



ST. ANTHONY'S COLLEGE, SHILLONG

ENTRANCE TEST FOR ADMISSION INTO POST GRADUATE PROGRAMME 2005

BIOTECHNOLOGY

DATE : 1 August 2005
TIME : 11.00 am
DURATION : 1 hour

INSTRUCTIONS

- ◆ There are 90 questions in this test. The questions are to be answered in the answer sheet provided by placing a cross mark in the box corresponding to the correct answer.
- ◆ Every correct answer will be awarded 1 mark and for every wrong answer, .25 marks will be deducted.
- ◆ The candidate is to answer as many questions as possible in the time that is allotted for this test.
- ◆ Make sure that you have entered the hall ticket number properly in the place provided in the answer sheet.
- ◆ Please preserve your hall tickets. They will be required at the time of admission.
- ◆ The hall ticket numbers of those shortlisted for admission will be published on the college notice boards and on the college web site today itself by 3.00 pm. Admission procedures are to be completed on or before 5th August, 2005.

1. Two proteins with similar structure are likely to have
 - a) A heme group in the interior of the protein
 - b) Little similarity in amino acid sequence
 - c) Evolved from a common ancestral protein
 - d) Different functions

2. The rate of migration of a protein through an SDS-polyacrylamide gel is not influenced by
 - a) Size of the protein
 - b) Charge of the protein
 - c) Pore size of the gel
 - d) Strength of the electric field

3. Which of the following describes a primary property of enzymes?
 - a) They contain magnesium
 - b) They lower the activation energy of a reaction
 - c) They decrease the rate of a reaction
 - d) They bind to a variety of substrates

4. Noncovalent bonds include all of the following except
 - a) An ionic bond
 - b) A carbon-carbon double bond
 - c) A hydrogen bond
 - d) A van der Waals interaction

5. Inactivation of protein-degrading acid hydrolase in a cell would result in
 - a) An increase in pH
 - b) Tay-Sachs disease
 - c) Accumulation of proteins in the cell's lysosomes
 - d) Degradation of all acid hydrolases

6. Fluorescence microscopy is based on the ability of certain molecules to
 - a) Continuously emit light of a constant wavelength.
 - b) Absorb light of many different wavelengths.
 - c) Absorb light of a given wavelength and then emit light of a longer wavelength.
 - d) Absorb light of a given wavelength and then emit light of a shorter wavelength.

7. The fundamental contractile unit of skeletal muscle is
 - a) The myofiber
 - b) The sarcomere
 - c) The myofibril
 - d) The thick filament

8. The outermost layer of the epidermis is composed of
 - a) Undifferentiated epidermal cells
 - b) Basal stem cells
 - c) Cross-linked keratin filaments
 - d) Differentiated epidermal cells

9. In the electron transport chain prosthetic groups such as heme and iron-sulfur clusters function to
 - a) Donate electrons to NADH
 - b) Allow proteins to diffuse within the cristae
 - c) Both accept and donate electrons during electron transport
 - d) Transport protons across the mitochondrial inner membrane

10. Which of the following is necessary for electron flow from both FADH_2 and NADH to O_2 ?
 - a) Succinate-CoQ reductase complex
 - b) Coenzyme Q
 - c) Flavin mononucleotide
 - d) Fumarate

11. Which of the following does not function as an electron carrier?
 - a) Coenzyme Q
 - b) Cytochrome a
 - c) Cytochrome c
 - d) H_2O

12. During electron flow from NADH to O_2 , each of the major enzyme complexes in the chain
 - a) Uses all of each electron's potential energy to transport protons into the matrix
 - b) Uses all of each electron's potential energy to transport protons out of the matrix

- c) Uses a portion of each electron's potential energy to transport protons out of the matrix
 - d) Uses a portion of each electron's potential energy to transport protons into the matrix
13. Cells that have the attributes of specificity, diversity, memory and self/nonself recognition are known as
 - a) WBCs
 - b) RBCs
 - c) Macrophages
 - d) Lymphocytes
 14. Cells of the immune system arise from a common progenitor called
 - a) β Cell
 - b) B cell
 - c) Lymphoid Cell
 - d) Hematopoietic stem cell
 15. An organ which captures antigens and provides sites for activation of lymphocytes is the
 - a) Thymus
 - b) Bone marrow
 - c) Secodary lymphoid organ
 - d) Liver
 16. All of the following are true of a B cell except
 - a) It derives its name from the bone marrow
 - b) It secretes antibodies
 - c) It can present antigens
 - d) It can interact with antigens
 17. The class of antibody that is produced first in a primary immune response is
 - a) IgD
 - b) IgE
 - c) IgM
 - d) IgG
 18. An investigator would be able to distinguish a solution containing RNA from one containing DNA by
 - a) Heating the solutions to 82.5° C and measuring the absorption of light at 260 nm
 - b) Comparing the T_m of each solution
 - c) Monitoring the change in absorption of light at 260 nm while elevating the temperature
 - d) Measuring the absorption of light at 260 nm
 19. The chromatography technique that is based on the specificity of biological interactions is known as
 - a) Gel filtration
 - b) Chromatofocusing
 - c) Affinity chromatography
 - d) Thin Layer Chromatography
 20. All of the following are true of an immunoglobulin except
 - a) It can be immunogenic
 - b) It is monospecific
 - c) It can be membrane bound
 - d) Its specificity develops after interaction with antigen
 21. Special structures called telomeres are needed in eukaryotic cells but not bacteria because
 - a) Eukaryotic cells contain linear chromosomes
 - b) Eukaryotic cells have more than one chromosome
 - c) Eukaryotic cells contain a nucleus
 - d) Eukaryotic cells contain more forms of DNA polymerases
 22. In *E. coli*, parental DNA strands are distinguishable from newly synthesized daughter strands because
 - a) Parental strands are methylated and daughter strands are unmethylated
 - b) Parental strands are unmethylated and daughter strands are methylated
 - c) Parental strands are depurinated while daughter strands are not
 - d) Parental strands contain point mutations and daughter strands contain deletions

- d) Cell do not make either nucleotides
37. Human beings, based on excretion of amino nitrogen, are
- a) ammonotelic
 - b) ureotelic
 - c) uricotelic
 - d) recycle all amino groups
38. Which of the options contain only carbohydrates?
- a) glycogen, chitin, cellulose
 - b) glycogen, chitin, keratin
 - c) chitin, cellulose, fibroin
 - d) cellulose, keratin, fibroin
39. During transcription of E. coli genes, promoter specificity is provided by
- a) activators
 - b) repressors
 - c) σ factor of RNA polymerase
 - d) lac operon
40. Snurps are
- a) Chromosomal aberrations
 - b) Cell organelles
 - c) Catalytic RNA complexes
 - d) Denatured proteins
41. Cleavage of phosphodiester bonds at precise positions of specific nucleotide sequences are done by
- a) Exonucleases
 - b) Amylase
 - c) Dehydrogenases
 - d) Restriction endonucleases
42. Extrachromosomal covalently continuous double stranded DNA that occur in bacteria is known as
- a) Mitochondrial DNA
 - b) Chloroplast DNA
 - c) extra DNA
 - d) Plasmid
43. Prokaryotes are included in kingdom
- a) Monera
 - b) Protista
 - c) Plantae
 - d) Animalia
44. The tusks of elephant are modified form of
- a) Incisors
 - b) Canines
 - c) Premolars
 - d) Molars
45. Pick the correct sentence
- a) Glycogen is the storage form of carbohydrate in humans
 - b) Starch is the storage form of carbohydrate in plants
 - c) Sucrose is a non-reducing disaccharide
 - d) All these statements are correct
46. Classic hemophilia exhibits missing or reduced activity of
- a) Thrombin
 - b) Fibrinogen
 - c) Factor X
 - d) Factor VIII
47. When the plant cell is already amply supplied with the reducing power NADPH but only requires additional ATP, it carries out
- a) noncyclic electron flow
 - b) cyclic electron flow
 - c) photorespiration
 - d) None of the above
48. Keratinocytes are components of
- a) Skin Epidermis
 - b) Hair
 - c) Leaves
 - d) RBC
49. Cancer of epithelial cells is known as
- a) Carcinoma
 - b) Sarcoma
 - c) Myeloma
 - d) Plasmacytoma

78. Stomata open when the guard cells have
- a) more K⁺
 - b) less K⁺
 - c) more abscisic acid
 - d) less acid
79. A mixture of enzymes can be separated by
- a) Gas chromatography
 - b) Pulse field gel electrophoresis
 - c) SDS- PAGE
 - d) Native PAGE
80. Micronutrients are elements that are
- a) as important as macronutrients but required in small proportions
 - b) less important in nutrition of plants
 - c) able to play only a minor role in plant nutrition
 - d) not a must for culture medium
81. Active transport requires
- a) ATP
 - b) acetyl choline
 - c) phloroglucinol
 - d) ADP
82. Cartilage and bone are types of
- a) epithelial tissue
 - b) connective tissue
 - c) muscle tissue
 - d) nervous tissue
83. RBCs have a life span of about
- a) 100 days
 - b) 120 days
 - c) 140 days
 - d) 160 days
84. A congenital disorder is a
- a) communicable disease
 - b) parasitic disease
 - c) deficiency disease
 - d) genetic disease
85. Nondisjunction of human chromosome number 21 causes
- a) Turner's syndrome
 - b) Thallesemia
 - c) Down's syndrome
 - d) Phenylketonuria
86. Which of the following enzymes is essential for DNA replication?
- a) Guanyl transferase
 - b) Primase
 - c) Hexokinase
 - d) Peptidyl transferase
87. The nutritive value of a protein depends on its digestibility and
- a) solubility
 - b) degradability
 - c) essential amino acid content
 - d) specific dynamic action
88. Which of the following vitamins plays a major role in calcium metabolism?
- a) vitamin K
 - b) vitamin C
 - c) vitamin D
 - d) vitamin A
89. Which of the following can be used to detect a specific protein in a test sample?
- a) Southern blotting
 - b) Northern blotting
 - c) ELISA
 - d) Salt fractionation
90. The non-protein part of conjugated enzymic proteins is known
- a) Apoenzymes
 - b) Prosthetic group
 - c) Holoenzyme
 - d) Chymotrpsin