answering the questions.
- (ii) Use **Blue/Black Ink/ Ball Pen only**, to darken the appropriate circle in the OMR Answer Sheet.
- (iii) Darken one circle deeply for each question in the OMR Answer Sheet, as faintly darkened circle might be rejected by the Optical Scanner.
- (iv) Darkening of more than one circle shall be rejected by the scanner. **Over-writing, cutting, erasing or use of White Fluid is not allowed.**
- (v) Before dealing with the question paper, fill-up the required information with Blue/Black Ball Pen correctly both in the Question Booklet and in the OMR Answer Sheet.
- (vi) Do not fold the OMR Answer Sheet nor put any mark here and there to avoid rejection by the Optical Scanner.
- (vii) Write Roll. No. carefully on the OMR Answer Sheet and darken the appropriate circle properly.
- (viii) **Each question carries Four Marks while 1 mark shall be deducted for each incorrect response.**
- (ix) **Use of Calculator is not allowed.**
- (x) **No over-writing, cutting, erasing or use of white fluid is allowed.**
- (xi) Rough work be done on the sheet(s) at the end.
- (xii) **MOBILE TELEPHONES (EVEN ON SWITCH-OFF MODE) AND SUCH OTHER ELECTRONIC DEVICES ARE NOT ALLOWED INSIDE THE EXAMINATION HALL.**
- (xiii) The question paper-booklet will be retained by the candidate after the entrance test is over.

Q1. A 20-year-old woman has a random blood glucose of 130 mg/dL and a urine sample positive for Benedict's test. Which of the following is NOT a possible cause?

- (a) Fructosuria
- (b) Pentosuria
- (c) Decreased renal threshold for glucose
- (d) Diabetes mellitus

Q2. Aspirin is used as an antithrombotic drug despite inhibiting both thromboxane A₂ and prostacyclin because:

- (a) Platelets can regenerate COX, endothelium cannot
- (b) Endothelium can regenerate COX, platelets cannot
- (c) Aspirin inhibits only thromboxane
- (d) Aspirin increases nitric oxide from platelets

Q3. A laboratory report shows total calcium 7.3 mg/dL, normal ionized calcium, and albumin 2.1 g/dL. What best explains this finding?

- (a) Vitamin D toxicity
- (b) Hyperparathyroidism
- (c) Pseudohypocalcemia
- (d) Chronic kidney disease

Q4. Identical twins raised in different environments show differences in disease susceptibility. The most likely mechanism is:

- (a) Different DNA sequences
- (b) DNA methylation and histone modification
- (c) Chromosomal translocation
- (d) Genetic polymorphism

Q5. Failure of addition of mannose-6-phosphate to lysosomal enzymes results in:

- (a) Tay–Sachs disease
- (b) I-cell disease
- (c) Gaucher disease
- (d) Wilson disease

Q6. Loss-of-function mutation in BRCA1 and BRCA2 predisposes to cancer due to defective:

- (a) Base excision repair
- (b) Homologous recombination repair
- (c) Nucleotide excision repair
- (d) Mismatch repair

Q7. A 10-month-old child presents with recurrent vomiting, lethargy, seizures during fasting, and hypoketotic hypoglycemia. The most likely diagnosis is:

- (a) Medium-chain acyl-CoA dehydrogenase deficiency
- (b) Glucose-6-phosphatase deficiency
- (c) Pyruvate dehydrogenase deficiency
- (d) Glucokinase deficiency

Q8. The Friedewald formula cannot be used when triglyceride levels are:

- (a) <150 mg/dL
- (b) >400 mg/dL
- (c) <400 mg/dL
- (d) Normal with high HDL

Q9. Wernicke's encephalopathy in chronic alcoholics is due to deficiency of:

- (a) Vitamin B₁
- (b) Vitamin B₂
- (c) Vitamin B₃
- (d) Vitamin B₁₂

Q10. Which enzyme is selenium-dependent and protects against oxidative damage?

- (a) Catalase
- (b) Glutathione peroxidase
- (c) Superoxide dismutase
- (d) Peroxisomal oxidase

Q11. During apoptosis, recognition of apoptotic cells by macrophages is facilitated by:

- (a) Increased cholesterol in membrane
- (b) Externalization of phosphatidylserine
- (c) Loss of integral membrane proteins
- (d) Increased glycolipid concentration

Q12. Tumor suppressor protein p53 induces apoptosis mainly by:

- (a) Inhibiting caspases
- (b) Activating anti-apoptotic proteins
- (c) Increasing Bax expression
- (d) Blocking cytochrome-c release

Q13. The Ct (threshold cycle) value in real-time PCR indicates:

- (a) Amount of enzyme used
- (b) Total number of PCR cycles
- (c) Cycle at which fluorescence crosses threshold
- (d) End point of PCR

Q14. The extension step in PCR occurs optimally at:

- (a) 90–95 °C
- (b) 72 °C
- (c) 50–65 °C
- (d) 30–35 °C

Q15. In Sanger sequencing, chain termination occurs due to incorporation of:

- (a) dNTPs
- (b) rNTPs
- (c) ddNTPs
- (d) Nucleosides

Q16. Which protein is a negative acute-phase reactant?

- (a) Haptoglobin
- (b) α_1 -antitrypsin
- (c) Albumin
- (d) Fibrinogen

Q17. Which electrophoretic pattern is characteristic of chronic inflammation?

- (a) Elevated α_1 and α_2 fractions only
- (b) Polyclonal increase in γ -globulins
- (c) Monoclonal γ spike
- (d) Reduced albumin with normal globulins

Q18. Which enzyme converts H antigen into A antigen?

- (a) Galactosyltransferase
- (b) Fucosyltransferase
- (c) N-acetylgalactosaminyltransferase
- (d) Sialyltransferase

Q19. Which class of drugs is prohibited in precision sports such as shooting?

- (a) Stimulants
- (b) Beta-blockers
- (c) Anabolic agents
- (d) Narcotics

Q20. In lead poisoning, which metabolite is increased in urine?

- (a) Porphobilinogen
- (b) Delta-aminolevulinic acid
- (c) Urobilinogen
- (d) Creatinine

Q21. CRISPR–Cas system in bacteria functions primarily as:

- (a) Gene regulation system
- (b) DNA repair mechanism
- (c) Adaptive immune system
- (d) Protein degradation pathway

Q22. Caloric restriction is believed to slow aging by:

- (a) Increasing insulin secretion
- (b) Increasing oxidative stress
- (c) Activating sirtuins and reducing ROS
- (d) Increasing telomere shortening

Q23. Elevated PSA levels may be seen in:

- (a) Prostatitis
- (b) Benign prostatic hyperplasia
- (c) Prostate cancer
- (d) All of the above

Q24. EQAS samples should be tested:

- (a) Using special procedures
- (b) Only after calibration
- (c) As routine patient samples
- (d) Repeated multiple times

Q25. The most commonly used statistical tool in EQAS evaluation is:

- (a) Standard deviation
- (b) Z-score
- (c) Mean
- (d) Coefficient of variation

Q26. In reversed-phase HPLC, the stationary phase is:

- (a) Polar
- (b) Non-polar
- (c) Charged
- (d) Aqueous

Q27. Mass spectrometry identifies compounds based on:

- (a) Boiling point
- (b) Polarity
- (c) Mass-to-charge ratio
- (d) Retention index

Q28. Derivatization in GC-MS is done to:

- (a) Increase molecular weight
- (b) Improve volatility and thermal stability
- (c) Reduce detector sensitivity
- (d) Change ionization method

Q29. X-ray crystallography is mainly used to determine:

- (a) Molecular weight
- (b) Three-dimensional atomic structure

- (c) Chemical reactivity
- (d) Solubility

Q30. Which fat-soluble vitamin is synthesized by gut bacteria?

- (a) Vitamin A
- (b) Vitamin D
- (c) Vitamin E
- (d) Vitamin K

Q31. Increase in sample size has what effect on random error?

- (a) Increases random error
- (b) Decreases random error
- (c) No effect on random error
- (d) Eliminates random error

Q32. Which of the following is NOT one of the four core principles of biomedical ethics?

- (a) Autonomy
- (b) Justice
- (c) Beneficence
- (d) Non-maleficence

Q33. Breaking the findings of a single study into multiple publications is called:

- (a) Falsification
- (b) Fabrication
- (c) Salami slicing
- (d) Duplicate publication

Q34. The most commonly used enzyme in CLIA is:

- (a) Lactate dehydrogenase
- (b) Catalase
- (c) Horseradish peroxidase
- (d) Acid phosphatase

Q35. Which compound is commonly used as a label in ECLIA?

- (a) Gold nanoparticles
- (b) Ruthenium complex
- (c) Acridinium ester
- (d) Fluorescein

Q36. Pantothenic acid is a component of:

- (a) Coenzyme A
- (b) FAD
- (c) NAD
- (d) Coenzyme Q

Q37. Raw egg white contains avidin, which inhibits absorption of:

- (a) Vitamin K
- (b) Biotin
- (c) Niacin
- (d) Thiamine

Q38. The specific dynamic action (thermic effect) of protein is approximately:

- (a) 30%
- (b) 15%

- (c) 10%
- (d) 5%

Q39. The limiting amino acid in cereals such as rice and wheat is:

- (a) Methionine
- (b) Lysine
- (c) Tryptophan
- (d) Tyrosine

Q40. Defect in mismatch DNA repair is associated with:

- (a) Breast cancer
- (b) Colorectal cancer
- (c) Xeroderma pigmentosum
- (d) Melanoma

Q41. A protein lacking a signal sequence for intracellular sorting remains in the:

- (a) Cytoplasm
- (b) Nucleus
- (c) Ribosome
- (d) Endoplasmic reticulum

Q42. All are true regarding muscle glycogenolysis EXCEPT:

- (a) It is insensitive to glucagon
- (b) Its main product is glucose-6-phosphate
- (c) It is affected in von Gierke disease
- (d) It is sensitive to calcium

Q43. Carnitine palmitoyltransferase-I deficiency leads to:

- (a) Increased ketogenesis
- (b) Hypoglycemia with decreased ketogenesis
- (c) Increased fatty acid oxidation
- (d) Hyperglycemia

Q44. All are rich sources of omega-3 fatty acids EXCEPT:

- (a) Fish
- (b) Flaxseed
- (c) Chia seeds
- (d) Cheese

Q45. Serotonin is synthesized from which amino acid?

- (a) Alanine
- (b) Serine
- (c) Tryptophan
- (d) Tyrosine

Q46. Refsum disease results from a defect in:

- (a) Beta-oxidation
- (b) Omega-oxidation
- (c) Alpha-oxidation
- (d) Carnitine transport

Q47. Which test compares means of more than two groups in parametric statistics?

- (a) t-test
- (b) Chi-square test

- (c) One-way ANOVA
- (d) Kruskal–Wallis test

Q48. Parametric statistical tests assume that data:

- (a) Is categorical
- (b) Follows normal distribution
- (c) Has unequal variance
- (d) Does not follow normal distribution

Q49. A patient has serum sodium 124 mmol/L, normal serum osmolality, and triglycerides 1000 mg/dL. Which method caused falsely low sodium?

- (a) Direct ISE
- (b) Indirect ISE
- (c) ABG analyzer
- (d) Enzyme assay

Q50. Carbohydrate-deficient transferrin is a marker for:

- (a) Viral hepatitis
- (b) Acute-phase reaction
- (c) Hemochromatosis
- (d) Chronic alcohol consumption

Q Answer Reference

- 1 d Harper's Illustrated Biochemistry
- 2 b Goodman & Gilman
- 3 c Tietz Textbook of Clinical Chemistry
- 4 b Robbins Basic Pathology
- 5 b Harper's Biochemistry
- 6 b Robbins Molecular Pathology
- 7 a Harper's
- 8 b Lipid Disorders – NCEP
- 9 a Harrison's
- 10 b Lehninger Principles
- 11 b Robbins
- 12 c Robbins
- 13 c Molecular Diagnostics
- 14 b PCR Techniques – Sambrook
- 15 c Sanger Sequencing – Lehninger
- 16 c Acute Phase Proteins – Tietz
- 17 b Serum Protein Electrophoresis
- 18 c Blood Group Biochemistry
- 19 b WADA Prohibited List
- 20 b Harper's
- 21 c CRISPR – Nature Reviews
- 22 c Aging Biology – Harrison
- 23 d PSA Interpretation – Urology
- 24 c Laboratory Quality Control

Q Answer Reference

25 b	EQAS Statistics
26 b	HPLC Principles
27 c	Mass Spectrometry
28 b	GC-MS
29 b	Structural Biology
30 d	Vitamins – Harper
31 b	Biostatistics
32 d	Ethics – ICMR Guidelines
33 c	Publication Ethics
34 c	Immunoassays
35 b	ECLIA Principles
36 a	Coenzymes – Harper
37 b	Vitamins
38 a	Ganong Physiology
39 b	Nutrition – Harper
40 b	DNA Repair
41 a	Cell Biology
42 c	Glycogen Metabolism
43 b	FA Oxidation
44 d	Lipid Nutrition
45 c	Neurotransmitters
46 c	Inborn Errors
47 c	Biostatistics
48 b	Clinical Chemistry

Q Answer Reference

49 d Alcohol Biomarkers

50 d

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