ST. ANTHONY'S COLLEGE SHILLONG

ENTRANCE TEST FOR ADMISSION INTO POST GRADUATE PROFESSIONAL COURSES 2016

BIOTECHNOLOGY

DATE : 29TH JUNE, 2016
TIME : 10:00 – 11:30 AM
DURATION: 1 HOUR 30 MINUTES

[For official purpose only]

TEST CODE NO: _____

INSTRUCTIONS

- This test has a total of **90 questions** spread across **Two Sections**.
- **Section A** has 60 multiple choice questions which are to be answered in the **separate sheet by putting 'X' mark below the correct answer with pen or pencil.**
- **Section B** has 30 fill in the blanks questions which are to be answered in the space provided for each in the question paper.
- ***Negative Marking: 0.25 marks will be deducted for every wrong answer.***
- Write your **Test Roll Number** given on your **Admit Card** in the space specified below.
- **Please preserve your Admit Card**. It will be required for personal interview and admission.
- The Test Roll Numbers of those shortlisted for personal interview will be published on the College Notice Boards as well as on the College Web Site by **Friday, 1st July, 2016.**
- Personal interview will be held on the **4th and 5th of July, 2016**. Shortlisted candidates should bring to the personal interview all original mark sheets & certificates from the 10th standard exam onwards. It is mandatory for candidates awaiting final results of their undergraduate course to produce mark sheets up to the 5th semester or the 2nd year (in yearly system) exams.

Test Roll No: _____

Invigilator's signature_____

Section A

Choose the most appropriate answers for the following:

1. Approximately 50% of the foodborne outbreaks in restaurants that were associated with poultry were caused by:

a) *Salmonella* sp.
b) *Clostridium perfringens*
c) *Staphylococcus aureus*
d) *Escherichia coli*

2. Biological treatment of sewage by microorganisms (mainly decomposers) would most likely occur at which stage of wastewater treatment?

a) Primary
b) Secondary
c) Tertiary
d) Advanced

3. Which of the following wastewater treatments is most likely to produce carcinogens as a by-product?

a) Chlorination
b) Ultraviolet (UV) light
c) Ozonation
d) Carbon filtration

4. Which of the following compounds can be made by the action of microorganisms?

a) Ethanol
b) Cheese
c) Bread
d) All of these

5. The antibiotic streptomycin inhibits bacterial growth by binding to a protein in the 30S (subunit) of the ribosome. Based on this information, streptomycin inhibits:

a) DNA synthesis
b) Translation in prokaryotes
c) Transcription in eukaryotes
d) Transcription in prokaryotes

6. Metamerically segmented, bilaterally symmetrical animals bearing jointed appendages. These are characteristic of

a) Helminthes
b) Annelida
c) Mollusca
d) Arthropoda

7. Scientific and commercial method of bee keeping for production of honey and wax is called:

a) Apiculture
b) Sericulture
c) Silviculture
d) Pisciculture

8. Which of the following organisms neither have a notochord nor a vertebral column in the adult stage?

a) Cephalochordates
b) Herdmania
c) Petromyzon
d) Bdellostoma

9. Which cation is required for the conversion of Prothrombin into active thrombin by thromboplastin?

a) Ca^{2+}
b) Fe^{2+}
c) Mg^{2+}
d) Mn^{2+}

10. Which of the following pairs is incorrectly matched?

a) Glucagon – beta cells (source)
b) Insulin – diabetes mellitus (disease)
c) Somatostatin – delta cells (source)
d) Corpus luteum – relaxin (secretion)

11. The first confirmation regarding the status of DNA as a genetic material was given by the work of Avery, Macleod and McCarty on

a) *Escherichia coli*
b) *Diplococcus pneumoniae*
c) *Klebsella pneumoniae*
d) T4 phage

12. Chloroplast DNA is

a) Separate from nuclear DNA
b) Coded by the nucleus
c) Paternally inherited
d) Transformed nuclear DNA

13. The complementary sequence of 5′AATTCGCTTA3′is:

a) 3′ AATTCGCTTA 5′
b) 5′ TAACGCTTAA 3′
c) 5′TAAGCGAATT 3′
d) 5′ TTAAGCGAAT 3′

14. Mode of DNA replication in *E. coli* is

a) Conservative and unidirectional
b) Semi-conservative and unidirectional
c) Conservative and bidirectional
d) Semi-conservative and bidirectional

15. Which of the following enzymes involved in ribosomal protein synthesis is a ribozyme?

a) Amino acyl t-RNA synthetase
b) Peptidyltransferase
c) Release factors 1 and
d) Ribosome recycling factor

16. Alternative splicing

a) Creates protein from multiple segments of DNA on different chromosomes
b) Creates different proteins from a single gene
c) Is the reason why the human genome is more complex than other species
d) Is not tissue specific

17. Which of the following does not have introns?

a) DNA
b) Unprocessed RNA
c) Processed mRNA
d) Primary RNA transcript

18. DNA methylation is associated with

a) CpG islands
b) CAAT box
c) TATA box
d) increasing gene transcription

19. Translation is the

a) Synthesis of DNA from a mRNA template
b) Synthesis of RNA from a DNA template
c) Synthesis of protein from a mRNA template
d) Synthesis of RNA from mRNA template

20. To which of the following does guanine form hydrogen bonds with in a DNA helix?

a) Adenine
b) Cytosine
c) Guanine
d) Uracil

21. In the electromagnetic spectrum visible light ranges from

a) 200 nm – 800 nm
b) 320 nm – 700 nm
c) 390 nm – 740 nm
d) 410 nm – 650 nm

22. The power of an atom in a molecule, to attract electrons to itself is called

a) Attracting power
b) Valency
c) Combining ability
d) Electronegativity

23. Of the ionizing radiations, α, β and γ, charged particles comprise

a) α - radiation only
b) β - radiation only
c) Both α – and β – radiations
d) γ – radiation only

24. Oxygen and ozone are

a) Allotropes
b) Isomers
c) Isotopes
d) Isobars

25. Which of the following is used as a moderator in nuclear reactors?

a) Heavy hydrogen
b) Ozone
c) Heavy water
d) Hydrogen peroxide

26. Hydrogen peroxide is used as an antiseptic under the name

a) Bleaching powder
b) Perhydrol
c) Nessler's reagent
d) Catechol

27. Which of the following metals release hydrogen on reacting with dilute HNO_3?

a) Al
b) Mg
c) Au
d) Sn

28. The IUPAC name of the compound $CH_3 – CH = CH – C \equiv CH$ is

a) Pent-2-en-4-yne
b) Pent-1-en-3-3-yne
c) Pent-3-en1-yne
d) Pent-2-en-5-yne

29. The strongest acid of the following is

a) C_2H_6
b) C_3H_8
c) C_2H_2
d) CH_4

30. The compound added to petrol to act as antiknock is

a) $SnCl_4$
b) $(C_2H_5)_4Pb$
c) $PbCl_4$
d) $AlCl_3$

31. The subunits of prokaryotic ribosome are

a) 60 S +40S
b) 70S + 30S
c) 60S +30S
d) 50S + 30S

32. Smooth endoplasmic reticulum is the site of

a) Protein synthesis
b) Carbohydrate synthesis
c) Amino acid synthesis
d) Lipid Synthesis

33. The basic microtubular structure of cilia and flagella is called

a) Axoneme
b) Nexin
c) Dynein
d) Radial spoke

34. The fluidity of plasma membrane increase with

a) Increase in saturated fatty acids in the membrane
b) Increase in unsaturated fatty acids in the membrane
c) Increase in phospholipid content in the membrane
d) Increase in glycolipid content in the membrane

35. Chemiosmotic hypothesis was proposed by

a) Peter D. Mitchell
b) Charles Darwin
c) Mendele
d) Alfred Russell

36. During Bio-Geo-chemical cycle, some amount of elemental carbon was utilized by the microorganisms. The phenomenon is called as

a) Dissimilation
b) Immobilization
c) Decomposition
d) Neutralization

37. Who demonstrated that open tubes of broth remained free of bacteria when air was free of dust?

a) Spallanzani
b) John Tyndall
c) Francisco Redi
d) Pasteur

38. Lyophilization means

a) Sterilization
b) Freeze-drying
c) Burning to ashes
d) Exposure to formation.

39. Which type of spores are produced sexually?

a) Conidia
b) Sporangiospores
c) Ascospores
d) None of these

40. Bacterial transformation was discovered by

a) Lederberg and Tatum
b) Beadle and Tatum
c) Griffith
d) None of these

41. Disease that affects many people at different countries is termed as

a) Sporadic
b) Pandemic
c) Epidemic
d) Endemic

42. The degradation of an excessive amount of which of the following causes accumulation of uric acid/ sodium urate crystals, eventually leading to gout?

a) Thymine
b) Ribose-5-phosphate
c) Adenine
d) Cytosine

43. Ibuprofen is prescribed to reduce inflammation. Which of the following pathways is blocked as an anti-inflammatory mechanism of action of NSAIDS?

a) Prostaglandin synthesis
b) Leukotriene synthesis
c) All Eicosanoid syntheses
d) Arachidonic acid release from membrane

44. A reaction takes place in which, a terminal phosphate group from an ATP donor molecule is transferred to an acceptor –OH group on the substrate molecule. The enzyme catalysing such a reaction is most probably a

a) Synthase
b) Phosphatase
c) Phosphorylase
d) Kinase

45. Which of the following statements regarding hormones is incorrect?

a) Hormones can bind to receptors, and the resulting hormone-receptor complexes bind to transcription-control regions in DNA thereby affecting expression of specific genes
b) Some hormones can affect the activity of specific proteins, including enzymes and channel proteins
c) Steroid hormones such as eicosanoids, bind to receptor proteins on the outer surface of the cell membrane and elicit a cellular response
d) Tropic hormones such as TSH can regulate the secretory action of other endocrine glands

46. Which of the following statements is not true of enzymes and enzyme catalyzed reactions?

a) Equilibrium point of the reaction is altered
b) Display saturation kinetics and are specific
c) Activation energy is reduced
d) Display absolute and group specificity

47. Lack of production of a pigment by melanocytes causes albinism. A defect in which of the following enzymes is related to this?

a) NADPH oxidase
b) Dihydrofolate reductase
c) Phenylalanine hydroxylase
d) Tyrosinase

48. The chemical structure that forms transiently in the course of a reaction and has the highest free energy of any reaction intermediate is

a) The ES complex
b) The active site
c) The transition state
d) The reaction intermediate

49. Which of the following is a natural pain reliever?

a) Thromboxane
b) Creatinine
c) Porphin
d) Endorphin

50. The hypothesis that all photosynthesis organisms require a source of hydrogen was first proposed by

a) Van Niel
b) Hatch and Slack
c) Hill
d) Ruber and Kamen

51. Organic farming is the technique of raising crops through uses of

a) Manures
b) Biofertilizers
c) Resistant varieties
d) All of these

52. Which of the following method is suitable for combining the desirable characters of two plants together in a single plant

a) Cutting
b) Layering
c) Grafting
d) All of these

53. Which of the following statement is true regarding vegetative propagation?

a) Vegetative propagation occurs naturally and artificially producing genetically identical plants
b) Vegetative propagation occurs naturally and artificially producing genetically different plants
c) Vegetative propagation occurs artificially producing genetically similar plants
d) Vegetative propagation occurs naturally producing genetically similar plants

54. The waxy substance associated with the walls of trunks of some angiospermic trees is

a) Cutin
b) Suberin
c) Lignin
d) Hemicelluloses

55. Which of the following is a common intermediate of protein, lipid and carbohydrate metabolism?

a) Pyruvate
b) Acetyl CoA
c) Phosphoglycerate
d) Succinyl CoA

56. The physical expression of a gene is called

a) Genotype
b) Phenotype
c) Allotype
d) Morphology

57. A genotype containing only one of the alleles is said to be

a) Monoallelic
b) Homozygous
c) Heterozygous
d) Monoploid

58. A monohybrid cross has the phenotypic ratio

a) 3:1
b) 1:2:1
c) 1:3:3:1
d) 1:3:2

59. The "inborn error of metabolism" that was first identified was

a) Phenylketonuria
b) Alkaptonuria
c) Lesch Nyhan Syndrome
d) Anemia

60. Linkage prevents

a) Homozygous condition
b) Heterozygous condition
c) Segregation of alleles
d) Multiple allelism

Fill in the blanks:

In electron microscope, _____ and _____are used as an objective lens.

1. _____ are viruses that live as parasites on bacteria.
2. A bacterium containing prophage is called a _____.
3. Discontinuous heating is called as _____.
4. The cytoplasm of muscle fibres is called _____.
5. The volume of air breathed in and out during effortless respiration is referred to as _____.
6. Cells in the seminiferous tubules that provide nourishment to the developing sperms are called _____ cells.
7. The enzyme responsible for initiating DNA replication in prokaryotes is _____.
8. The _____ subunit of the bacterial RNA polymerase is responsible of promoter recognition.
9. The building blocks of DNA are called _____.
10. The DNA helicase enzyme involved in base excision repair mechanism is _____.
11. There are _____ stop codon(s) in the universal genetic code.
12. _____ is the site of ribosome synthesis and assembly.
13. The membrane around the vacuole is called _____.
14. _____ are known as traffic police of the cells.
15. Proteins that are involved in the import of proteins into the cell nucleus are called _____.
16. CDKs in cell cycle stands for _____.
17. The process by which DNA make exact copies of itself is _____.
18. _____ is the only amino acid without an asymmetric carbon atom.
19. The inborn error of metabolism that is characterised by the accumulation of phenyl lactate and phenyl acetate in the cells is called _____.
20. The pH scale ranges from _____ to _____.
21. The Dark reaction of photosynthesis was worked out by _____.
22. Plants which flower only once in their life is _____.
23. Plant absorb the element nitrogen in the form _____.
24. Loss of water from the stomata of leaves are known as _____.
25. Crossing over takes place during _____ of meiosis I.
26. Down's syndrome is a result of chromosome number_____ trisomy.
27. A_____ cross is performed to determine the genotype of a plant.
28. A geometrical diagram used for finding possible combinations of male and female gametes is a _____ .
29.
30. _____ is the model organism called Drosophila of the plant kingdom.