



ST. ANTHONY'S COLLEGE SHILLONG

ENTRANCE TEST FOR ADMISSION INTO UNDER GRADUATE PROFESSIONAL COURSES **2012** **BIOTECHNOLOGY**

DATE : THURSDAY, 26TH April 2012
TIME : 9:30 – 10:30 AM

INSTRUCTIONS

- This test has two parts. Part A and Part B.
- **Part A** has a total of **70** multiple choice questions. Part A is to be answered on the **Answer Sheet** provided to you by darkening the correct answer as shown.



- **Part B** has a total of **30** questions. These questions are to be answered on the question paper itself, in the space provided.
- For each question you may select only **ONE** answer. Selecting more than one option qualifies as a wrong answer. You can use a pen/pencil for answering the questions.
- Each correct answer in Part A and B carries a weightage of 1 mark while a wrong answer carries a penalty of – 0.25.
- Write your **Test Roll Number** given on your Admit Card in your **Answer Sheet** as well as on the space specified below, on this question paper.
- Submit both your Answer Sheet and this Question Paper to the Invigilator in charge, at the end of this test.
- **Please preserve your Admit Card.** It will be required at the time of admission.
- The Roll Numbers of those shortlisted for admission on the basis of this Entrance Test will be published on the College Notice Boards as well as on the College Web Site by **Saturday 28th April, 2012.**
- The final admission will be done on a first come, first served basis, after the marksheets of the Class XII examinations of the Meghalaya Board of School Education are available, provided the eligibility criteria as laid down in the prospectus are fulfilled. Shortlisted students from other boards and streams whose Class XII results are declared later will also be considered for admission provided they report **not later than 2 days** after the result declaration of their respective board examinations along with their marksheets (Original or Downloaded).

TEST ROLL NO. _____

Invigilators Signature: _____

PART A

Mark the correct answer from the options given in the Answer Sheet provided:

- Robert Hooke was the first person to use the term _____ in 1665, to describe the hollow spaces bored by cork in thin cork slices:
a. xylem b. cell c. phloem d. golgi
- Chlorophyll-containing bodies found in plant cells:
a. mitochondria b. chloroplast c. protoplast d. lysosome
- According to the genetic code, there are _____ amino acids.
a. 22 b. 21 c. 20 d. 18
- _____ is the only amino acid without an asymmetric carbon atom.
a. Alanine b. Valine c. Glycine d. Serine
- The four nitrogenous bases of DNA are: Adenine, Guanine, Cytosine and _____.
a. Uracil b. Thymine
c. Cysteine d. Hypoxanthine
- The process by which DNA make exact copies of itself is _____.
a. Transcription b. Replication
c. Recombination d. Regeneration
- Do the mature Red Blood Cells of human have nuclei?
a. Yes b. Sometimes
c. No d. None of these
- The presence of _____ on the surface of the Endoplasmic reticulum(ER) differentiates between rough and smooth ER.
a. Ribosomes b. Lysosomes c. Mesosomes d. Lipids
- The fluid mosaic model of _____ is widely accepted as the best at explaining the properties of cell membrane.
a. Danilli – Danson b. Singer and Nicolson
c. Robertson d. Harvey and Cole
- The 3 types of RNA that have been distinguished are: mRNA, tRNA and _____.
a. rRNA b. gRNA c. dRNA d. siRNA
- In dihybrid cross, the phenotypic ratio will be:
a. 9:2:4:1 b. 9:3:3:1
c. 1:2:1 d. 27:9:9:9:3:3:3:1
- One of the following ratios represents incomplete dominance:
a. 1:1 b. 3:1
c. 1:2:1 d. None of these
- XO is seen in case of:
a. Klinefelter syndrome b. Turner syndrome
c. Androgen-insensitivity syndrome d. Patau syndrome
- Crossing over takes place in which stage of meiosis?
a. Diplotene b. Diakinesis
c. Pachytene d. None of these
- A man with type A blood marries a woman with type O blood. Their first child has type O blood. What is the genotype of the MAN?
a. $I^A I^A$ b. $I^B I^B$ c. $I^A I^O$ d. $I^O I^O$
- Pleiotropy is:
a. When one gene influences multiple phenotypic traits
b. When the X chromosome is inactivated in some tissues, but not others
c. A gene pair hides the effect of another.
d. The inheritance pattern exhibited when a gene is carried on the sex chromosome

17. The total genetic content of a haploid cell is called:
 a. Genome b. Gene pool c. Gene bank d. Gene library
18. A DNA nucleotide chain has 5'-AGCTTCGA-3'; the sequence of other chain would be:
 a. TCGAAGCT b. GCTAAGCT
 c. TAGCATAT d. GATCCTAG
19. Initiation codon of protein synthesis (in eukaryotes) is:
 a. GUA b. GCA c. CCA d. AUG
20. Most abundant RNA of the cell is:
 a. tRNA b. rRNA c. mRNA d. snRNA
21. Which of the following are reducing sugars?
 a. Galactose, b. Methylgalactoside
 c. Gluconic acid d. Glucitol
22. Which of the following compounds are alpha amino acids?
 a. Hydroxyproline b. β -Alanine
 c. γ -aminobutyrate d. None of these
23. At what pH values would glutamate be a good buffer?
 a. pH 1 b. pH 5
 c. pH 8 d. near its pKa values
24. The major protein of hair and feathers is:
 a. Collagen b. Keratin c. Actin d. Myoglobin
25. Forces that hold protein subunits in a quaternary structure are:
 a. Hydrogen bonds b. Hydrophobic interactions
 c. Charge-charge interactions d. All of these
26. Palmitic acid and Stearic acid are:
 a. Saturated fatty acids b. Unsaturated fatty acids
 c. Polyunsaturated fatty acids d. All of these
27. The sugar present in RNA is :
 a. Ribose b. Deoxyribose c. Glucose d. Fructose
28. The time required for a cell to undergo binary fission is called the:
 a. growth rate b. growth curve c. generation time d. lag period
29. The major difference of RNA from DNA in the nitrogenous bases composition is absence of:
 a. Thymine b. Guanine c. Uracil d. Cytosine
30. Which of the following compounds is NOT a di- or polysaccharide with at least one glucose unit in it?
 a. mannose b. lactose c. sucrose d. amylase
31. Okazaki fragments are found in:
 a. The leading strand b. The lagging strand
 c. The promoting strand d. None of these
32. The fluid portion of the blood with clotting factors present in it is:
 a. Serum b. Heme c. Plasma d. Myoglobin
33. Which among the following is the field in medicine that deals with the biology, diagnosis, and treatment of cancer:
 a. Conchology b. Tumorology c. Oncology d. Cytology
34. Serum glutamate pyruvate transaminase is a marker enzyme for the:
 a. Liver b. Heart c. Kidney d. Thyroid
35. Blood does not clot properly when a person is suffering from:
 a. Hemoragea b. Hemocytinosis
 c. Halitosis d. Haemophilia

36. How many irreversible steps are there in glycolysis?
 a. 1 b. 2 c. 3 d. 4
37. The pK_a of a weak acid is 4.8. What should be the ratio of [acid]/[salt] of a buffer if $pH = 5.8$ is required?
 a. 0.1 b. 1 c. 2 d. 10
38. All of the following are carbohydrates, except:
 a. Chitin b. Glycogen c. Cholesterol d. Pectin
39. Which of the following is a disaccharide?
 a. Galactose b. Lactose c. Cellulose d. Xylose
40. Which of the following is an example of a nucleotide:
 a. Adenine b. Adenylate c. Adenosine d. Acetylate
41. Mad-cow disease is a common name for:
 a. Bovine Spongiform Encephalopathy b. Bovine Serum Albumin
 c. Bovine Spondylitis Eczema d. None of these
42. A set of individuals of the same species found in a given place in a given time is:
 a. Group b. Community c. Population d. Family
43. Eutrophication is the process of:
 a. Excessive increasing of nutrients, like phosphate and nitrate, in water due to direct deposit of untreated sewage.
 b. Excessive decreasing of nutrients, like phosphate and nitrate, in water due to direct deposit of untreated sewage.
 c. Excessive increase in the oxygen content
 d. None of the above
44. Deforestation:
 a. decreases the release of carbon dioxide and increases the intake of carbon dioxide.
 b. increases the release of carbon dioxide and reduces the intake of carbon dioxide.
 c. increases the release of oxygen and reduces the intake oxygen.
 d. decreases the release of oxygen and increases the intake of oxygen.
45. Ecosystems covering wide areas & with similar climates & organisms are:
 a. Niches b. Biomes c. Biosphere d. Trophic levels.
46. The most common type of pollution in the North East in general is:
 a. Water b. Noise c. Air d. Soil
47. Dermatologists advise patients with skin problems not to wear violet colour clothes, because:
 a. violet rays have higher wavelength b. violet rays travel with the velocity of sound
 c. violet rays have higher frequencies d. they are not electromagnetic radiation
48. Which of the following scientific instruments has the greatest resolving power?
 a. electron microscope b. light microscope
 c. phase-contrast microscope d. centrifuge
49. Which of the following describes how a microwave oven heats food?
 a. The oven's interior reflects heat onto the food.
 b. The oven's interior, like a lens, focuses heat onto the food.
 c. Water molecules in the food reflect energy from microwave radiation.
 d. Water molecules in the food absorb the energy of microwave radiation.
50. Two parallel wires carrying currents in opposite directions will:
 a. attract each other b. repel each other
 c. cause an electric arc to form d. not affect each other
51. According to the second law of thermodynamics, energy tends to become more and more unavailable for conversion from:
 a. thermal to kinetic energy b. kinetic to thermal energy
 c. thermal to mechanical energy d. mechanical to thermal energy

52. If the distance between two masses is increased by a factor of 5, the gravitational force of attraction between them will:
- reduce by a factor of 5
 - reduce by a factor of 25
 - increase by a factor of 5
 - remain the same
53. Twinkling of stars is due to:
- periodic bursts of light from the star
 - partial absorption of light in the atmosphere
 - interference between light coming from various stars
 - refractive index fluctuations in the atmosphere
54. A conjugated diene will have two double bonds in:
- Alternate Positions
 - Adjacent Positions
 - Isolated Positions
 - Any Position
55. In benzene, each carbon atom undergoes:
- sp
 - sp²
 - sp³
 - sp² and sp³ hybridization
56. If 'x' denotes the number of valence electrons of the element, then its valency is equal to:
- x-8
 - x
 - 8-x
 - b and c
57. When the temperature is increased, the surface tension of water:
- increases
 - decreases
 - remains constant
 - shows irregular behavior
58. A solution is prepared by dissolving 10 grams of NaOH in 100 ml of water. Its molarity is:
- 1 M
 - 2.5 M
 - 1.5 M
 - 4.0 M
59. Which of the following is not an alkali metal?
- Na
 - Fr
 - Ca
 - K
60. In thermodynamics, a process is called reversible when:
- surroundings and system change to each other
 - there is no boundary between system and surrounding
 - the surroundings are always in equilibrium with the system
 - the system changes into surroundings spontaneously
61. Which property in bacteria makes them active in different ecological situations?
- centrioles
 - wide metabolic potential
 - histones
 - 80s ribosomes
62. Which antibiotic is an inhibitor of bacterial cell wall?
- Cycloserine
 - Azidothymidine
 - Clindamycin
 - Erythromycin
63. Siderophores are :
- iron chelators present in the bacterial cell
 - cation chelating agents in the organism
 - the most abundant polycationic compound in the cell
 - All are correct
64. Lysosymes break linkage between_____in bacterial cell wall.
- N-acetyl muramic acid & L-alanine
 - N-acetyl muramic acid & N-acetyl glucose amine
 - N-acetyl muramic acid & D-alanine
 - N-acetyl muramic acid & first aminoacid in glycin chain
65. Some bacteria can use CO₂ as the sole carbon source and obtaining energy by oxidation & reduction of inorganic substances. These bacteria are classified as:
- Chemolithotrophs
 - Chemoheterotrophs
 - Photoautotrophs
 - photoheterotrophs
66. The average of 1.05 + 0.0025 + 0.75 + 12.1 + 2.0 is:
- 3.01
 - 3.4705
 - 3.1805
 - 3.205

67. The solution for the equation $3.75x + 0.5 = 2.25x + 8$ is, $x = ?$
 a. 3 b. 10 c. -5 d. 5
68. The factors of the expression $a^2b^3 + a^3b^2$ are:
 a. $x^3y^3(y-2x)$ b. $a^2b^2(b+a)$ c. ab d. $a(b+c)$
69. If $a + b = 5$ and $ab = 6$, the value of $a^3 + b^3$ is:
 a. 31 b. 40 c. 35 d. 33
70. The solution for the equation $-5x + 3 = -12$ is, $x = ?$
 a. -3 b. 3 c. 5 d. 5

PART B

Fill in the blanks:

1. The buoyant forces due to gases are relatively much _____ than exerted by liquids.
2. In the sun, helium is produced from hydrogen by _____.
3. There are _____ pairs of chromosomes in humans.
4. Parthogenesis is the development of an egg without _____.
5. _____ are called 'power houses' of the cell.
6. DNA stands for _____.
7. RNA differs from DNA in having _____ as the sugar component.
8. Enzymes that catalyze the transfer of amino groups from α -amino to α -keto acids are called _____.
9. The amino acid which in chemical terms is an _____ is proline.
10. In eukaryotic cells, the citric acid cycle occurs in the matrix of the _____.
11. An enzyme together with its cofactor is active and termed as a/an _____.
12. In enzyme kinetics, the Line weaver–Burk plot is also called the _____.
13. _____ fatty acids are never "trans fats" because they have no double bonds.
14. A linear Aldohexose with four chiral carbon atoms has _____ possible structure.
15. The relationship between D-Glucose and D-Galactose is best described as _____.
16. When the pH is less than the isoelectric point, the sign of the charge on a protein is _____.
17. The Watson-Crick Model of DNA is a _____ antiparallel double helix.
18. In humans the main catabolic product of purines is _____.
19. Removal of introns from pre-mRNA is called _____.

20. An exchange of segments between the two non-homologous chromosomes is called _____.
21. A cross between an F1 genotype and either of the parental genotypes is called a _____.
22. The short lengths of DNA produced by discontinuous replication of the lagging strand are called _____.
23. Enzyme involved of converting RNA to DNA is _____.
24. The CGS unit of dipole moment is _____.
25. Enthalpy of combustion is always _____.
26. Ozonolysis of ethyne gives _____.
27. 20 degrees Celsius is equivalent to _____ Kelvin.
28. _____ are extra chromosomal self-replicating DNA molecules.
29. Oxygen is _____ in anaerobic respiration.
30. The presence of bacteria in the blood is termed _____.