

Sr. No.

ENTRANCE TEST-2023

SCHOOL OF BIOLOGICAL SCIENCES

MICROBIOLOGY

Question Booklet Series

A

Total Questions : 60

Time Allowed : 70 Minutes

Roll No. :

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Instructions for Candidates :

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1. According to Pasteur's statements which one of the following is true ?
 - (A) Living organisms discriminate between stereoisomers
 - (B) Fermentation is caused by microorganisms
 - (C) Living organisms don't discriminate between stereoisomers
 - (D) Both (A) and (B)
2. The light emitting luminescent bacteria is :
 - (A) *Vibrio fischeri*
 - (B) *Photobacterium phosphoreum*
 - (C) *Vibrio anguillarum*
 - (D) All of the above
3. Salt and sugar preserve foods because they :
 - (A) increase osmotic pressure
 - (B) Produce a hypertonic environment
 - (C) Deplete nutrient
 - (D) Both (A) and (B)
4. Father of microbiology is :
 - (A) Louis Pasteur
 - (B) Lister
 - (C) A.V. Leeuwenhoek
 - (D) Robert Koch
5. Compound microscope was discovered by :
 - (A) Antonie van Leeuwenhoek
 - (B) Louis Pasteur
 - (C) Johnsen & Hans
 - (D) None of these
6. The main feature of prokaryotic organism is :
 - (A) Absence of locomotion
 - (B) Absence of nuclear envelope
 - (C) Absence of nuclear material
 - (D) Absence of protein synthesis
7. Mycoplasmas are bacterial cells that :
 - (A) Fail to reproduce on artificial media
 - (B) Have a rigid cell wall
 - (C) Are resistant to penicillin
 - (D) Stain well with Gram's stain
8. Protein particles which can infect are called :
 - (A) Virons
 - (B) Prion
 - (C) Nuclei
 - (D) None of these
9. The colonies produced by *Pseudomonas* on MacConkey's medium are :
 - (A) Purple colored
 - (B) Pink colored
 - (C) Pale colored
 - (D) Green colored
10. Mesosomes are the part of :
 - (A) Plasma membrane
 - (B) ER
 - (C) Mitochondria
 - (D) Golgi apparatus
11. A culture medium the exact composition of which is not known was called as :
 - (A) Simple
 - (B) Enriched
 - (C) Defined
 - (D) Natural

12. The temperature required for pasteurization is :
- (A) Above 100°C
 - (B) Below 100°C
 - (C) 100°C
 - (D) None of these
13. Best method for getting pure culture is :
- (A) Streak-plate
 - (B) Sub culture
 - (C) Both (A) & (B)
 - (D) None of these
14. The major constituent in agar is :
- (A) Lipids
 - (B) Amino-acids
 - (C) Polysaccharides
 - (D) Polypeptides
15. In the synthesis of cell components the major element required is :
- (A) Nitrogen
 - (B) Sulphur
 - (C) Carbon
 - (D) Oxygen
16. In the sigmoid curve (or) growth curve of bacteria, there are _____ stages.
- (A) 3
 - (B) 4
 - (C) 6
 - (D) 7
17. The genetic material in influenza A virus is :
- (A) dsDNA
 - (B) dsRNA
 - (C) sRNA
 - (D) None of these
18. Which of the following is imperfect fungi ?
- (A) Basidiomycetes
 - (B) Deuteromycetes
 - (C) Zygomycetes
 - (D) Ascomycetes
19. Basic principle in industrial microbiology is :
- (A) Suitable growth conditions
 - (B) Fermentation
 - (C) Providing aseptic conditions
 - (D) All of these
20. Submerged fermentations are :
- (A) Batch fermentation
 - (B) Continuous fermentation
 - (C) Both (A) and (B)
 - (D) None of these
21. The organisms which can grow best in the presence of a low concentration of oxygen :
- (A) Aerophilic
 - (B) Microaerophilic
 - (C) Aerobic
 - (D) Anaerobic
22. Plasmids are ideal vectors for gene cloning as :
- (A) They are indispensable for genetic cloning
 - (B) They are essential for bacterial reproduction
 - (C) They can replicate freely outside the bacterial cell
 - (D) They are self replicating within the bacterial cell
23. The utilization of light energy to drive the synthesis of ATP is called as :
- (A) Photolysis
 - (B) Phosphorylation
 - (C) Photosynthesis
 - (D) Respiration

24. Which is the Sulphur containing amino acid ?
- (A) Methionine
 - (B) Leucine
 - (C) Valine
 - (D) Arginine
25. For the synthesis of amino acids cysteine and methionine the element required is :
- (A) Sulphur
 - (B) Oxygen
 - (C) Nitrogen
 - (D) None
26. During cyclic phosphorylation NADP is formed or not ?
- (A) No NADP formation
 - (B) No NADP utilization
 - (C) NADP is converted into NADPH
 - (D) All of the above
27. The compound that is added to the medium to absorb oxygen for the creation of anaerobic conditions :
- (A) Potassium sulphate
 - (B) Nitrous acid
 - (C) Hydrogen peroxide
 - (D) None
28. The method in which the cells are frozen dehydrated is called :
- (A) Pasteurization
 - (B) Desiccation
 - (C) Disinfection
 - (D) Lyophilization
29. Choose the correct sequence among the following: Western blotting, Northern blotting and Southern blotting is a technique used in the determination of :
- (A) Protein, RNA and DNA
 - (B) RNA, DNA and Protein
 - (C) DNA, RNA and Protein
 - (D) Protein DNA and RNA
30. Malate dehydrogenase enzyme is a :
- (A) Hydrolase
 - (B) Oxido reductase
 - (C) Transferases
 - (D) Isomerase
31. The distance between each turn in the helical strand of DNA is :
- (A) 20A°
 - (B) 34A°
 - (C) 42A°
 - (D) 28A°
32. The technique involved in comparing the DNA components of two samples is known as :
- (A) Monoclonal Ab techniques
 - (B) Recombinant DNA technology
 - (C) Genetic finger printing
 - (D) Polymerase chain reaction
33. What are the first cells to reach the site of a bacterial infection?
- (A) Neutrophils
 - (B) Dendritic cells
 - (C) Lymphocytes
 - (D) RBCs

34. The passage of blood cells through the intact walls of the capillaries, typically accompanying inflammation is :
- (A) Anaphylaxis
(B) Diapedesis
(C) Phagocytosis
(D) None of these
35. The antibody that is first formed after infection is :
- (A) IgG
(B) IgM
(C) IgD
(D) IgE
36. The acquired immunity can be developed :
- (A) Artificially
(B) Naturally
(C) Both
(D) None
37. Intensity of attraction between antigen and antibody molecule is known as :
- (A) Affinity
(B) Avidity
(C) Synergism
(D) Precipitation
38. Phagocytosis is carried out by which cells ?
- (A) Neutrophils
(B) Macrophages
(C) Dendritic cells
(D) All of these
39. What is the similarity between IgM and IgG?
- (A) Compliment fixation
(B) Placental transport
(C) Heat stability at 56°C
(D) Sedimentation coefficient
40. The oxidation of which substance in the body yields the most calories ?
- (A) Glucose
(B) Proteins
(C) Lipids
(D) Glycogen
41. Which among the following is not an Archaeobacteria?
- (A) Euryarchaeota
(B) Korarchaeota
(C) Thaumoaarchaeota
(D) Proteobacteria
42. The Mitochondrial DNA is :
- (A) Circular double stranded
(B) Circular single stranded
(C) Linear single stranded
(D) Linear double stranded
43. The cofactor of the enzyme Ptyalin is :
- (A) Manganese
(B) Chlorine
(C) Sodium
(D) Potassium
44. In denaturation of proteins, the bond which is not broken:
- (A) Disulphide Bond
(B) Peptide bond
(C) Hydrogen bond
(D) Ionic bond
45. Cellulose is made up of the molecules of
- (A) α -glucose
(B) β -glucose
(C) Both
(D) None

46. A holoenzyme is :
- (A) Functional unit
 - (B) Coenzyme
 - (C) Apoenzyme
 - (D) All of these
47. The Enzymes catalyzing electron transport are present mainly in the :
- (A) Endoplasmic reticulum
 - (B) Nuclear membrane
 - (C) Inner mitochondrial membrane
 - (D) None of these
48. Cyanobacteria are believed to be the free living ancestors of :
- (A) Plasmids
 - (B) Chloroplasts
 - (C) Fungi
 - (D) None of these
49. In a food chain, the total amount of living material is depicted by :
- (A) Pyramid of biomass
 - (B) Pyramid of energy
 - (C) Pyramid of number
 - (D) Trophic levels
50. The particulate matter in the air can lead to :
- (A) Rise in blood pressure
 - (B) Impaired kidneys
 - (C) Impaired nervous system
 - (D) Aggravated respiratory diseases
51. The water potential of a pure water is :
- (A) 1
 - (B) -2
 - (C) Zero (0)
 - (D) None
52. The process of successful establishment of the species in a new area is called :
- (A) Sere
 - (B) Climax
 - (C) Invasion
 - (D) Ecesis
53. Which is the first transgenic plant developed ?
- (A) Transgenic Tobacco
 - (B) Transgenic Soyabean
 - (C) Transgenic Cotton
 - (D) Transgenic Maize
54. The term totipotency is the capability of :
- (A) Cells to generate whole plant
 - (B) Bud to generate whole plant
 - (C) Seed to generate whole plant
 - (D) None of the above
55. Which enzyme is used by Agrobacterium for growth?
- (A) Auxin
 - (B) Cytokinin
 - (C) Opine
 - (D) All of the above
56. Synthesis of hydrolyzing enzymes during germination is induced by :
- (A) Indole-3-acetic acid
 - (B) Absciscic Acid
 - (C) Ethylene
 - (D) Gibberellic Acid

57. Which of the following is not a measure of central tendency ?
- (A) Standard deviation
 - (B) Mean
 - (C) Mode
 - (D) Median
58. The probability of occurrence of an event lies between :
- (A) -1 and 0
 - (B) 0 and 1
 - (C) -1 and 1
 - (D) Exactly 1
59. Which of the following correlation coefficient value is considered as weak ?
- (A) 0.5
 - (B) 2
 - (C) 0.2
 - (D) 0.4
60. The standard error is a measure of
- (A) The standard error is computed from known sample statistics
 - (B) Representative sample parameter is likely to be of the population parameter
 - (C) It provides an unbiased estimate of the standard deviation of the statistic
 - (D) All of the above

ROUGH WORK

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1. Consider the following statements about the cell theory :
 - i. Cell theory was proposed by Schleiden and Schwann
 - ii. Cells are generated from the dead material spontaneously
 - iii. Cell is the basic unit of life.
 Choose the correct answer/s from the codes given below:
 - (A) i, only
 - (B) ii, iii only
 - (C) i, iii only
 - (D) iii, only

2. Archaeobacteria are discovered by :
 - (A) Edelman
 - (B) Carl Woese
 - (C) Ehrlich
 - (D) Pasteur

3. Who is considered to be the father of medical microbiology ?
 - (A) Koch
 - (B) Pasteur
 - (C) Jenner
 - (D) Tatum

4. Who is /are associated with the discovery of conjugation in bacteria ?
 - (A) Griffith
 - (B) Lederberg and Tatum
 - (C) Both (A) and (B)
 - (D) Neither (A) nor (B)

5. Which of the following is considered to be a prokaryotic ?
 - (A) Protozoan
 - (B) Helminth
 - (C) Mold
 - (D) Cyanobacteria

6. The function of Agar was seen in culture medium by :
 - (A) Petri
 - (B) Skoog
 - (C) Pasteur
 - (D) Hesse

7. The correct binomial nomenclature of one of the important bacteria also known as super bug is:
 - (A) *Pseudomonas Putida*
 - (B) *Pseudomonas putida*
 - (C) *pseudomonas Putida*
 - (D) *pseudomonas putida*

8. The bacteria living at low temperatures are called as :
 - (A) Mesophiles
 - (B) Thermophiles
 - (C) Psychrophiles
 - (D) None of the above

9. In most multicellular species of algae, individuals produce special sex cells, called gametes that have following feature/s :
 - (A) that contain only one set of chromosomes
 - (B) the gametes from two individuals fuse sexually and can develop directly into offspring
 - (C) they can form cells that subsequently produce spores
 - (D) All of the above.

10. Bovine spongiform encephalopathy is also known by the name/s :
 - (A) Mad dog disease
 - (B) Mad cow disease
 - (C) Kuru disease
 - (D) All of the above

11. Consider the following statements about the benefits of fungus to humans :
- Human disease
 - Toxins
 - Hormone production
- Choose the correct answer/s from the codes given below :
- i, only
 - ii, iii only
 - i, iii only
 - iii only
12. Heterothallism is shown by :
- Rhizopus*
 - Peziza*
 - Personospora*
 - All of the above
13. Cytokines produced during immune response are :
- Proteins/glycoproteins
 - Able to kill pathogens directly
 - Often acting in synergy to induce immune response
 - All of the above
14. Which system of the body due to hypersensitivity produces allergic reactions ?
- Digestive system
 - Pulmonary system
 - Immune system
 - Circulatory system
15. Antibodies have usually _____ shape.
- R
 - A
 - Y
 - M
16. _____ is not able to stimulate an immune response unless it is not bound to larger molecule.
- Virus
 - Hapten
 - Antigen
 - Antibody
17. Which among the following molecule/s possess zero dipole moment ?
- Para-dichlorobenzene
 - Carbon tetrachloride
 - Both (A) and (B)
 - Neither (A) nor (B)
18. Stability of DNA can be achieved through :
- Hydrophobic interactions
 - Hydrogen bonds between A and T
 - Hydrogen bonds between G and C
 - All of the above
19. Entropy decreases in case of :
- Protein denaturation
 - Rusting of iron
 - Curdling of Milk
 - Condensation of water vapours
20. The units of first order reaction rate constant can be :
- sec^{-1}
 - moles/lit./sec
 - moles/lit./sec^2
 - $\text{mole}^{-1}/\text{lit./sec}$
21. What does enzyme activity refers to ?
- Potential energy of enzyme
 - Enzyme specificity
 - Catalytic ability
 - Enzyme sensitivity

34. By what genetic analysis mechanism, genotype of a dominant plant can be determined ?
- Pedigree analysis
 - Back cross
 - Test cross
 - Dihybrid cross
35. The role of σ -subunit of RNA polymerase is to :
- Specifies the site for transcription
 - Initiate the replication
 - Provide the contact between ribonuclease and DNA template
 - Terminate the transcription
36. Consider the following statements about the Euchromatin :
- It stains slightly
 - It is partially condensed
 - It is genetically active chromatin with genes.
- Choose the correct answer/s from the codes given below :
- i, only
 - ii, iii only
 - i, ii, and iii
 - iii only
37. Who had first successfully treated acute leukemia through the Hematopoietic Stem Cell Transplantation ?
- Thomas
 - Henry
 - George
 - Edison
38. Mitosis occurs between ____ and ____ phases during the cell cycle.
- S, G1 phase
 - G2, S phase
 - G1, G2 phase
 - G1, S phase
39. ____ technique is helpful in construction of Genomic libraries.
- Colony hybridization
 - Shotgun approach
 - PCR
 - All of the above
40. The requirements for carrying out PCR are :
- Primers and buffer
 - Taq pol* and $MgCl_2$
 - DNA Template and dNTPs
 - All of the above
41. In clinical biochemistry, working as a clinical scientist is to :
- Help in diagnosing and managing the disease through the analysis of blood, urine and other body fluids
 - Produce and validate the results of chemical and biochemical analyses
 - Both (A) and (B)
 - Neither (A) nor (B)
42. An LDH isoenzymes test is used to find out the location, type, and severity of tissue damage. It can help diagnose a number of different conditions including :
- Recent heart attack
 - Liver disease, including hepatitis and cirrhosis
 - Both (A) and (B)
 - Neither (A) nor (B)
43. Polypeptide namely ____ is important for the expression of MHC1 on the cell membrane.
- β_2 microglobin
 - Interferons
 - Interleukines
 - Lymphokines

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 - Interleukines
 - Lymphokines

44. HDLs considered as good cholesterol vehicles, are synthesized in :
- Liver
 - Blood
 - Intestines
 - Pancrease
45. The _____ % water absorbed by herbaceous plants is lost during transpiration.
- 60
 - 75
 - 90
 - 99
46. Consider the following statements about the Nitrogen fixation in plants by nitrifying bacteria :
- They convert free nitrogen to nitrogen compounds
 - They oxidize ammonia to nitrates
 - They reduce nitrates to free nitrogen
- Choose the correct answer/s from the codes given below :
- i, only
 - ii only
 - i, iii only
 - ii, iii only
47. The CO_2 is converted to malate, a four carbon organic compound which is stored in the _____ where it is later transported to the chloroplast for conversion of malate to CO_2 for photosynthesis.
- Vacuoles
 - Endoplasmic reticulum
 - Chloroplast
 - Mitochondria
48. One of the following hormones responsible for making RNA and proteins can be:
- Auxin
 - Gibberellins
 - Ethylene
 - Cytokinin
49. _____ refers to the formation of embryoids from the pollen grains in the tissue culture medium.
- Double fertilization
 - Cellular totipotency
 - Organogenesis
 - Test tube culture
50. More and more secondary metabolite production can be achieved through the hairy root cultures induced by transforming plant cells with :
- Agrobacterium rhizogenes*
 - Agrobacterium tumefaciens*
 - Bacillus thuringiensis*
 - Virus
51. Which among the following plant fibres is known as the "golden fibre" ?
- Coir
 - Jute
 - Hemp
 - All of the above
52. *Brassica juncea* is the scientific name of which one of the following Rabi crops ?
- Peas
 - Gram
 - Wheat
 - Mustard

53. There is a great potential for fisheries in J&K UT and the Dal and Wular lakes alone produce about _____ % of the total fish production in Jammu and Kashmir.
- (A) 50
(B) 60
(C) 70
(D) 95
54. The ratio between the energy flow at different points along the food chain, after expressing it in %age is called as the :
- (A) Ecological gradient
(B) Ecological efficiency
(C) Energy flow efficiency
(D) Relative ratio of energy flow
55. Among the following chemical species, one typically cycling in most localized areas is :
- (A) Phosphorus
(B) Carbon
(C) Water
(D) Nitrogen
56. Low levels of DO (Dissolved oxygen) in water bodies lead to the death of fish and other oxygen dependent organisms due to :
- (A) Offensive sludge
(B) Methane
(C) Hydrogen sulphide
(D) All of the above
57. In case of statistical analysis where there is a symmetrical distribution, then :
- (A) Mean and Mode coincide
(B) Mode and Median coincide
(C) Mean, Mode and Median coincide
(D) Mean and Median coincide
58. Example of Non- probability sampling can be :
- (A) Snow ball sampling
(B) Cluster sampling
(C) Stratified sampling
(D) Simple random sampling
59. The variance calculated for the observation having values 4.2, 4.3, 4.0 and 4.1 taken in the lab is :
- (A) 0.27
(B) 0.28
(C) 0.30
(D) 0.31
60. The Chi square value for the data, where one has 8 red, 5 green, 12 orange, and 15 blue balls for testing the null hypothesis that the colors of the balls occur with equal frequency will be :
- (A) 5.6
(B) 5.68
(C) 5.86
(D) 5.8

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1. Classification of viruses by David Baltimore is based on differences in :
 - (A) The envelope proteins on the surface of viruses
 - (B) The modes of transmission of viruses
 - (C) The pathways required to synthesize virus mRNA
 - (D) Host cell receptors used by viruses
2. The typical coronavirus structure is :
 - (A) An icosahedral large pleomorphic virus
 - (B) Large regimented barrel shaped virus
 - (C) Club shaped glycoprotein spikes protrude through a lipid bilayer
 - (D) An icosahedral structure with an envelope
3. Target of the antibiotics on micro organisms is mainly due to :
 - (A) Inhibition of cell-wall synthesis
 - (B) Damage to the cytoplasmic membrane
 - (C) Inhibition of nucleic acid and protein synthesis
 - (D) All of the above
4. Which of the following is an unusual feature of the replication cycle in coronaviruses ?
 - (A) The RNAs all terminate in a common 3' end and produce nested set with the genome.
 - (B) They take advantage of recombination with the long RNA genome
 - (C) They are not highly mutable
 - (D) They use capped cellular mRNA's
5. Identify the gene responsible for the evolutionary relationship between the taxonomic groups :
 - (A) 16S rRNA
 - (B) 23S rRNA
 - (C) 5S rRNA
 - (D) 18S rRNA
6. Select the pleomorphic bacteria
 - (A) Mycobacteria
 - (B) Corynebacterium
 - (C) Streptococcus
 - (D) Pseudomonas
7. Growth requirement for mycoplasma :
 - (A) Nitrogen
 - (B) Carbon
 - (C) Cholesterol
 - (D) Glucose
8. Double-stranded DNA is found in which viruses ?
 - (A) Poliomyelitis
 - (B) Influenza viruses
 - (C) Pox viruses
 - (D) None of the above
9. Which of the following is a parasitic algae ?
 - (A) Sargassus
 - (B) Cladophora
 - (C) Oedogonium
 - (D) Celphaleuros

10. Laminarin is an energy storage material characteristic of :
- (A) Chlorophyta
 - (B) Chrysophyta
 - (C) Phaeophyta
 - (D) Pyrrophyta
11. Mark the incorrect statement concerning *Giardia lamblia* :
- (A) *G. Lamblia* has both a trophozoite and cyst stage in its life cycle
 - (B) *G. Lamblia* is transmitted by the fecal oral route from both human and animal sources
 - (C) *G. Lamblia* causes hemolytic anemia
 - (D) *G. Lamblia* can be diagnosed by the string test
12. Identify the organ associated for defence in protozoans :
- (A) Statocysts
 - (B) Trichocysts
 - (C) Otocysts
 - (D) Nematocysts
13. Secondary metabolites such as penicillin from mold are produced during the :
- (A) Lag phase
 - (B) Idiophase
 - (C) Log phase
 - (D) Decline phase
14. Clearances of antigens by antibodies involve :
- (A) Neutralization and agglutination
 - (B) Opsonisation and complement activation
 - (C) Precipitation
 - (D) All of the above
15. Hypervariable region of antibody consists of :
- (A) 5-10 amino acids that form antigen binding site
 - (B) 50-100 amino acids that form antigen binding site
 - (C) 5-10 amino acids that form antibody binding site
 - (D) A part of constant region of heavy and light chain
16. Which of the following factor affects the heat of reaction based on Kirchhoff equation ?
- (A) Molecularity
 - (B) Temperature
 - (C) Pressure
 - (D) Volume
17. Chemical dissociation is :
- (A) Exothermic
 - (B) Reversible
 - (C) Endothermic
 - (D) Reversible and endothermic

18. The principle laws of photochemistry are :
- (A) Grothus-Draper and Stark-Einstein law
 - (B) Raoult's and Dalton's law
 - (C) Raoult's and Henry's law
 - (D) Lambert's and Beer's law
19. Which of the following will result in deviation from Beer's law ?
- i. Change in a refractive index of medium
 - ii. Dissociation of analyte on dilution
 - iii. Polychromatic light
 - iv. Path length of cuvette.
- (A) i, ii and iii
 - (B) ii, iii and iv
 - (C) i, iii and iv
 - (D) i, ii and iv
20. Mark the incorrect statement :
- (A) First step in photochemistry is excited state (photo excitation)
 - (B) When a molecule or atom in the ground state (S_0) absorbs light, one electron is excited to a higher orbital level
 - (C) It is possible for the excited state S_1 to undergo spin inversion
 - (D) Photochemical reactions are caused by absorption of ultraviolet only
21. Which of the following processes are thermodynamically reversible ?
- (A) Throttling
 - (B) Constant volume and constant pressure
 - (C) Hyperbolic and $pV = C$
 - (D) Isothermal and adiabatic
22. Mark the enzyme necessary for the below mentioned biochemical reaction : Triglyceride + $3H_2O \longrightarrow$ Glycerol + Fatty acids
- (A) Lipase
 - (B) Zymase
 - (C) Glycerol phosphate dehydrogenase
 - (D) Glycerol kinase
23. Identify the physical property differ for each of a pair of enantiomers ?
- (A) Boiling point and melting point
 - (B) Index of refraction
 - (C) Solubility in ethanol
 - (D) Direction of rotation of plane-polarized light
24. Which of the following statements about an enzyme is incorrect ?
- (A) An enzyme is usually a large protein
 - (B) An enzyme changes the equilibrium constant of a reaction
 - (C) An enzyme is a catalyst for biological reactions
 - (D) An enzyme is a chiral molecule

25. Catalase is found exclusively in :
- (A) Lysosomes
 - (B) Peroxisomes
 - (C) Golgi apparatus
 - (D) Mitochondria
26. Substrate level phosphorylation in glycolysis is :
- (A) Conversion of Glucose to Glucose-6-phosphate
 - (B) Conversion of Glyceraldehyde-3-phosphate to 1, 3-Bisphosphoglycerate
 - (C) Conversion of Dihydroxyacetone phosphate to Glyceraldehyde-3-Phosphate
 - (D) Conversion of 1, 3-Bisphosphoglycerate to 3-Phosphoglycerate
27. Identify the organelle involved in apoptosis :
- (A) Lysosome
 - (B) Mitochondria
 - (C) ER
 - (D) Golgi
28. The origin of polytene chromosome (as giant chromosome) is by the process of :
- (A) Endomixes
 - (B) Endomitosis and endoreduplication
 - (C) Mitosis
 - (D) Meiosis
29. Major role of carbohydrates as a component of the cell membrane is :
- (A) Adhesion
 - (B) Locomotion
 - (C) Recognition
 - (D) Reception
30. mtDNA is considered as one of the best marker tool for population biologist and evolutionary biologist. The reason for this :
- (A) Mitochondrial DNA undergo spontaneous mutation
 - (B) Mitochondrial DNA can be easily isolated
 - (C) Mitochondrial genes are specified to mtDNA
 - (D) Absence of genetic recombination in mtDNA
31. Which one of the following properties of telomerase is different from that of DNA polymerase ?
- (A) Telomerase requires a template to direct the addition of nucleotides
 - (B) Telomerase can only extend a 3 -OH end of DNA
 - (C) Telomerase does not carry out lagging strand synthesis
 - (D) Telomerase acts in a processive manner
32. During development, if a cell has committed to a particular fate, it is said to be :
- (A) Pluripotent
 - (B) Totipotent
 - (C) Determined
 - (D) Differentiated

33. Which of the following statements is incorrect about topoisomerases as a potential anticancer drug target ?
- (A) As cancer cells are rapidly growing cells, they usually contain higher level of topoisomerases.
 - (B) The transient DNA breaks created by topoisomerases are usually converted to permanent breaks in the genome in the presence of topoisomerase targeted drugs.
 - (C) As cancer cells often have impaired DNA repair pathways, they are more susceptible towards topoisomerase targeted drugs.
 - (D) The drugs which specifically target topoisomerases, usually do not affect normal fast growing cells.
34. Nitric oxide synthase is responsible for generation of nitric oxide, an important signaling molecule. The substrate for this enzyme is :
- (A) Glycine
 - (B) Lysine
 - (C) Histidine
 - (D) Arginine
35. Which one of the following is not a neurotransmitter ?
- (A) Adrenaline
 - (B) Histidine
 - (C) Glutamate
 - (D) Histamine
36. Identify the vector using in human genome project :
- (A) Cosmid vectors
 - (B) Yeast artificial chromosomes
 - (C) Phagemid vector
 - (D) Yeast episomal plasmids
37. Which one of the following fungi is the most serious threat in a bone marrow transplant unit ?
- (A) *Candida albicans*
 - (B) *Aspergillus*
 - (C) *Blastomyces*
 - (D) *Cryptococcus*
38. Enzymes responsible for alcoholic fermentation :
- (A) Zymase
 - (B) Ketolase
 - (C) Peroxidase
 - (D) Oxidase
39. Monoclonal antibodies are associated with the name of :
- (A) Burnet
 - (B) Medwar
 - (C) Milstein kohler
 - (D) Owen

40. The ability of a pathogen to spread in the host tissues after establishing the infection is known as :
- (A) Adhesion
(B) Invasiveness
(C) Toxigenicity
(D) None of these
41. Which of the following enzyme is defective in galactosemia — a fatal genetic disorder in infants ?
- (A) Glucokinase
(B) Galactokinase
(C) Galactose-1-phosphate uridyl transferase
(D) UPD-Galactose 4-epimerase
42. Gluconeogenesis occurs in the liver because of the presence of :
- (A) Phosphofructokinase
(B) Pyruvate carboxylase
(C) Glucose 6 phosphatase
(D) Glucokinase
43. Emergence of unique functional heavy chain-only antibodies in which of the following animals ?
- (A) Dog
(B) Camel
(C) Pigeon
(D) Mice
44. Which one of the following is the correct order of electron transport during light reaction in the thylakoid membrane of chloroplast ?
- (A) P680 ® Cytochrome b_6f ® PC ® PQ
(B) P680 ® PC ® Cytochrome b_6f ® PQ
(C) P680 ® PQ ® PC ® Cytochrome b_6f
(D) P680 ® PQ ® Cytochrome b_6f ® PC
45. The C_4 carbon cycle is a CO_2 concentrating mechanism evolved to reduce photorespiration. The following are stated as important features of the C_4 pathway :
- The leaves of C_4 plants have Kranz anatomy that distinguishes mesophyll and bundle sheath cells.
 - In the peripheral mesophyll cells, atmospheric CO_2 is fixed by phosphoenol pyruvate carboxylase yielding a four-carbon acid.
 - In the inner layer of mesophyll, NAD-malic enzyme decarboxylates four-carbon acid and releases CO_2 .
 - CO_2 is again re-fixed through Calvin cycle in the bundle sheath cells.
- Which one of the following combinations is correct ?
- (A) i, iii and iv
(B) i, ii and iii
(C) i, ii and iv
(D) i, iii and iv

46. Given below are names of phytohormones in column I and their associated features/effects/functions in column II :
- | I | II |
|------------------|----------------------------------|
| (a) Auxin | (i) Delayed leaf senescence |
| (b) Gibberellins | (ii) Epinastic bending of leaves |
| (c) Cytokinin | (iii) Polar transport |
| (d) Ethylene | (iv) Removal of seed dormancy |
- Select the correct set of combinations from the options given below :
- | | | | |
|-----------|-------|-------|------|
| (a) | (b) | (c) | (d) |
| (A) (iii) | (ii) | (iv) | (i) |
| (B) (iv) | (iii) | (i) | (ii) |
| (C) (iii) | (iv) | (i) | (ii) |
| (D) (i) | (iv) | (iii) | (ii) |
47. Which one of the following is used for Targeting Induced Local Lesions in Genomes (TILLING) ?
- (A) T-DNA tagging by Agrobacterium-mediated transformation
 (B) Transposon tagging using Ac/Ds elements
 (C) Mutagenesis with ethylmethane sulphonate
 (D) Protoplast transportation by electroporation
48. Lake zone having phytoplanktons in abundance :
- (A) Littoral zone
 (B) Benthic zone
 (C) Limnetic zone
 (D) Profundal zone
49. Identify the food chain type :
- Dead animals → blowfly maggot → maggots → frog → snake
- (A) Detrital food chain
 (B) Decomposer food chain
 (C) Predator food chain
 (D) Grazing food chain
50. Point out the 'K' selected species :
- (A) Aspergillus
 (B) Human
 (C) Taraxacum
 (D) Grass
51. The middle region of thermal stratification, showing the vertical temperature change is called :
- (A) Mesolimnion
 (B) Epilimnion
 (C) Metalimnion
 (D) Hypolimnion
52. The purpose of Lincoln index is to measure :
- (A) Population mortality rate
 (B) Population natality rate
 (C) Population size
 (D) Population density
53. The workers of cement factory are prone to :
- (A) Leukemia
 (B) Bone marrow diseases
 (C) Asbestosis
 (D) Cytosilicosis

54. The Yak (ox) and the Bharal are found in :
- Uttarakhand
 - Himachal Pradesh
 - Jammu and Kashmir
 - Ladakh
55. Which of the following statements is true about the Air Quality Index ?
- It indicates the colour of the air.
 - It predicts ozone levels in your area.
 - It determines the intensity of sound and sound pollution.
 - It estimates air pollution mainly sulphur content in the air.
56. Algal productivity in fresh water lakes is limited by the availability of inorganic ions of :
- Carbon
 - Nitrogen
 - Phosphorus
 - All of the above
57. Select the wrong statement regarding correlation :
- In case of positive correlation, the two variables move in the same direction
 - In case of negative correlation, the two variables move in different directions
 - The value of coefficient of correlation (r) vary in between -1 to $+1$
 - The calculated r value “0.075” indicates strong positive correlation
58. The result of a statistical test, denoted p , shall be interpreted as follows :
- The null hypothesis h_0 is rejected if $p < 0.05$
 - The null hypothesis h_0 is rejected if $p > 0.05$
 - The alternate hypothesis h_1 is rejected if $p > 0.05$
 - The null hypothesis h_0 is accepted if $p < 0.05$
59. The value of Chi-square will be zero when :
- Expected frequency is less than the observed frequency
 - Expected frequency is equal to the observed frequency
 - Expected frequency is double that of the observed frequency
 - Expected frequency is greater than the observed frequency
60. Identify the statistical test to validate the statement “people having high cholesterol suffer from hypertension”.
- Student’s t-test
 - Regression analysis
 - Pearson correlation coefficient test
 - ANOVA

ROUGH WORK

ROUGH WORK

ENTRANCE TEST-2020

SCHOOL OF BIOLOGICAL SCIENCES

MICROBIOLOGY

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series

D

Roll No. :

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Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be '**Negative Marking**' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. The technique recently tested for gene therapy is :
 - (A) Protein editing
 - (B) RNA editing
 - (C) CRISPR
 - (D) All of the above
2. SINEs are :
 - (A) Non-repetitive DNA sequences
 - (B) Repetitive DNA sequences
 - (C) Semi-repetitive DNA sequences
 - (D) Unique 5' UTR mRNA sequences
3. Genome cannot be rearranged by :
 - (A) Point mutation
 - (B) Recombination
 - (C) Transposition
 - (D) Gene conversion
4. The histone acetylation is a mark of :
 - (A) Inactive gene expression
 - (B) Active gene expression
 - (C) Gene rearrangement
 - (D) Active gene repression
5. Which of the following sequences correctly portrays the flow of electrons during photosynthesis ?
 - (A) NADPH → chlorophyll → Calvin cycle
 - (B) NADPH → electron transport chain → O₂
 - (C) H₂O → photosystem I → photosystem II
 - (D) H₂O → NADPH → Calvin cycle
6. Which of the following coenzyme takes part in tissue respiration ?
 - (A) Coenzyme Q
 - (B) Coenzyme A
 - (C) NADP
 - (D) Cobamide
7. Auxin response factors are involved in :
 - (A) Gene expression
 - (B) Post-translational modifications
 - (C) Both (A) and (B)
 - (D) None of the above
8. Ethylene receptor complex is located on :
 - (A) Nucleus
 - (B) Cell Wall
 - (C) Endoplasmic reticulum
 - (D) None of the above
9. Was/were first to culture plant cells *in-vitro* :
 - (A) Schleiden
 - (B) Schwann
 - (C) Haberlandt
 - (D) Kolte and Robbins
10. Cement factory labourers are proven to :
 - (A) Leukaemia
 - (B) Bone marrow disease
 - (C) Asbestosis
 - (D) Cytosilicosis
11. 5th June is observed as :
 - (A) World Forestry Day
 - (B) World Environmental Day
 - (C) World Wildlife Day
 - (D) World Population Day
12. Minamata disease was due to water polluted by :
 - (A) Methyl mercury
 - (B) Methyl isocyanate
 - (C) Methyl carbonate
 - (D) Lead
13. Which is the popular cold water fish in Kashmir valley ?
 - (A) Brown trout
 - (B) Rainbow trout
 - (C) Both (A) and (B)
 - (D) None of the above
14. The composition of plant fibres of Jute is (Major component) :
 - (A) Lignin and chitin
 - (B) Hemi-cellulose
 - (C) Hemi-cellulose and chitin
 - (D) Cellulose and lignin

15. Universally accepted theories of organic evolution are :
- Modern synthetic theory of evolution
 - Hugo Devries mutation, and Weismann's germplasm theories
 - Theories of Parasitism and Lamarckism
 - All of these
16. Which one of the following is not gaseous biogeochemical cycle in ecosystem ?
- Nitrogen cycle
 - Carbon cycle
 - Phosphorus cycle
 - Water cycle
17. If the values of a set are measured in centimeters, the unit of variance will be :
- No unit
 - Cm
 - Cm²
 - Cm³
18. The range of regression coefficients is :
- 1 to +1
 - ∞ to +∞
 - 0 to +∞
 - 0 to 1
19. Analysis of variance utilizes :
- F-test
 - Chi square test
 - Z-test
 - T-test
20. Paired t-test is applicable when the observations in the two samples are :
- Paired
 - Correlated
 - Equal in number
 - All the above
21. The existence of Microbes was first reported by :
- Louis Pasteur
 - Robert Koch & Fleming
 - Robert Hook & Anton Von Leeuwen Hoek
 - None of the above
22. Antiseptic surgery was developed by :
- Edward Jenner
 - Paul Ehrlich
 - Karry B Mulis
 - Joseph Lister
23. Zinkarnagel and Doherty were awarded Nobel Prize for discovery of :
- rDNA technology
 - Interleukin I
 - MHC II Antigen
 - MHC Restriction phenomenon
24. Which of the following is not a distinguishing characteristic of prokaryotic cells ?
- A single circular chromosome
 - 80s Ribosome
 - Cell wall containing Peptidoglycan
 - DNA not associated with histones
25. Which of the following in the cell wall make bacteria acid fast ?
- Glycoprotein
 - Peptidoglycan
 - Mycolic acid
 - Arabinoglycan
26. Stanley Prusiner discovered self-replicating pathogens called :
- Prions
 - BSE agent
 - Viriods
 - Scrapie

27. Which of the following does not pose zoonotic potential ?
- SARS virus
 - COVID-19
 - Infectious Bronchitis virus
 - MERS virus
28. Bacterial genetic variation may be due to :
- Transformation
 - Conjugation
 - Transduction
 - All the above
29. Which of the following is used to classify organisms into kingdom Fungi ?
- Ability to photosynthesize, possess a cell wall
 - Unicellular, possess cell wall, prokaryotic
 - Unicellular, lacking cell wall, eukaryotic
 - Absorptive, possess cell wall, eukaryotic
30. Most systemic infections due to fungi in human and animals belong to the class :
- Ascomycetes
 - Deuteromycetes
 - Phycomycetes
 - Zygomycetes
31. Germ tubes are demonstrated in which of the following ?
- Histoplasma
 - Coccidioides
 - Candida
 - Blastomyces
32. Parasites have following modes of nutrition :
- Autotrophic
 - Heterotropic
 - Saprophytic
 - All of the above
33. Catalytic antibodies which have dual role as antibody and enzyme are called :
- Monoclonal antibodies
 - Ubiquibodies
 - Abzymes
 - Immunotoxins
34. Circulating blood cells that differentiate into macrophage in tissue are :
- Kuffer cells
 - Eosinophils
 - Mast cells
 - Monocytes
35. Small organic molecules that are antigenic but not immunogenic are called :
- Antigens
 - Carriers
 - Haptens
 - Immunogens
36. Most effective antigen processing cell is :
- B-cell
 - Dendritic cell
 - Macrophage
 - None
37. Identify the one which does not come under the organic addition reaction :
- Hydration
 - Dehydration
 - Halogenation
 - Hydrohalogenation
38. Rusting of iron occurs due to :
- Reduction
 - Hydrogenation
 - Oxidation
 - Sublimation

39. Which of the following is not an example of redox reaction ?
- (A) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
 (B) $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
 (C) $2\text{K} + \text{F}_2 \rightarrow 2\text{KF}$
 (D) $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$
40. In an open system, for maximum work, the process must be entirely :
- (A) Irreversible
 (B) Reversible
 (C) Adiabatic
 (D) None of the mentioned
41. In liver disease there is decreased serum level of :
- (A) Creatinine
 (B) Amylase
 (C) Urea
 (D) SGPT
42. Diagnosis of organophosphates involves the estimation of :
- (A) SGOT
 (B) Glycerol
 (C) Glutamine
 (D) AChE
43. The serum level of conjugated bilirubin increases in :
- (A) Obstructive liver disease
 (B) Liver damage
 (C) Kidney obstruction
 (D) All of the above
44. The antibody mostly used in immunochemical technique is :
- (A) Ig A
 (B) Ig D
 (C) Ig E
 (D) None of these
45. Shine-Dalgarno sequence is the binding site for :
- (A) α factor
 (B) Ω factor
 (C) DNA Pol
 (D) Ribosome
46. Regions of DNA that are associated with nuclear matrix are :
- (A) AT rich
 (B) GC rich
 (C) AC rich
 (D) None of these
47. Termination of transcription involves :
- (A) β factor
 (B) Rho factor
 (C) α factor
 (D) All of the above factors
48. RNA polymerase involved in the expression of tRNA genes is :
- (A) RNA Pol I
 (B) RNA Pol II
 (C) RNA Pol III
 (D) RNA Pol IV
49. Removal of phosphate moiety is catalyzed by :
- (A) Phosphatases
 (B) Kinases
 (C) Both (A) and (B)
 (D) Dehydrogenases
50. O- α -D-Glucopyranosyl-(1 \rightarrow 4)- α -D-glucopyranose is :
- (A) Sucrose
 (B) Maltose
 (C) Lactose
 (D) Galactose
51. Co-enzyme for carboxylase is :
- (A) Niacin
 (B) Thiamine
 (C) Biotin
 (D) Folic acid

52. The vitamin that regulates gene expression is :
- (A) A
 - (B) B6
 - (C) Biotin
 - (D) K
53. Deficiency of glucose-6-phosphatase causes :
- (A) von Gierke's disease
 - (B) Pompe's disease
 - (C) Hers' disease
 - (D) None of the above
54. Excess amino acids are :
- (A) Stored
 - (B) Degraded
 - (C) Converted to proteins
 - (D) Converted to organic acids
55. Ketogenesis involves :
- (A) NADPH
 - (B) FAD+
 - (C) NADH
 - (D) FMN
56. Cytochrome oxidase is inhibited by :
- (A) H₂S
 - (B) CO
 - (C) O₂
 - (D) Both (A) and (B)
57. The technique used to analyse protein-DNA interaction is :
- (A) Immunoprecipitation
 - (B) Haemagglutination
 - (C) RIA
 - (D) ChIP
58. The material used for separation of whole cells by centrifugation is :
- (A) Cesium chloride
 - (B) Sodium iodide
 - (C) Glycerol
 - (D) Bovine serum albumin
59. The class of hormones that can diffuse through plasma membranes is :
- (A) Lipid-derived hormones
 - (B) Amino acid-derived hormones
 - (C) Peptide hormones
 - (D) Glycoprotein hormones
60. Metabolism of a cell is determined by the :
- (A) Size of proteins in the cell
 - (B) The genetic material
 - (C) Protein composition of the DNA
 - (D) Activity of enzymes produced in the nucleus

1. The name enzyme was coined by :
 - (A) Wilhelm Kühne
 - (B) Michaelis and Menten
 - (C) Kary Mulis
 - (D) None of the above
2. In case of Competitive type of enzyme inhibition, which of the following statements is correct ?
 - (A) K_M decreases and V_{max} remains constant
 - (B) K_M increases and V_{max} remains constant
 - (C) Both K_M and V_{max} decrease
 - (D) Both K_M and V_{max} increase
3. RNA is polymer of purine and pyrimidine ribonucleotides linked together by :
 - (A) Hydrogen bonds
 - (B) van der Waal's forces
 - (C) 3' -- 5' phosphodiester linkages
 - (D) 5' - 3' phosphodiester linkages
4. Protein-energy malnutrition (PEM) refers to a state where the infant's dietary intake is insufficient in :
 - (A) Proteins
 - (B) Overall calories
 - (C) Carbohydrates
 - (D) Both (A) and (B)
5. Which among the following is the best possible explanation for glycolytic pathway to continue in the direction of glucose catabolism ?
 - (A) There are essentially three irreversible reactions that act as the driving force for the pathway
 - (B) High levels of ATP keep the pathway going in a forward direction
 - (C) The enzymes of glycolysis only function in one direction
 - (D) Glycolysis occurs in either direction
6. The number of net ATPs produced during complete oxidation of palmitic acid *via* β oxidation are :
 - (A) 131
 - (B) 129
 - (C) 146
 - (D) 148
7. Lovastatin is helpful in reducing :
 - (A) Blood Cholesterol
 - (B) Glycogen
 - (C) Blood glucose
 - (D) None of the above
8. In Hartnup's disease, the urine of a patient is containing highly increased amounts of :
 - (A) Tryptophan
 - (B) Indole acetic acid
 - (C) Tyrosine
 - (D) Both (A) and (B)
9. Insulin is a protein that is produced by certain pancreatic cells and secreted into the blood stream. Which of the following choices best describes the route of insulin from its production to its exit from the cell ?
 - (A) Rough ER, transport vesicles, cell membrane
 - (B) Rough ER, transport vesicles, Golgi apparatus, transport vesicles, cell membrane
 - (C) Rough ER, lysosomes, transport vesicles, cell membrane
 - (D) Rough ER, Golgi apparatus, smooth ER, cell membrane
10. The _____ of a mitochondrion is/are an adaptation that increases the surface area and enhances mitochondrion's ability to produce ATP.
 - (A) Stroma
 - (B) Grana
 - (C) Inter membrane space
 - (D) Cristae
11. Consider the following facts about membrane phospholipids :
 - (i) Have hydrophilic heads that face outward and are exposed to water
 - (ii) Have hydrophobic tails that face inward and are shielded from water

Choose the correct answer/s from the codes given below :

 - (A) (i) only
 - (B) (ii) only
 - (C) Both (i) and (ii)
 - (D) Neither (i) nor (ii)

12. Consider the following facts about chloroplasts :
- Chloroplast ribosomes can synthesize all chloroplast proteins
 - Ribulose-1, 5-bisphosphate carboxylase/oxygenase is concentrated in the stroma of chloroplasts.
- Choose the correct answer/s from the codes given below :
- (i) only
 - (ii) only
 - Both (i) and (ii)
 - Neither (i) nor (ii)
13. Consider the following statements :
- Assertion (A) : Incompatibility is a gene-physiology process
- Reason (R) : Moderately high temperatures are also known to reduce the self-incompatibility reaction in certain plants.
- Select the correct answer from the codes given below :
- Both (A) and (R) are true, but (R) is the correct explanation of (A)
 - Both (A) and (R) are true, and (R) is not the correct explanation of (A)
 - (A) is true, but (R) is false
 - (A) is false, but (R) is true
14. Ovum producing Klinefelter's syndrome shall have chromosome number :
- 21
 - 22
 - 23
 - 24
15. Negative regulation of protein synthesis is accomplished by :
- Allosteric inhibition
 - The binding of RNA polymerase to the promoter
 - The binding of a repressor to the DNA
 - The binding of a repressor to the RNA polymerase
16. The outcomes of point mutations include :
- Missense mutation
 - Nonsense mutation
 - Silent mutation
 - All of the above
17. During which stage of cell cycle, replication takes place ?
- G₁ phase
 - S phase
 - G₂ phase
 - M phase
18. Self-phosphorylation is an excellent mechanism for triggering specific catalytic function of the proteins involved in signal cascades because it :
- Changes the shape and thus the enzymatic activity of the proteins involved
 - Makes the receptor more likely to capture the signaling molecule
 - Allows hydrophilic signaling molecules to cross the plasma membrane
 - None of the above
19. The name of Restriction enzymes is based on :
- The person who discovered them
 - The bacterium they are derived from
 - The viral DNA that they attack
 - None of the above
20. The enzyme/s used in PCR is/are :
- Taq* pol
 - Pfu* pol
 - Vent* pol
 - All of the above
21. Antibody diversity arises from :
- Gene amplification
 - Gene re-arrangement
 - Alternative splicing
 - All of the above

22. The formula to calculate maximum urea clearance is $(U \times V)/B$, where U denotes :
- Concentration of urea in urine in g/24 hr
 - Concentration of urea in urine in mg/100 ml
 - Concentration of urea in blood in mg/100 ml
 - Volume of urine in ml/min
23. The isoenzyme LDH₅ is elevated in :
- Myocardial infarction
 - Peptic ulcer
 - Liver disease
 - Infectious diseases
24. Genes encoding cell surface glycoproteins that are required for antigen presentation to T cells and also responsible for rapid graft rejection is called as :
- MHC complex
 - B cell complex
 - T cell complex
 - None of the above
25. The rate of transpiration increases with the increase in:
- Wind
 - Light
 - Temperature
 - All of the above
26. The hormone helpful in natural root stimulation is :
- Auxin
 - Traumatic
 - Florigen
 - None of the above
27. During nitrogen cycle nitrites are converted into nitrates by :
- Azotobacter
 - Rhizobium
 - Nitrobacter
 - Clostridium
28. In order to reduce six CO₂ molecules to glucose during photosynthesis, the number of ATPs and NADPH required are :
- 12 ATP and 6 NADPH
 - 6 ATP and 6 NADPH
 - 18 ATP and 12 NADPH
 - 18 ATP and 6 NADPH
29. During protoplast fusion, the fusogen used is :
- Manitol
 - Sorbitol
 - Polyethylene Glycol
 - Ethylene Glycol
30. The phenomenon "Somaclonal" variation is associated with :
- Plant tissue culture technology
 - Hybridoma technology
 - DNA recombinant technology
 - None of the above
31. Jute cultivation in India is concentrated in the delta area of which of the following rivers ?
- Ganga
 - Mahanadi
 - Brahamputra
 - Godavari
32. Artemisia sp. are sources of well established secondary metabolite artmisnin, used for treatment of:
- Malaria
 - Diabetes
 - Arthritis
 - Cardiovascular disease
33. The main nitrogen reservoir in the biosphere is :
- Rocks
 - Atmosphere
 - Ocean
 - Organism

34. The carrying capacity of any given population is determined by its :
- Population growth rate
 - Birth rate
 - Death rate
 - Limiting resources
35. Compared with COD, the BOD of a wastewater sample is generally :
- Greater
 - Equal
 - Less
 - None of the above
36. Consider the following facts about Heerpora Wildlife Sanctuary :
- It is located in Shopian district of Kashmir
 - It has around 50 individuals the critically endangered Pir Panjal markhor
 - It has around 156 individuals of Hangul (Kashmir stag)
- Choose the correct answer/s from the codes given below :
- (i) only
 - (ii) only
 - (i) and (ii) only
 - (i), (ii) and (iii)
37. If arithmetic mean is multiplied to coefficient of variation then resulting value is classified as :
- Coefficient of deviation
 - Coefficient of mean
 - Standard deviation
 - Variance
38. Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5 ?
- 1/20
 - 3/20
 - 5/20
 - 9/20
39. The number of variables one should have in order to run a one-sample Chi-square analysis :
- You can have only 1
 - At least 5
 - At least 3
 - There are no restrictions
40. If one regression coefficient is greater than one, then other will be :
- More than one
 - Equal to one
 - Less than one
 - Equal to minus one
41. All of the following scientists got Nobel Prize for their contribution in the field of Microbiology except :
- Antony Van Leeuwenhoek
 - Elie Metchnikoff
 - Paul Ehrlich
 - Robert Koch
42. Each of the following agents is a recognized cause of diarrhea except :
- Clostridium perfringens*
 - Vibrio cholera*
 - Enterococcus faecalis*
 - Escherichia coli*
43. The fact that is not true about eukaryotes :
- Mitosis
 - Cell wall, if present, is chemically simple
 - Larger size 80S ribosome located in organelles
 - Glycocalyx present in some cells that lack a cell wall

44. While discussing binomial nomenclature, parts of scientific names are :
- Genus and class
 - Genus and kingdom
 - Genus and species
 - Genus and phylum
45. It has been said that bacteria are essential for the existence of life on earth, which of the following would be the essential function performed by bacteria ?
- Control insect population
 - Directly provide food for humans
 - Decompose organic material and recycle elements
 - Produce human growth hormone such as insulin
46. Consider the following statements about archaea :
- Prokaryotes characterized as extremophiles that share some bacterial and some eukaryotic traits
 - Organisms that are adapted to high temperature environments such as volcanic springs
 - Bacteria like organisms that can live only in extreme salt environments.
- Choose the correct answer/s from the codes given below :
- (i) only
 - (ii) only
 - (i) and (iii) only
 - (i), (ii) and (iii)
47. Infectious RNA particle without protein coat is called as :
- Virion
 - Viroid
 - Virusoid
 - Prion
48. Consider the following facts about the role/s of algae :
- Algae are primary producers in aquatic food chains
 - Planktonic algae produce most of the molecular oxygen in the Earth's atmosphere
 - Petroleum is the fossil remains of the planktonic algae.
- Choose the correct answer/s from the codes given below :
- (i) only
 - (ii) only
 - (i) and (iii) only
 - (i), (ii) and (iii)
49. Process of breakdown of mycelium, in which each broken fragment gives rise to a new mycelium is :
- Fragmentation
 - Budding
 - Conjugation
 - Binary fission
50. Fungi usually store the reserved food material in the form of :
- Proteins
 - Starch
 - Glycogen
 - Lipids
51. Heterothallism was first observed by :
- Blakeslee
 - Metha
 - Pasteur
 - Alexopolous

52. The main nitrogenous waste of paramecium is :
- Urea
 - Ammonia
 - Uric acid
 - Creatinine
53. Which of the following statements is incorrect regarding HAT medium ?
- HAT medium is a selective medium
 - Aminopterin in the HAT medium blocks *de novo* pathway of nucleotide Synthesis
 - Salvage pathway requires aminopterin and thymidine
 - Hypoxanthine is converted to guanine by HGPRT enzyme
54. Alternative pathway of complement system is activated by :
- Antigen-antibody complex
 - Antigen
 - Microorganism or its toxin
 - Antigen bound to MHC
55. Activation of B cell receptor by the binding of an epitope result in the formation of :
- Plasma cells and T cytotoxic cells
 - Memory cells and T cytotoxic cells
 - Plasma cells for antibody production and memory cells for primary response
 - Plasma cells for antibody production and memory cells for secondary response
56. The antibody present in the secretions like, tears, colostrums and saliva is :
- IgA
 - IgE
 - IgG
 - IgM
57. Consider the following statements :
- Assertion (A) : A car rusts because steel reacts with water and oxygen in the air
- Reason (R) : When iron rusts electrons are lost from the metal
- Select the correct answer from the codes given below :
- Both (A) and (R) are true, but (R) is the correct explanation of (A)
 - Both (A) and (R) are true, and (R) is not the correct explanation of (A)
 - (A) is true, but (R) is false
 - (A) is false, but (R) is true
58. Which of the following organic molecule reacts more rapidly in SN_2 reaction ?
- 2-bromo hexane
 - 1-bromo-3-methyl hexane
 - 2-bromo-2-methyl hexane
 - 3-bromo hexane
59. Which of the following statement is correct in response to hydrogen bond in water ?
- Hydrogen bond is 10% covalent and 90% electrostatic
 - Hydrogen bond is 25% covalent and 75% electrostatic
 - Hydrogen bond is 50% covalent and 50% electrostatic
 - Hydrogen bond is 100% electrostatic
60. The work of expansion for a system is 500 cal. The heat given to the system is 80 cal. The change in internal energy in the process will be :
- 80 cal
 - 500 cal
 - 420 cal
 - +420 cal

Sr. No.227.....

ENTRANCE TEST-2017

SCHOOL OF BIOLOGICAL SCIENCES

MICROBIOLOGY

Question Booklet Series

A

Total Questions : 60

Time Allowed : 70 Minutes

Roll No. :

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Instructions for Candidates :

1. Write your Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be 'Negative Marking' for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

SEAL

1. The oldest eukaryotic organisms are considered to be
- diplomonads like Giardia
 - archaea
 - fungi
 - animals
2. The phospholipids present in cytoplasm membrane of eubacteria is mainly
- phosphoglycerides
 - polyisoprenoid
 - phospholipoprotein
 - none of these
3. Which were the investigators who lived at the same time?
- Koch and Pasteur
 - Darwin and Woese
 - Van Leeuwenhoek and Ricketts
 - Berg and Hooke
4. Who was the inventor of the Petri dish?
- R.J. Petri, an assistant of R. Koch
 - A famous French cook
 - Italian glass blower from Petri, Italy
 - None of the above
5. The five-kingdom system of classification was set up by
- Louis Pasteur
 - Robert Whittaker
 - Robert Koch
 - Masaki Ogata
6. Holozoic nutrition is characterized by
- phagocytosis of solid nutrients and subsequent formation of phagocytic vacuoles
 - pinocytosis of solid nutrients and subsequent formation of phagocytic vacuoles
 - phagocytosis of soluble nutrients and subsequent formation of phagocytic vacuoles
 - photosynthesis
7. Organisms with amoeboid cells that move within a network of mucous tracks using a typical gliding motion
- Labyrinthomorpha
 - Microspora
 - Apicomplexa
 - Myxozoa
8. Which of the following structure is absent in eukaryotic cells?
- Mitochondria
 - Chloroplasts
 - Golgi structure
 - Mesosome
9. Which of the following is not a function of cysts for Protozoa?
- Protect against adverse environments
 - Sites for nuclear reorganization and cell division
 - Serve as a means of transfer between hosts in parasitic species
 - All of the above
10. Sexual reproduction in the Protozoa occurs most commonly by
- conjugation
 - gametangial contact
 - binary fission
 - binary fusion
11. Organisms with complex life cycles which include a mammalian host and an insect host and involves schizogony as part of the cycle belong to which phylum of Protozoa?
- Sarcomastigophora
 - Microspora
 - Apicomplexa
 - Myxozoa

12. A protozoan is defined as
- motile prokaryotic unicellular protist
 - motile eukaryotic unicellular protist
 - motile eukaryotic unicellular photosynthetic protist
 - motile eukaryotic multicellular protist
13. Weil-Felix reaction is based on sharing of antigens between
- sheep RBCs and EB virus
 - mycoplasma and human O group RBCs
 - rickettsial antigens and antigens of certain strains of Proteus
 - none of these
14. Agglutination reaction is more sensitive than precipitation for the detection of
- antigens
 - antibodies
 - complement
 - antigen-antibody complexes
15. In which of the following case a large lattice is formed?
- Antibody is in excess
 - Antigens and antibodies are in optimal proportion
 - Antigen is in excess
 - None of these
16. VDRL test is an example of
- Tube test
 - Ring test
 - Slide test
 - none of these
17. Those reactions in which two or more substances combine to form a single substance is called
- Combination reaction
 - Displacement reaction
 - Decomposition reaction
 - Double displacement reaction
18. Those chemical substances which have a sour taste are:
- Salt
 - Acid
 - Bases
 - None of the above
19. Those chemical substances which have a bitter taste are:
- Acid
 - Bases
 - Salt
 - Concentrated Acids
20. The scale on which the strength of acid solutions as well as basic solutions could be represented by making use of hydrogen ion concentrations in them is called:
- Balance scale
 - Platform scale
 - Pan scale
 - pH scale
21. What is an unsaturated hydrocarbon in which the two carbon atoms are connected by a double bond called?
- Alkanes
 - Alkenes
 - Alkynes
 - Ionic bond
22. The phospholipids present in cytoplasm membrane of the archaeo-bacteria is
- phosphoglycerides
 - polyisoprenoid
 - polyisoprenoid branched chain lipids
 - none of the above
23. Organic molecules that increase the rate of metabolic reactions with themselves changing are known as
- coenzymes
 - enzymes
 - substrates
 - reactants

24. Enzymes can
- not pass through semipermeable membrane
 - pass through semipermeable membrane
 - dissolve semipermeable membrane
 - none of these
25. Ascorbic acid acts as a/an
- reducing agent
 - oxidizing agent
 - oxidizing and reducing agent both
 - none of the above
26. A deficiency of thiamin produces the disease known as
- beri-beri
 - scurvy
 - cataract
 - anemia
27. How many molecules of ATPs are synthesized per NADH oxidation?
- 2
 - 1
 - 3
 - 4
28. Glycolytic pathway regulation involves
- allosteric stimulation by ADP
 - allosteric inhibition by ATP
 - feedback, or product, inhibition by ATP
 - all of the above
29. In what form does the product of glycolysis enter the TCA cycle?
- Acetyl CoA
 - Pyruvate
 - NADH
 - Glucose
30. Oxidation of a molecule involves
- gain of electron
 - loss of electron
 - gain of proton
 - loss of proton
31. Two true breeding parents are crossed similar to Mendel's P generation. A tall plant is crossed with a short plant. What is the expected outcome for the F1 generation?
- all short
 - all tall
 - all medium height
 - None of the above
- Handwritten note: Only all series - B*
32. If a plant that has round seeds has a parent that has wrinkled seeds, what is its genotype? (Assume that round is dominant.)
- RR
 - Rr
 - rr d
 - RrWw
33. Stem cells are capable of
- self renewal
 - potency
 - both (A) and (B)
 - none of above
34. In a developing embryo, stem cells can differentiate into
- ectoderm
 - endoderm
 - mesoderm
 - all of above
35. Which of the following techniques can be used to determine the defective gene and for developing cancer?
- Western blot
 - Southern blot
 - Northern blot
 - Eastern blot
36. Both DNA gel electrophoresis and SDS-PAGE of proteins are similar because
- in both cases molecules migrate to the anode
 - both techniques rely on a constant charge to mass ratio
 - both techniques utilize the sieving properties of gels
 - all of the above

37. The TP53 gene of chromosome 17 codes for a protein
- that plays a role in the digestive process
 - involved in glucose transport
 - involved in the regulation of the cell cycle
 - that is like a white blood cell protein
38. Which of the following genetic diseases would be amenable to genetic engineering?
- Down's syndrome
 - Muscular dystrophy
 - Cystic fibrosis
 - Cri du Chat
39. Kidney dialysis and kidney transplant are two treatments for
- misbalance in glomerular filtrate
 - kidney failure
 - kidney stones
 - misbalance of osmoregulation
40. Functions of liver does not include
- digestion of fats
 - detoxication of alcohol
 - carbohydrate digestion
 - iron storage
41. For specific antigen recognition by T cells
- antigen is bound by a T cell membrane antibody
 - denaturation of antigen does not reduce epitope recognition
 - MHC molecules are not required
 - antigen exposure during T cell maturation is required
42. Lymphocytes are activated by antigen in the
- blood stream
 - bone marrow
 - liver
 - lymph nodes
43. Nitrogen fixation by the microorganisms can be detected by adopting the approach of
- demonstrating growth in a nitrogen free medium
 - cultivating the microorganisms in the presence of nitrogen labeled with isotropic nitrogen
 - measuring $^{15}\text{N}_2$ by mass spectrometer
 - all of the above
44. Nitrogen fixation refers to the direct conversion of atmospheric nitrogen gas into
- ammonia
 - glucose
 - ATP
 - nitrate
45. Sugar moves in phloem vessels as
- cellulose
 - glucose
 - starch
 - sucrose
46. Red pigment in tomato is
- β -carotene
 - Anthocyanin
 - Lycopene
 - Lutein
47. Chlorophyll-a differs from chlorophyll-b in having
- Methyl group instead of aldehyde group
 - Aldehyde group instead of methyl group
 - Methyl group instead of ethyl group
 - Only phytol tail instead of head
48. Organogenesis is
- formation of callus tissue
 - formation of root and shoots on callus tissue
 - both (A) and (B)
 - genesis of organs

49. Which of the following is used in the culture of regenerating protoplasts, single cells or very dilute cell suspensions?
- Nurse medium
 - Nurse or feeder culture
 - Both (A) and (B)
 - None of these
50. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as
- redifferentiation
 - dedifferentiation
 - either (A) or (B)
 - none of these
51. The controversy regarding the use of Bt corn is that it
- is potentially harmful to monarch butterflies
 - is a potential allergen to humans
 - both (A) and (B)
 - can contaminate groundwater
52. Which of the following is an organic gas?
- Hydrocarbons
 - Aldehydes
 - Ketones
 - Ammonia
53. Which of the following is/are inorganic gas(es)?
- Carbon monoxide
 - Hydrogen sulphide
 - Chlorine
 - All of the above
54. The major contributor of Carbon monoxide is
- Motor vehicle
 - Industrial processes
 - Stationary fuel combustion
 - None of the above
55. Treatment of municipal water supplies is based upon
- coagulation, filtration, chlorination
 - chlorination, filtration, coagulation
 - filtration, coagulation, chlorination
 - coagulation, chlorination, filtration
56. What is an anaerobic digester?
- New diet drink
 - Microbe that eats hazardous waste
 - Method to convert agricultural waste into a biogas
 - All of the above
57. Which of the following is NOT a possible value of the correlation coefficient?
- negative 0.9
 - zero
 - positive 0.15
 - positive 1.5
 - negative .05
58. A numerical value is used as a summary measure for a sample; such as sample mean, is known as a
- population parameter
 - sample parameter
 - sample statistic
 - None of the above answers is correct.
59. The mean of a sample is
- always equal to the mean of the population
 - always smaller than the mean of the population
 - computed by summing all the data values and dividing the sum by the number of items
 - None of the above answers is correct.
60. Mode is the most frequently occurring data value, it
- can never be larger than the mean
 - is always larger than the median
 - is always larger than the mean
 - None of the above answers is correct.