

Paper II – Zoology

36. What is the function of MHC class I molecules?
- A. Antibody production
 - B. Antigen presentation to helper T cells
 - C. Antigen presentation to cytotoxic T cells
 - D. B cell activation
37. Operons are Commonly found in
- A. Viruses
 - B. Eukaryotes
 - C. Prokaryotes
 - D. Fungi
38. Which of the following mutations does not alter the amino Acid sequence?
- A. Silent
 - B. Nonsense
 - C. Missense
 - D. Frameshift
39. A ribosomal binding site found in prokaryotic mRNA, crucial for initiating protein synthesis
- A. Shine-Dalgarno sequence
 - B. Kozak sequence
 - C. UTR region
 - D. TATA box
40. Km value in enzyme kinetics represents:
- A. Maximum velocity
 - B. Substrate concentration at half Vmax
 - C. Catalytic constant
 - D. Enzyme concentration
41. Which enzyme exhibits reverse transcription activity?
- A. DNA polymerase III
 - B. Primase
 - C. Reverse transcriptase
 - D. Telomerase
42. Which organelle is associated with β -oxidation in plant cells?
- A. Mitochondria
 - B. Chloroplast
 - C. Peroxisome
 - D. Lysosome
43. Which mitochondrial process contributes to reactive oxygen species (ROS) production?
- A. Glycolysis
 - B. β -oxidation
 - C. TCA cycle
 - D. Electron transport chain
44. Which element is essential for nitrogenase enzyme activity?
- A. Fe
 - B. Mg
 - C. Cu
 - D. Mo
45. Keystone species:
- A. Invasive species
 - B. Apex predator
 - C. Most abundant
 - D. Ecosystem stabilizer
46. Lactose in lac operon acts as:
- A. Repressor
 - B. Inducer
 - C. Co-repressor
 - D. Activator
47. Bicoid gene in Drosophila is responsible for:
- A. Wing development
 - B. Anterior-posterior axis
 - C. Eye development
 - D. Segmentation
48. Which antibiotic inhibits protein synthesis?
- A. Penicillin
 - B. Rifampicin
 - C. Tetracycline
 - D. Ciprofloxacin
49. GTP is required in protein synthesis for:
- A. DNA unwinding
 - B. Peptide bond formation
 - C. Translation initiation and elongation
 - D. RNA polymerization
50. PCR is a method to:
- A. Synthesize proteins
 - B. Cut DNA
 - C. Amplify DNA
 - D. Sequence proteins
51. Which of the following describes Z-DNA?
- A. Left-handed helix
 - B. Right-handed helix
 - C. Single-stranded RNA
 - D. Circular DNA
52. Light reactions of photosynthesis occur in:
- A. Stroma
 - B. Cytoplasm
 - C. Thylakoid membrane
 - D. Inner mitochondrial membrane
53. A coenzyme is:
- A. Inorganic activator
 - B. Non-protein organic molecule
 - C. Competitive inhibitor
 - D. Ribosomal subunit

54. Which of the following is a second messenger?
- DNA
 - cAMP
 - ATP
 - RNA
55. Telomerase acts on
- mRNA capping
 - Chromosome ends
 - Replicating Plasmid
 - Ligating Okazaki fragments
56. The σ^{70} subunit of bacterial RNA polymerase is primarily responsible for
- Elongation
 - Transcription termination
 - Promoter recognition
 - mRNA capping
57. Which enzyme is responsible for proof-reading in prokaryotic DNA replication?
- DNA Pol I
 - DNA Pol III
 - Primase
 - Ligase
58. Which of the following second messengers is generated by phospholipase C (PLC) activity?
- cAMP
 - IP_3 and DAG
 - GTP
 - NAD^+
59. The Hardy-Weinberg equilibrium can be disturbed by all EXCEPT:
- Migration
 - Natural selection
 - Genetic drift
 - Random mating
60. Kin selection theory explains
- Cooperation among unrelated individuals
 - Competition among siblings
 - Altruistic behavior towards relatives
 - Parental neglect
61. Which molecular marker is most suitable for resolving deep phylogenetic relationships across domains?
- ITS region
 - 18S rRNA
 - Mitochondrial COI
 - Microsatellites
62. JAK-STAT signaling is commonly associated with:
- GPCRs
 - Cytokine receptors
 - TLRs
 - Ion channels
63. Which classification system incorporates evolutionary relationships best?
- Phenetic system
 - Artificial system
 - Numerical taxonomy
 - Phylogenetic system
64. Which of the following hormones is secreted in response to low blood calcium levels?
- Calcitonin
 - Parathyroid hormone
 - Aldosterone
 - Insulin
65. The Haldane effect describes:
- Effect of pH on oxygen binding
 - CO_2 transport enhanced by deoxygenation of hemoglobin
 - Oxygen binding affinity at lungs
 - Buffering of blood by bicarbonate
66. A mutation that replaces a purine with another purine is called a
- Transversion
 - Transition
 - Nonsense mutation
 - Silent mutation
67. A bacterial strain with a mutation in RecA protein would be deficient in
- DNA replication
 - Transcription
 - Recombination and SOS response
 - Translation
68. A protein exhibits cooperative binding to a ligand. Its Hill coefficient is:
- <1
 - 1
 - >1
 - Negative
69. What is the role of Dicer in RNA interference?
- Transcription initiation
 - Pre-mRNA splicing
 - Cleaving dsRNA into siRNAs
 - Degrading mRNA
70. During *Xenopus* gastrulation, involution is driven primarily by:
- Apoptosis of marginal zone cells
 - Convergent extension and bottle cell formation
 - Nodal signaling
 - BMP4 repression

