ENTRANCE EXAMINATION FOR ADMISSION, MAY 2011.

M.Sc. (BIOTECHNOLOGY)

COURSE CODE : 303

Register Number :

Signature of the Invigilator
(with date)

COURSE CODE : 303

Time : 2 Hours Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you –1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. When Frederick Griffith injected mice with *S. pneumoniae* that lacked a capsule, the mice

(A) remained healthy
(B) died of blood poisoning
(C) became ill but lived
(D) reproduced quicker

2. The substrates for photosynthesis are

(A) Water and oxygen
(B) Oxygen and carbon dioxide
(C) Water and carbon dioxide
(D) ATP and carbon dioxide

3. All of the genes and other DNA of an organism constitute its

(A) genome
(B) introns
(C) multigene family
(D) polygenic makeup

4. If an element has an atomic number of 6 and a mass number of 14, how many neutrons does it have?

(A) 6 (B) 14 (C) 7 (D) 8

5. Dioecious plants have

(A) perfect flowers
(B) both male and female flowers
(C) male or female flowers
(D) only asexual reproduction

6. The site on the enzyme surface where the reactant fits is referred to as the

(A) reactive site
(B) allosteric site
(C) active site
(D) binding site

7. Unlike other blood cells, certain types of ———— are not confined to the bloodstream, but instead can squeeze through the walls of capillaries to get to where they are needed.

(A) erythrocytes (B) leukocytes (C) thrombocytes (D) platelets

8. When cloning Dolly, in order to encourage the plasma membranes of the two cells to become leaky so that the contents of the mammary cell passed into the egg cell, researchers applied

(A) Several methyl groups
(B) Adeno-associated viruses
(C) An electrical shock
(D) DOPA

9. The ———— involves proteins in the plasma that are activated when bacteria or fungi are present. These puncture holes in the cell walls of invaders.

(A) natural killer cell
(B) complement system
(C) inflammatory response
(D) macrophagic defense system

10. All of the following are correct about the X and Y chromosomes except

(A) There are 78 active genes on the Y chromosome

(B) Females have one X and one Y chromosome

(C) In early meiosis, identical chromosomes can repair mutations

(D) X and Y chromosomes cannot pair and exchange genetic information

11. An extracellular matrix is produced by glycoprotein secretion by

(A) fungal cells (B) bacterial cells (C) plant cells (D) animal cells

12. The purpose of meiosis is

(A) to separate homologous chromosomes (B) to replicate chromosomes

(C) to create 4 haploid cells (D) to separate sister chromatids

13. What is the goal of angiogenesis inhibitors?

(A) They inhibit the formation of small blood vessels that feed a tumor

(B) They prevent the activation of protein kinases in the cell

(C) They target the Ras protein, causing it to stop promoting cell division

(D) They inhibit the synthesis of HER 1 proteins on cancerous cells

14. The ———— is a waxy band of cells surrounding endodermal cells in the root.

(A) cortex (B) pericycle

(C) root band (D) casparian strip

15. Mitochondria are also called

(A) suicidal bags (B) digestive bags

(C) protein synthesizers (D) power house of the cell

16. ATP stands for

(A) Adenosine triphosphate (B) Adenosine diphosphate

(C) Advanced tactical plane (D) Adenosine tetraphosphate

17. The resting or non-dividing stage between two successive mitotic divisions is called

(A) metaphase (B) telophase (C) interphase (D) prophase

18. The largest animal cell is

(A) ostrich egg (B) amoeba

(C) red blood corpuscles (D) human sperm

19. A molecular model which shows how the atoms in a molecule are arranged is called

(A) Atomic model (B) Structural model

(C) Chemical model (D) Arranged model

20. Liposomes are characteristic of what type of lipid

(A) Lipolipid (B) Glycerol (C) Sterol (D) Phospholipid

21. A community and the nonliving factors with which it interacts is called

(A) biome (B) biosphere (C) ecosystem (D) community

22. The process of using and transforming energy is

(A) response to stimulation (B) complexity

(C) metabolism (D) homeostasis

23. The first stage of cellular respiration, called ———— takes place in the cytoplasm of the cell and needs no oxygen.

(A) Glycolysis (B) Krebs cycle (C) Photorespiration (D) Oxidation

24. Mendel tested for heterozygotes by using

(A) dihybrid cross (B) test cross

(C) monohybrid cross (D) true-breeding cross

25. Glyphosphate, the active ingredient in the herbicide Roundup, is a good choice for engineering plants resistant to it because

(A) it is a powerful herbicide (B) it is readily biodegradable

(C) humans are not affected by it (D) all of these are correct

26. To turn genes off a regulatory protein called a ———— is bound to a regulatory site so that RNA polymerase is blocked.

(A) repressor (B) translator (C) signal molecule (D) operon

27. Darwin spent 5 years sailing around the world on the

(A) H.M.S. Species (B) H.M.S. Beagle

(C) H.M.S. Evolution (D) H.M.S. Tortoise

28. According to Darwin's theory of evolution

(A) all individuals have an equal chance of surviving and reproducing

(B) species are immutable

(C) tortoises are the modern descendents of glyptodonts

(D) all of the above

29. Human red blood cells and onion epidermal cells are similar in that they both

(1) have a nucleus.

(2) possess a cell membrane

(3) have no chloroplasts.

(A) (1) and (2) only (B) (1) and (3) only

(C) (2) only (D) (1), (2) and (3)

30. In humans, a sperm differs form an ovum in that

(A) it contains less cytoplasm

(B) it has a smaller nucleus

(C) it has no sex chromosome

(D) it contains a smaller number of chromosome

31. Which of the following processes will decrease the carbon dioxide level of the atmosphere?

(A) photosynthesis (B) combustion (C) respiration (D) putrefaction

32. In many countries, DDT is banned as an insecticide because

(A) it can be broken down by insects

(B) it is not readily biodegradable

(C) it is less effective in killing insect pests

(D) it is poisonous to plants

33. Darwin explained his theory of evolution in a book called

(A) On the Origin of Species (B) The Principles of Population

(C) Survival of the Fittest (D) Around the World in Eighty Days

34. Which of the following statements is a correct description of antibiotics?

(A) Antibiotics are proteins

(B) Antibiotics can engulf bacteria

(C) Antibiotics can be produced by fungi

(D) Antibiotics can react with specific antibodies

35. Penicillin had been a very effective antibiotic in killing bacteria before. It is now much less effective because

(A) resistant strains of bacteria have evolved.

(B) penicillin is now produced by a different method.

(C) the human body has become less sensitive to penicillin.

(D) uncontrolled intake of penicillin affects the immune system of the human body.

36. Which of the following methods of food preservation does not require heating?

(A) Pasteurization (B) Canning (C) Salting (D) Smoking

37. The first antibiotic discovered by scientists was secreted by

(A) a virus (B) bacteria (C) a yeast (D) a mould

38. Which of the following statements about antibiotics is NOT correct?

(A) Antibiotics are produced by microorganisms.

(B) Antibiotics inhibit the growth of microorganisms.

(C) Antibiotics combine with antigens of pathogens.

(D) Antibiotics do not kill human cells.

39. Which of the following plants reproduces by seeds but have no flowers?

(A) pine (B) fern (C) maize (D) grass

40. A slippery outer covering in some bacteria that protects them from phagocytosis by host cells is

(A) capsule (B) cell wall

(C) flagellum (D) peptidoglycan

41. When flagella are distributed all around a bacterial cell, the arrangement is called

(A) polar (B) random (C) peritrichous (D) encapsulated

42. A shiny, sticky colony of *Streptococcus pneumoniae* is likely to be

(A) encapsulated and pathogenic

(B) non-encapsulated and non-pathogenic

(C) non-encapsulated and pathogenic

(D) encapsulated and non-pathogenic

43. A bacterial cell wall does all of the following except

(A) gives shape and rigidity to the cell

(B) is the site of action for some antibiotics

(C) is associated with some symptoms of disease

(D) protects the cell from phagocytosis

44. The minimum distance at which a microscope is capable of distinguishing two points as separate is its

(A) magnification (B) focal distance

(C) illumination (D) resolving power

45. A Gram negative cell wall is ———— than a Gram positive one.

(A) thicker (B) thinner (C) lighter (D) simpler

46. Because penicillin prevents peptidoglycan synthesis, it is more effective on ————

(A) Gram positive bacteria (B) Gram negative bacteria

(C) Acid fast bacilli (D) yeast cell

47. Flagella and pili are made of

(A) lipids (B) carbohydrates (C) nucleic acids (D) protein

48. The genetic information of bacteria is stored in ———— in one circular chromosome located in the cytoplasm.

(A) RNA (B) Protein (C) Phospholipids (D) DNA

49. Differences between eukaryotic and prokaryotic cells include all of the following except

(A) eukaryotic cells have mitochondria

(B) prokaryotic cells have more complex cell walls

(C) eukaryotic cells have cilia and flagella with complex structure

(D) prokaryotic cells have no genetic material

50. The fact that viruses are obligate intracellular parasites means that they require a ———— for reproduction

(A) culture dish
(B) host cell
(C) phenol red broth
(D) secondary virus

51. One way to determine the size, cell morphology and grouping of bacterial cells is to use a ———— technique

(A) streak plate
(B) phenol red
(C) simple stain
(D) nutrient broth culture

52. Cloudiness is a sign that bacteria have grown in a ———— after inoculation and incubation.

(A) Streak plate
(B) Tube of nutrient broth
(C) Gram stain
(D) Pour plate

53. The bacterial envelope includes all of the following structures except

(A) capsule (B) cell wall (C) cell membrane (D) endospore

54. All of the following structures of bacteria contain (or are made of) protein except

(A) plasmids
(B) ribosomes
(C) pili
(D) cell membrane

55. Which of the following contains polysaccharide?

(A) Gram negative cell wall
(B) Pili & flagella
(C) (A) & (B)
(D) Plasmids

56. Which of the following contains DNA?

(A) Gram positive cell wall
(B) Capsule
(C) Pili
(D) Plasmids

57. An encapsulated cell will reproduce to form colonies that appear

(A) nonpathogenic
(B) translucent
(C) pink
(D) smooth

58. Endospores are all of the following except ———— as compared to vegetative cells.

(A) more likely to survive treatment with disinfectants

(B) more resistant to staining

(C) more likely to prefer nutritionally rich conditions for formation

(D) more resistant to temperature changes

59. Phagocytosis of the bacteria is more difficult when they protected by a capsule. Which of the following organism produce?

(A) *Streptococcus Pneumoniae* (B) *Staphylococcus Pneumoniae*

(C) *Klebsiella Pneumoniae* (D) *Mycoplasma Pneumoniae*

60. If you use a visible light microscope to examine a live culture of a bacterium possessing flagella, you will be able to see the flagella of moving the bacteria.

(A) one can see the flagella (B) one cannot see the flagella

(C) one can only see pili (D) none of the above

61. In what phase of the growth curve is/does a culture is most sensitive to antibiotics?

(A) exponential growth

(B) stationary

(C) at the end of stationary growth when the maximum amount of accumulated waste products

(D) lag phase

62. Most human pathogens prefer temperatures near that of the human body. They are called

(A) psychrophiles (B) thermophiles (C) mesophiles (D) halophiles

63. The optimum temperature for an organism is the one at which

(A) it grows with the shortest generation time

(B) it has the longest time between cell divisions

(C) it is near one extreme of its range of tolerated temperatures

(D) its enzymes begin to denature

64. The breakdown of glucose to pyruvate is called glycolysis and produces most of the ATP available from the glucose molecule

(A) true

(B) false

(C) first part is true and second part is false

(D) first part is false and second part is true

65. Energy is stored in the ATP (adenosine triphosphate) molecule in its

(A) sugar portion
(B) adenine portion
(C) third phosphate bond
(D) all of the above

66. Organisms that ferment glucose may produce any of the following end products except

(A) lactic acid (B) propionic acid (C) alcohol (D) oxygen

67. All of the following hormones are involved in the menstrual cycle EXCEPT

(A) estrogen (B) prolactin (C) progesterone (D) FSH

68. DNA contains all the following molecules EXCEPT

(A) uracil (B) guanine (C) adenine (D) deoxyribose

69. In aerobic respiration, the final electron acceptor in the electron transport chain is

(A) NAD+ (B) O_2 (C) H_2O (D) NADP+

70. A researcher performs a cross between 2 mice, both having black fur. Black for is dominant over white for. 75% of the offspring have black coats and 25% have white coats. The researcher can assume that the parents genotypes were most likely:

(A) BB × BB (B) BB × Bb (C) BB × bb (D) Bb × Bb

71. All of the following statements are correct regarding alleles EXCEPT

(A) A gene can have more than one allele.
(B) Two identical alleles are said to be heterozygous with respect to that gene
(C) Alleles are found on corresponding loci of homologous chromosomes.
(D) One allele can be dominant and the other can be recessive.

72. The Krebs cycle in humans occurs in the

(A) inner mitochondrial membrane
(B) outer mitochondrial membrane
(C) cytoplasm
(D) mitochondrial matrix

73. The part of the brain that controls involuntary actions is known as the

(A) cerebrum
(B) medulla
(C) cerebellum
(D) hypothalamus

74. A feature of amino acids not found in carbohydrates is the presence of

(A) phosphorous (B) nitrogen (C) oxygen (D) carbon

75. Crossing over occurs during which of the following phases in sexual reproduction?
(A) Metaphase I (B) Metaphase II (C) Prophase I (D) Prophase II

76. Which of the following arc characteristics of both bacteria and fungi?
(A) cell wall unicellularity, and mitochondria
(B) cell wall, DNA, and plasma membrane
(C) nucleus. organelles, and unicellularity
(D) plasma membrane, multicellularity, and Golgi apparatus

77. The major difference between cartilage and bone is that cartilage
(A) is a type of connective tissue
(B) lacks blood vessels and nerves
(C) secretes a rubbery matrix and it is part of the skeletal system
(D) is composed of collagen and salts

78. The stored form of sugar in humans.
(A) Glycogen (B) Cellulose (C) Protein (D) Triglyceride

79. Lipid which consists of three fatty acids covalently bonded to glycerol
(A) Glycogen (B) Cellulose (C) Protein (D) Triglyceride

80. A substance that cannot be broken down by cows
(A) Glycogen (B) Cellulose (C) Protein (D) Triglyceride

81. The appendix of a human and the hipbone of a whale.
(A) Vestigial Structures (B) Analogous structures
(C) Homologous structures (D) Divergent evolution

82. Net primary productivity in most ecosystems, is important because it represents the
(A) surplus energy generated by producers
(B) total solar energy converted to chemical energy by producers
(C) energy used in respiration by heterotrophs
(D) energy available to producers

83. All of the following are stimulated by the sympathetic nervous system EXCEPT

(A) increased heart rate and constriction of blood vessels

(B) increase secretion of the sweat glands

(C) dilation of the pupil

(D) increased peristalsis in the gastrointestinal tract

84. Which of the following is a characteristic of arteries?

(A) They contain valves which prevent backflow

(B) They carry blood away from the heart

(C) Blood is kept moving by the contraction of voluntary muscles

(D) They are thin-walled blood vessels and always carry oxygenated blood

85. Vitamins are essential to the human diet because they act as

(A) neurotransmitters

(B) cofactors

(C) hormones

(D) coenzymes

86. Which of the following is not a trait of an anabolism in the metabolism process?

(A) Nutrients and molecules form complex molecules

(B) Uses simple sugars as building blocks for more complex molecules

(C) The process of breaking down complex molecules to release energy

(D) Uses amino acids as building blocks for more complex molecules

87. Coal is formed by the compression of

(A) dinosaurs

(B) fish

(C) ferns

(D) sandstone and lime stone

88. Density is defined as

(A) the mass of a substance divided by the weight of a substance

(B) the volume of a substance divided by the mass of a substance

(C) the volume of a substance divided by the weight of a substance

(D) the mass of a substance divided by the volume of a substance

89. Photosynthesis in plants does not require the availability of

(A) Oxygen (B) Carbon dioxide (C) Water (D) Light

90. The cell wall of fungus contains

(A) Pectin and cellulose (B) Cellulose and chitin

(C) Chitin and pectin (D) Silica and pectin

91. Pasteurization of milk means

(A) Removal of fat

(B) Addition of Vitamin A and D

(C) Heating to 110° C for 30 minutes followed by quick cooling

(D) Heating upto 60° C for 30 minutes followed by quick cooling

92. Hormones chemically are

(A) Proteins (B) Carbohydrates (C) Fats (D) All the above

93. Identify the following point mutation in mRNA UAU to UAU AAC CUA and UUG CUA to UUG CUG AUA

(A) Transition and frame shift respectively

(B) Transversion frame shift respectively

(C) Frame shift and transition respectively

(D) Frame shift and tranversion respectively

94. Nuclear power generates

(A) Photo-chemical pollution (B) SO_2 pollution

(C) Air Pollution (D) Thermal Pollution

95. In insects moulting is effected with secretion of hormone

(A) Thyromine (B) Ecdysone

(C) Juvenile hormone (D) Indole acetic acid

96. The translation step in the process of protein synthesis, which is the conversion of the language of nucleic acids into that of proteins, is made by charged form of

(A) mRNA
(B) tRNA
(C) rRNA
(D) Template DNA

97. Which is the best soil for plant growth?

(A) Loamy soil
(B) Sandy soil
(C) Gravel
(D) Clayey soil

98. In the process of Kreb's cycle

(A) ADP is converted into ATP
(B) Pyruvic acid is converted into ATP
(C) Acetyl CoA is converted into CO_2 and water
(D) Glucose is converted into CO_2

99. Vegetables are sources of

(A) Fats and oils
(B) Minerals and Vitamins
(C) Fats
(D) Carbohydrates

100. DDT is a

(A) Non-Biodegradable pollutant
(B) Antibiotic
(C) Biodegradable pollutant
(D) None of the above