

CALICUT UNIVERSITY COMMON ENTRANCE TEST (CU-CET), APRIL 2026**BIOTECHNOLOGY**

Time : Two Hours

Maximum : 200 Marks

*Each question carries 4 marks.**One mark will be deducted for each wrong answer.*

1. Which RNA polymerase is mainly responsible for transcription of rRNA in the nucleolus ?
(A) RNA polymerase I. (B) RNA polymerase II.
(C) RNA polymerase III. (D) RNA polymerase IV.
2. During which phase of the cell cycle does the nucleolus typically disappear ?
(A) G1 phase. (B) S phase.
(C) Prophase. (D) Telophase
3. Which of the following membrane components is mainly involved in cell recognition and signaling ?
(A) Cholesterol.
(B) Glycoproteins.
(C) Phosphatidylcholine.
(D) Integral proteins without carbohydrate moieties.
4. Induced pluripotent stem cells (iPSCs) are generated by :
(A) Fusion of somatic cells with embryonic stem cells.
(B) Introducing specific transcription factors into somatic cells.
(C) Spontaneous mutation in adult stem cells.
(D) Differentiation of embryonic stem cells.

Turn over

5. Which of the following is a major distinguishing feature of grassland ecosystems compared to forests?
- (A) Dominance of woody vegetation.
 - (B) High annual rainfall.
 - (C) Presence of permafrost.
 - (D) Dominance of herbaceous plants.
6. Which of the following ecosystems acts as a transition zone between terrestrial and aquatic environments?
- (A) Desert.
 - (B) Wetland.
 - (C) Boreal forest.
 - (D) Open ocean.
7. Which of the following is an example of phytoremediation?
- (A) Using bacteria to degrade pesticides.
 - (B) Using fungi to break down lignin.
 - (C) Using plants to accumulate heavy metals.
 - (D) Using enzymes to degrade plastics.
8. In a serial dilution plate count, 0.1 mL of a 10^{-5} dilution produced 85 colonies. What is the original cell concentration?
- (A) 8.5×10^5 CFU/mL.
 - (B) 8.5×10^6 CFU/mL.
 - (C) 8.5×10^7 CFU/mL.
 - (D) 8.5×10^8 CFU/mL.
9. What is the key characteristic that distinguishes the lysogenic cycle from the lytic cycle?
- (A) Immediate destruction of the host cell.
 - (B) Production of viral proteins.
 - (C) Latent incorporation of viral genome without killing the host.
 - (D) Absence of viral DNA replication.

10. Corn steep liquor (CSL) is commonly used in industrial media as a source of :
- (A) Carbon only.
 - (B) Nitrogen, vitamins, and growth factors.
 - (C) Oxygen.
 - (D) Trace metals only.
11. In a trickling filter, the microbial community is primarily composed of :
- (A) Only anaerobic bacteria.
 - (B) Only fungi.
 - (C) Aerobic microorganisms forming a biofilm.
 - (D) Viruses and protozoa only.
12. A major disadvantage of biological filters like trickling filters is :
- (A) High energy consumption
 - (B) Requirement of skilled labor only
 - (C) Possibility of clogging due to excess biomass.
 - (D) Inefficiency in removing dissolved oxygen.
13. A positive Voges-Proskauer test is indicated by :
- (A) Blue color formation.
 - (B) Red color formation after addition of reagents.
 - (C) Yellow color formation.
 - (D) Black precipitate.
14. In the Citrate utilization test, a positive result is indicated by :
- (A) Formation of gas bubbles.
 - (B) Change of medium from green to blue.
 - (C) Formation of red ring.
 - (D) Black precipitate.

Turn over

15. According to the chemiosmotic theory, the proton motive force is generated by :
- (A) ATP hydrolysis.
 - (B) Electron transport chain activity.
 - (C) Substrate-level phosphorylation.
 - (D) Glycolysis.
16. Peptide bond formation is best described as which type of chemical reaction ?
- (A) Hydrolysis.
 - (B) Oxidation.
 - (C) Condensation (dehydration) reaction.
 - (D) Reduction.
17. Gangliosides differ from cerebrosides in that they contain :
- (A) Only glucose residues.
 - (B) Only galactose residues.
 - (C) Sialic acid residues.
 - (D) Phosphate groups.
18. In the Lowry method, the blue color intensity is measured at approximately :
- (A) 280 nm.
 - (B) 340 nm.
 - (C) 660
 - (D) 540 nm.
19. If a strong acid is added to a phosphate buffer, which reaction predominantly occurs ?
- (A) $\text{HPO}_4^{2-} + \text{OH}^- \rightarrow \text{H}_2\text{PO}_4^-$.
 - (B) $\text{H}_2\text{PO}_4^- + \text{H}^+ \rightarrow \text{H}_3\text{PO}_4$.
 - (C) $\text{HPO}_4^{2-} + \text{H}^+ \rightarrow \text{H}_2\text{PO}_4^-$.
 - (D) $\text{PO}_4^{3-} + \text{H}^+ \rightarrow \text{HPO}_4^{2-}$.
20. Which model explains that enzyme subunits change conformation sequentially upon substrate binding ?
- (A) Lock and key model
 - (B) Induced fit model
 - (C) Sequential model
 - (D) Monod-Wyman-Changeux (MWC) model.

21. Which of the following is a common example of an allosteric enzyme ?
- (A) Trypsin. (B) Hexokinase.
(C) Phosphofructokinase-1. (D) Pepsin.
22. Which phase is most suitable for studying antibiotic effects on actively dividing bacteria ?
- (A) Lag phase. (B) Log phase.
(C) Stationary phase. (D) Death phase.
23. Which protein plays a key role in initiating DNA replication at the bacterial origin of replication ?
- (A) DNA polymerase III. (B) DnaA.
(C) Helicase. (D) Primase.
24. If the frequency of homozygous recessive genotype (aa) is 0.16, what is the frequency of heterozygous genotype (Aa) assuming Hardy-Weinberg Equilibrium ?
- (A) 0.32. (B) 0.48.
(C) 0.64. (D) 0.24.
25. What is the most common outcome when an Hfr cell conjugates with an F^- cell ?
- (A) The recipient becomes F^+ .
(B) The recipient remains F^- but acquires new chromosomal genes.
(C) The donor becomes F^- .
(D) Both cells lose plasmids.
26. Which of the following enzymes is responsible for adding the 5' cap to pre-mRNA ?
- (A) RNA polymerase II. (B) DNA ligase.
(C) Guanylyl transferase. (D) Poly(A) polymerase.
27. Which enzyme is primarily responsible for introducing negative supercoils into bacterial DNA ?
- (A) DNA ligase. (B) DNA polymerase I.
(C) Topoisomerase T. (D) DNA gyrase.

Turn over

28. Which buffer component helps maintain a stable pH during DNA isolation ?
- (A) EDTA. (B) Tris-HCl.
(C) NaCl. (D) SDS.
29. The framework regions (FRs) in an antibody are primarily responsible for :
- (A) Antigen binding specificity.
(B) Maintaining structural integrity of variable domains.
(C) Activating complement system.
(D) Binding to Fc receptors.
30. The tuberculin skin test (Mantoux test) is an example of :
- (A) Type I hypersensitivity. (B) Type II hypersensitivity.
(C) Type III hypersensitivity. (D) Type IV hypersensitivity.
31. In scale-up of aerobic fermentations, which parameter is often kept constant to ensure similar oxygen availability ?
- (A) pH.
(B) Temperature.
(C) Power input per unit volume (P/V).
(D) Substrate concentration.
32. The volumetric mass transfer co-efficient (k_La) is important in fermentation scale-up because it represents :
- (A) Rate of substrate consumption.
(B) Efficiency of oxygen transfer from gas to liquid phase.
(C) Biomass concentration.
(D) Heat generation rate.

33. In the estimation of alcohol content in fermented grape juice using the dichromate method, potassium dichromate acts as :
- (A) Reducing agent. (B) Catalyst.
(C) Oxidizing agent. (D) Indicator.
34. Which enzyme combination is most used for plant protoplast isolation ?
- (A) Amylase and Protease. (B) Cellulase and Pectinase.
(C) Lipase and Nuclease. (D) Chitinase and Protease.
35. The Simian Virus 40 large T antigen immortalizes cells primarily by :
- (A) Increasing ATP production.
(B) Activating ribosomal RNA synthesis.
(C) Inactivating tumor suppressor proteins.
(D) Enhancing cell adhesion.
36. Which of the following genes is commonly introduced into cells to induce immortalization by maintaining telomere length ?
- (A) MYC. (B) hTERT.
(C) BCL-2. (D) VEGF.
37. Which host system is most suitable for producing recombinant proteins requiring post-translational glycosylation ?
- (A) *Escherichia coli*. (B) *Saccharomyces cerevisiae*.
(C) *Bacillus subtilis*. (D) In vitro transcription system.
38. Which biodiversity monitoring technique involves repeated observations along a fixed path over time ?
- (A) Transect method. (B) Quadrat method.
(C) Remote sensing. (D) Mist netting.

Turn over

39. The Svalbard Global Seed Vault is located in which country ?
- (A) Canada. (B) Norway.
(C) Sweden. (D) Finland.
40. Which database is most commonly used for biomedical literature search ?
- (A) Scopus. (B) PubMed.
(C) Web of Science. (D) Google Scholar.
41. Which of the following stages of the mouse embryo is most used for establishing embryonic stem (ES) cell cultures ?
- (A) Zygote. (B) 2-cell stage.
(C) Blastocyst. (D) Morula.
42. In an MTT assay, cytotoxicity is generally quantified by measuring :
- (A) Fluorescence intensity.
(B) Optical density.
(C) Radioactivity.
(D) pH change.
43. Which of the following vectors is commonly used for high-level protein expression in *E. coli* ?
- (A) pUC vectors. (B) pET vectors.
(C) Cosmids. (D) BACs.
44. The Sequence Read Archive primarily stores :
- (A) Curated protein structures.
(B) Processed gene annotations.
(C) Raw high-throughput sequencing data.
(D) Clinical trial reports.

45. Which glycoprotein of Herpes Simplex Virus is primarily involved in viral attachment to host cells ?
- (A) gB. (B) gC.
(C) gD. (D) gH.
46. Which mechanism is primarily associated with β -lactam antibiotics ?
- (A) Inhibition of protein synthesis at the 30S ribosomal subunit.
(B) Disruption of bacterial plasma membrane.
(C) Inhibition of cell wall synthesis by binding to penicillin-binding proteins.
(D) Inhibition of folic acid synthesis.
47. The concept of ecological footprint was developed by :
- (A) Rachel Carson.
(B) James Lovelock.
(C) Mathis Wackernagel and William Rees.
(D) Garrett Hardin.
48. What is the initial term of protection for a registered industrial design in India ?
- (A) 5 years. (B) 10 years.
(C) 15 years. (D) 20 years.
49. Which international agreement facilitates the protection of industrial designs across multiple countries through a single application ?
- (A) TRIPS Agreement. (B) Paris Convention.
(C) Hague Agreement. (D) Berne Convention.

Turn over

50. What is the primary purpose of an ISSN ?

- (A) To identify books uniquely.
- (B) To identify serial publications uniquely.
- (C) To classify research articles by subject.
- (D) To provide copyright protection.

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Name.....

Reg. No.....

**CALICUT UNIVERSITY CENTRALIZED ENTRANCE TEST (CU-CET)
APRIL 2025**

M.Sc. BIOTECHNOLOGY / M.Sc. GENERAL BIOTECHNOLOGY

Time : Two Hours

Maximum : 200 Marks

Each question carries 4 marks.

1 mark will be deducted for each wrong answer.

1. Which element is present in all organic compounds ?
(a) Hydrogen. (b) Carbon.
(c) Oxygen. (d) Nitrogen.
2. Which of the following is a transition metal ?
(a) Calcium. (b) Iron.
(c) Sodium. (d) Potassium.
3. Which of the following is NOT a macromolecule found in living organisms ?
(a) Lipid. (b) Monosaccharide.
(c) Protein. (d) Water.
4. Which of the following is an example of a reducing sugar ?
(a) Glucose. (b) Sucrose.
(c) Lactose. (d) Maltose.
5. Which of the following is NOT a function of carbohydrates in living organisms ?
(a) Energy storage. (b) Structural support.
(c) Cell signaling. (d) Regulation of body temperature.
6. What is the primary function of the citric acid cycle in cellular respiration ?
(a) Production of ATP.
(b) Oxidation of glucose.
(c) Reduction of NAD⁺ to NADH.
(d) Generation of electron carriers.

Turn over

7. Which of the following is NOT a function of the electron transport chain in cellular respiration ?
- (a) Production of ATP.
 - (b) Generation of a proton gradient.
 - (c) Oxidation of NADH and FADH₂.
 - (d) Conversion of pyruvate to acetyl-CoA.
8. Which amino acid is commonly found in nuts and seeds ?
- (a) Lysine.
 - (b) Methionine.
 - (c) Leucine.
 - (d) Phenylalanine.
9. Which amino acid is the most abundant in the body ?
- (a) Alanine.
 - (b) Glutamine.
 - (c) Asparagine.
 - (d) Leucine.
10. Which disaccharide is commonly used in the pharmaceutical industry as a tablet excipient ?
- (a) Lactose.
 - (b) Maltose.
 - (c) Sucrose.
 - (d) Galactose.
11. Which of the following diseases is associated with improper disulfide bond formation ?
- (a) Alzheimer's disease.
 - (b) Parkinson's disease.
 - (c) Cystic fibrosis.
 - (d) Diabetes mellitus.
12. Omega-3 fatty acids are classified as :
- (a) Saturated fatty acids.
 - (b) Monounsaturated fatty acids.
 - (c) Polyunsaturated fatty acids.
 - (d) Trans fatty acids.
13. What is the primary greenhouse gas emitted from human activities that influences the water cycle ?
- (a) Carbon dioxide (CO₂).
 - (b) Methane (CH₄).
 - (c) Nitrous oxide (N₂O).
 - (d) Water vapor (H₂O).

14. In addition to carbon dioxide, what other greenhouse gas is released during the combustion of fossil fuels ?
- (a) Methane. (b) Nitrous oxide.
(c) Water vapor. (d) Sulfur dioxide.
15. The electron transport chain is located in the :
- (a) Cytoplasm.
(b) Mitochondrial matrix.
(c) Inner mitochondrial membrane.
(d) Endoplasmic reticulum.
16. What is the approximate concentration of carbon dioxide in Earth's atmosphere ?
- (a) 0.03 %. (b) 0.3 %.
(c) 3 %. (d) 30 %.
17. Which of the following is a symptom of hypercalcemia ?
- (a) Weakness. (b) Bone pain.
(c) Nausea. (d) Muscle twitching.
18. Which type of chlorophyll is primarily found in algae ?
- (a) Chlorophyll a. (b) Chlorophyll b.
(c) Chlorophyll c (d) Chlorophyll d
19. Which type of chlorophyll is predominantly found in plants ?
- (a) Chlorophyll a. (b) Chlorophyll b.
(c) Chlorophyll c. (d) Chlorophyll d.
20. What is the name of the structure that surrounds and protects developing fern sporangia ?
- (a) Sorus. (b) Indusium.
(c) Strobilus. (d) Sporophyll.
21. Which of the following is not a type of RNA polymerase in eukaryotes ?
- (a) RNA polymerase I. (b) RNA polymerase II.
(c) RNA polymerase III. (d) RNA polymerase IV.

Turn over

22. Which of the following factors is not involved in transcriptional regulation through chromatin remodeling ?
- (a) Histone acetyltransferases (HATs).
 - (b) DNA methyltransferases.
 - (c) Histone deacetylases (HDACs).
 - (d) SWI/SNF complexes.
23. Which subunit of RNA polymerase II contains the catalytic activity responsible for RNA synthesis ?
- (a) Rpb1.
 - (b) Rpb2.
 - (c) Rpb3.
 - (d) Rpb4.
24. The phenotype of an organism is determined by its :
- (a) Genotype.
 - (b) Environment.
 - (c) Both genotype and environment.
 - (d) Neither genotype nor environment.
25. What is the approximate diameter of the B DNA helix ?
- (a) 1 nanometer.
 - (b) 2 nanometers.
 - (c) 3 nanometers.
 - (d) 4 nanometers.
26. What is the typical tilt angle between adjacent base pairs in Z DNA ?
- (a) 0 degrees.
 - (b) 45 degrees.
 - (c) 60 degrees.
 - (d) 90 degrees.
27. Which of the following DNA repair mechanisms is involved in repairing thymine dimers caused by UV radiation ?
- (a) Base excision repair.
 - (b) Nucleotide excision repair.
 - (c) Mismatch repair.
 - (d) Homologous recombination.

28. Which of the following genetic disorders is caused by a mutation in a mitochondrial gene ?
- (a) Cystic fibrosis.
 - (b) Duchenne muscular dystrophy.
 - (c) Leber's hereditary optic neuropathy.
 - (d) Tay-Sachs disease.
29. Which taxonomic category is the broadest ?
- (a) Species.
 - (b) Genus.
 - (c) Family.
 - (d) Kingdom.
30. What is the correct order of taxonomic categories from broadest to most specific ?
- (a) Kingdom, Phylum, Class, Order, Family, Genus, Species.
 - (b) Kingdom, Class, Phylum, Order, Family, Genus, Species.
 - (c) Phylum, Kingdom, Order, Class, Family, Genus, Species.
 - (d) Kingdom, Phylum, Order, Class, Family, Species, Genus.
31. Which of the following is a characteristic of an r-selected species ?
- (a) Long lifespan.
 - (b) High reproductive investment.
 - (c) Late reproductive age.
 - (d) Stable population size.
32. In which ecosystem is primary succession most likely to occur ?
- (a) Desert.
 - (b) Tundra.
 - (c) Grassland.
 - (d) Temperate forest.
33. What term describes the sequence of communities observed during succession ?
- (a) Biome shift.
 - (b) Ecological reversal.
 - (c) Climax progression.
 - (d) Seres.
34. Which of the following is a greenhouse gas that is naturally present in the atmosphere ?
- (a) Carbon monoxide.
 - (b) Methane.
 - (c) Sulfur dioxide.
 - (d) Nitrogen oxides.

Turn over

35. What is the largest class of fish ?
- (a) Chondrichthyes. (b) Osteichthyes.
(c) Agnatha. (d) Amphibia.
36. Which of the following is not a primary factor affecting soil formation ?
- (a) Parent material. (b) Climate.
(c) Topography. (d) Crop rotation.
37. Which agricultural practice involves tilling the land to bury crop residues and enhance soil fertility ?
- (a) No-till farming. (b) Conservation tillage.
(c) Strip-till farming. (d) Conventional tillage.
38. -What is the purpose of a condenser in a microscope ?
- (a) To focus light onto the specimen.
(b) To magnify the specimen.
(c) To control the intensity of light.
(d) To adjust the resolution of the image.
39. In fluorescence microscopy, what causes the fluorescent molecules in the specimen to emit light ?
- (a) Absorption of photons. (b) Reflection of photons.
(c) Scattering of photons. (d) Excitation by photons.
40. Which of the following is a major greenhouse gas that is primarily released through agricultural activities ?
- (a) Carbon dioxide (CO_2). (b) Methane (CH_4).
(c) Nitrous oxide (N_2O). (d) Ozone (O_3).
41. Which group of herbicides inhibits the enzyme protoporphyrinogen oxidase (PPO) ?
- (a) Group 2. (b) Group 4.
(c) Group 9. (d) Group 14.
42. What is the energy source utilized by DNA ligase to catalyze the joining of DNA fragments ?
- (a) ATP. (b) GTP.
(c) UTP. (d) CTP.

43. Which type of collagen is most abundant in the human body ?
- (a) Type I. (b) Type II.
(c) Type III. (d) Type IV.
44. What happens to the K_m value of an enzyme in non-competitive inhibition ?
- (a) K_m increases. (b) K_m decreases.
(c) K_m remains unchanged. (d) K_m becomes negative.
45. Which bacterial structure is responsible for attaching bacteria to surfaces and protecting them from desiccation and antibiotics ?
- (a) Capsule. (b) Flagellum.
(c) Pili. (d) Glycocalyx.
46. Which type of antibody is known for having a longer hinge region, contributing to its flexibility ?
- (a) IgA. (b) IgD.
(c) IgE. (d) IgG.
47. What is the term used to describe the process of introducing foreign DNA into the genome of an animal ?
- (a) Genetic engineering. (b) Gene splicing.
(c) Gene therapy. (d) Transgenesis.
48. Which insect order includes species that undergo incomplete metamorphosis ?
- (a) Diptera. (b) Hymenoptera.
(c) Orthoptera. (d) Hemiptera.
49. What is the typical composition of biogas ?
- (a) 50 % methane, 50 % carbon dioxide.
(b) 70 % methane, 30 % carbon dioxide.
(c) 80 % methane, 20 % carbon dioxide.
(d) 90 % methane, 10 % carbon dioxide.
50. Which of the following diseases has been successfully treated using stem cell therapy medical biotechnology ?
- (a) Alzheimer's disease. (b) Cystic fibrosis.
(c) Diabetes mellitus. (d) Tuberculosis.

P.G. / INTEGRATED P.G. ENTRANCE EXAMINATION, APRIL 2023

BIOTECHNOLOGY

Time : Two Hours

Maximum : 200 Marks

*Each question carries 4 marks.
1 mark will be deducted for each wrong answer.*

1. Lime water is :

(a) CaO .(b) Ca(OH)_2 .(c) CaCO_3 .(d) CaCl_2 .

2. The substance not responsible for the hardness of water is :

(a) Sodium nitrate.

(b) Calcium hydrogen carbonate.

(c) Calcium carbonate.

(d) Magnesium carbonate.

3. Soaps are formed by saponification of :

(a) Alcohols.

(b) Glycosides.

(c) Simple esters.

(d) Carboxylic acids.

4. Which is not true about the noble gases ?

(a) They are non-metallic in nature.

(b) They exist in atomic form.

(c) They are radioactive in nature.

(d) Xenon is the most reactive among these.

5. Rancidity can be prevented by :

(a) Adding antioxidants.

(b) Storing food away from light.

(c) Keeping food in refrigerator.

(d) All of these.

Turn over

6. Entropy is the measure of _____.
- (a) Energy changes. (b) Disorderliness.
(c) Heat content. (d) None of the above.
7. Which of the following is true for a closed system ?
- (a) Mass entering = mass leaving.
(b) Mass does not enter or leave the system.
(c) Mass entering can be more or less than mass leaving.
(d) None of the above.
8. Which of the following components are used to generate x-rays ?
- (a) Meyer tube. (b) West tube.
(c) Anger tube. (d) Coolidge tube.
9. Which of the following radiation have longest wavelength ?
- (a) IR radiation. (b) X-rays.
(c) Micro waves. (d) Radio waves.
10. Beer Lamberts law gives the relation between which of the following ?
- (a) Reflected radiation and concentration.
(b) Scattered radiation and concentration.
(c) Energy absorption and concentration.
(d) Energy absorption and reflected radiation.
11. The largest number which divides 70 and 125, leaving remainders 5 and 8, respectively, is :
- (a) 13. (b) 65.
(c) 17. (d) 875.

12. $n^2 - 1$ is divisible by 8, if n is :
- (a) An integer. (b) A natural number.
(c) An odd integer greater than 1. (d) An even integer.
13. If the 2nd term of an Arithmetic Progression is 13 and the 5th term is 25, what is its 7th term ?
- (a) 30. (b) 33.
(c) 37. (d) 38.
14. 100 cards are numbered from 1 to 100. Find the probability of getting a prime number.
- (a) $\frac{3}{4}$. (b) $\frac{27}{50}$.
(c) $\frac{1}{4}$. (d) $\frac{29}{100}$.
15. If the arithmetic means of $x, x + 3, x + 6, x + 9$ and $x + 12$ is 10, then $x = ?$
- (a) 1. (b) 2.
(c) 6. (d) 4.
16. One gene one enzyme hypothesis detected in which organism ?
- (a) *E. coli*. (b) *Saccharomyces servacea*.
(c) *Neurospora crassa*. (d) *Caenorhabditis elegans*.
17. Natural competency for transformation occur on :
- (a) *E. coli*. (b) *Bacillus subtilis*.
(c) *Bacillus licheniformis*. (d) *Pseudomonas aeruginosa*.
18. The Bacterial start codon is :
- (a) AUG. (b) UCC.
(c) UAG. (d) UGA.

Turn over

19. Rho factor is involved in :
- (a) Transcription termination.
 - (b) Transcription initiation.
 - (c) Translation termination.
 - (d) Translation initiation.
20. Which among the following is a promoter for plant gene expression ?
- (a) CMV promoter.
 - (b) SV40 promoter.
 - (c) CaMV 35 S promoter.
 - (d) RSV promoter.
21. Which is the co-factor of T4 DNA ligase ?
- (a) NAD.
 - (b) ATP.
 - (c) GTP.
 - (d) FAD.
22. Most predominant organic molecule on earth :
- (a) Glucose.
 - (b) Cellulose.
 - (c) Starch.
 - (d) Hemoglobin.
23. Which one is a cryoprotectant ?
- (a) DMSO.
 - (b) Sodium chloride.
 - (c) EDTA.
 - (d) Sucrose.
24. Which of the following intracellular or plasma membrane proteins require Ca^{2+} for full activity ?
- (a) Calmodulin.
 - (b) JAK kinase.
 - (c) Protein kinase A.
 - (d) Guanylyl cyclase.
25. Haploid plants can be obtained through :
- (a) Meristem culture.
 - (b) Embryo culture.
 - (c) Endosperm culture.
 - (d) Pollen culture.
26. The process of removal of stamen from flower during hybridization is called :
- (a) Grafting.
 - (b) Emasculation.
 - (c) Sterilization.
 - (d) Crossing.

27. A mass of fungal filaments is called a :
- (a) Colony. (b) Hyphae.
(c) Mycelium. (d) Mycorrhizae.
28. Chemical nature of agar :
- (a) Carbohydrate. (b) Lipid.
(c) Polysaccharide. (d) Protein.
29. A lipoprotein that favors atherogenesis :
- (a) LDL. (b) HDL.
(c) VLDL. (d) IDL.
30. A method used to identify pentose sugars :
- (a) Anthrone test. (b) Bial's test.
(c) Tager's test. (d) Molisch's test.
31. Generally, the color of flowers is due to the presence of :
- (a) Flavonoids. (b) Chlorophylls.
(c) Anthocyanins. (d) Alkaloids.
32. Which immunoglobulin class is elevated in atopy ?
- (a) IgA. (b) IgM.
(c) IgD. (d) IgE.
33. Which of the following antibiotic inhibits cell wall synthesis ?
- (a) Erythromycin. (b) Tetracycline.
(c) Streptomycin. (d) Vancomycin.
34. Which of the following is suitable for the primary screening for the antibiotic Producers ?
- (a) Crowded plate technique. (b) Auxanography.
(c) Disc diffusion test. (d) MIC Test.

Turn over

35. Which of the following is not coming under Archaea ?
- (a) Methanogens. (b) Halophiles.
(c) Thermoacidophiles. (d) Cyanobacteria.
36. T4 DNA ligase is capable of :
- (a) Stick end ligation only. (b) Blunt end ligation only.
(c) Both stick and blunt end ligation. (d) None of the above.
37. Turner syndrome karyotype is :
- (a) 44 + XO. (b) 44 + XXX.
(c) 44 + XXY. (d) 44 + OY.
38. Which among the following results in acquiring homozygosity in a population at the fastest rate ?
- (a) Out crossing. (b) Migration.
(c) Genetic drift. (d) Inbreeding.
39. Bulbosum technique is for :
- (a) Triploid plant production in.
(b) Hybrid plant production in barley.
(c) Aneuploid plant production in barley.
(d) Haploid plant production in barley.
40. Which among the following is not the property of cancerous cells ?
- (a) Anchorage independence. (b) Contact inhibition.
(c) Metastasis. (d) Uncontrolled division.
41. Which of the following acts as ionizing gas in Geiger Muller Counter ?
- (a) Argon. (b) Oxygen.
(c) Nitrogen. (d) Krypton.

42. Which of the following is a protein data base ?
- (a) DDBJ. (b) EMBL.
(c) Gen Bank. (d) PIR.
43. Which of the following is a multiple sequence alignment tool ?
- (a) Clustal W. (b) Chime.
(c) Dismol. (d) PDB.
44. Which one of the following triplets' codes for valine ?
- (a) GGG. (b) A AG.
(c) G A A. (d) GUG.
45. Which of the following will not result in variations among siblings ?
- (a) Independent assortment of genes. (b) Crossing over.
(c) Linkage. (d) Mutation.
46. New approach to conservation is the establishment of :
- (a) Sanctuaries. (b) Biosphere reserves.
(c) National parks. (d) Reserve forests.
47. One of the ex situ conservation methods for endangered species is :
- (a) Wild life sanctuaries. (b) Biosphere reserves.
(c) Cryopreservation. (d) National parks.
48. In RNAi, genes are silenced using :
- (a) ss DNA. (b) ds DNA.
(c) ds RNA. (d) ss RNA.

Turn over

49. Which of the following steps are catalyzed by Taq polymerase in a PCR reaction ?

- (a) Denaturation of template DNA.
- (b) Annealing of primers to template DNA.
- (c) Extension of primer end on the template DNA.
- (d) All of the above.

50. BOD of waste water is estimated by measuring the amount of :

- (a) Total organic matter.
- (b) Biodegradable organic matter.
- (c) Oxygen evolution.
- (d) Oxygen consumption.

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(Pages : 8)

Name.....

Reg. No.....

P.G. ENTRANCE EXAMINATION, APRIL 2024

BIOTECHNOLOGY

Time : Two Hours

Maximum : 200 Marks

Each question carries 4 marks.

1 mark will be deducted for each wrong answer.

1. Which of the following is a transition metal ?
 - (a) Calcium.
 - (b) Iron.
 - (c) Sodium.
 - (d) Potassium.
2. Which of the following is NOT a function of the pentose phosphate pathway ?
 - (a) Production of ribose-5-phosphate for nucleotide synthesis.
 - (b) Generation of NADPH for biosynthetic reactions.
 - (c) Production of ATP via substrate-level phosphorylation.
 - (d) Detoxification of reactive oxygen species.
3. What is the primary function of the citric acid cycle in cellular respiration ?
 - (a) Production of ATP.
 - (b) Oxidation of glucose.
 - (c) Reduction of NAD^+ to NADH.
 - (d) Generation of electron carriers.
4. Which amino acid is commonly found in plant proteins ?
 - (a) Lysine.
 - (b) Cysteine.
 - (c) Methionine.
 - (d) Glycine.
5. Which of the following is not an essential amino acid ?
 - (a) Lysine.
 - (b) Valine.
 - (c) Glycine.
 - (d) Tryptophan.

Turn over

6. Disulfide bonds are often important for the structure of which class of proteins ?
- (a) Intracellular proteins.
 - (b) Extracellular proteins.
 - (c) Nuclear proteins.
 - (d) Lipid-bound proteins.
7. Which of the following is NOT considered a property of water ?
- (a) High surface tension.
 - (b) Low heat capacity.
 - (c) Universal solvent ability.
 - (d) High specific heat.
8. The carbon cycle involves the movement of carbon between :
- (a) Atmosphere, lithosphere, and hydrosphere.
 - (b) Atmosphere, biosphere, and lithosphere.
 - (c) Hydrosphere, biosphere, and lithosphere.
 - (d) Atmosphere, biosphere, and hydrosphere.
9. What is the role of calcitonin in calcium regulation ?
- (a) Increases calcium reabsorption in the kidneys.
 - (b) Decreases calcium absorption in the intestines.
 - (c) Increases calcium resorption from bones .
 - (d) Decreases calcium levels in the blood.
10. Which of the following is NOT a type of membrane lipid ?
- (a) Phospholipid.
 - (b) Steroid.
 - (c) Triglyceride.
 - (d) Glycolipid.
11. Which part of the chlorophyll molecule is responsible for absorbing light energy ?
- (a) Chlorin ring.
 - (b) Phytol tail.
 - (c) Magnesium ion.
 - (d) Hydrocarbon side chain.
12. Which of the following is NOT a function of the pentose phosphate pathway ?
- (a) Nucleotide synthesis.
 - (b) Ribose production.
 - (c) ATP production.
 - (d) NADPH generation.

13. Which of the following factors is involved in the regulation of RNA polymerase activity through phosphorylation ?
- (a) Sigma factor.
 - (b) Transcription factor IIB (TFIIB).
 - (c) Cyclin-dependent kinase (CDK).
 - (d) DNA polymerase.
14. Which of the following factors is not involved in transcriptional regulation through chromatin remodeling ?
- (a) Histone acetyltransferases (HATs).
 - (b) DNA methyltransferases.
 - (c) Histone deacetylases (HDACs).
 - (d) SWI/SNF complexes.
15. Which structural feature of B DNA facilitates its recognition by regulatory proteins ?
- (a) Major groove.
 - (b) Minor groove.
 - (c) Sugar-phosphate backbone.
 - (d) Hydrogen bonds between base pairs.
16. Which subunit of RNA polymerase II contains the catalytic activity responsible for RNA synthesis ?
- (a) Rpb1.
 - (b) Rpb2.
 - (c) Rpb3.
 - (d) Rpb4.
17. What is the approximate rise per base pair in B DNA ?
- (a) 2 Ångstroms.
 - (b) 3 Ångstroms.
 - (c) 5 Ångstroms.
 - (d) 7 Ångstroms.

Turn over

18. In what type of sequence is Z DNA commonly found ?
- (a) AT-rich sequences.
 - (b) GC-rich sequences.
 - (c) TA-rich sequences.
 - (d) CG-rich sequences.
19. Which of the following is an example of epigenetic inheritance ?
- (a) Inheritance of DNA sequence mutations.
 - (b) Inheritance of DNA methylation patterns.
 - (c) Inheritance of chromosomal rearrangements.
 - (d) Inheritance of mitochondrial DNA.
20. What is the name of the photoreceptor responsible for perceiving blue light ?
- (a) Phytochrome.
 - (b) Cryptochrome.
 - (c) Phototropin.
 - (d) Chlorotropin.
21. The classification of organisms based on evolutionary history is called :
- (a) Phenetics.
 - (b) Cladistics.
 - (c) Systematics.
 - (d) Taxonomy.
22. What is the correct order of taxonomic categories from broadest to most specific ?
- (a) Kingdom, Phylum, Class, Order, Family, Genus, Species.
 - (b) Kingdom, Class, Phylum, Order, Family, Genus, Species.
 - (c) Phylum, Kingdom, Order, Class, Family, Genus, Species.
 - (d) Kingdom, Phylum, Order, Class, Family, Species, Genus.
23. Which factor is least likely to influence the composition of a climax community ?
- (a) Climate.
 - (b) Soil type.
 - (c) Human activity.
 - (d) Predation pressure.
24. In which layer of a pond ecosystem would you find rooted aquatic plants ?
- (a) Profundal zone.
 - (b) Littoral zone.
 - (c) Limnetic zone.
 - (d) Benthic zone.

25. What is the study of fossilized footprints called ?
- (a) Ichnology. (b) Paleobiology.
(c) Taphonomy. (d) Stratigraphy.
26. Which of the following is a greenhouse gas that is naturally present in the atmosphere ?
- (a) Carbon monoxide. (b) Methane.
(c) Sulfur dioxide. (d) Nitrogen oxides.
27. What is the main cause of coral bleaching ?
- (a) Pollution. (b) Overfishing.
(c) Ocean acidification. (d) Global warming.
28. What is the term for a fish that migrates between fresh and saltwater environments ?
- (a) Anadromous. (b) Catadromous.
(c) Diadromous. (d) Amphidromous.
29. Which of the following is a warm-season crop ?
- (a) Wheat. (b) Barley.
(c) Corn. (d) Oats.
30. Which of the following soil horizons contains the highest amount of organic matter ?
- (a) A horizon. (b) B horizon.
(c) C horizon. (d) O horizon.
31. Which of the following is not a macronutrient required by plants ?
- (a) Phosphorus. (b) Potassium.
(c) Iron. (d) Magnesium.
32. What is the maximum resolution limit of a light microscope ?
- (a) 0.1 nanometers. (b) 20 nanometers.
(c) 200 nanometers. (d) 2000 nanometers.

Turn over

33. Which of the following is an example of a surfactant-enhanced bioremediation technique ?
- (a) Air sparging.
 - (b) Bioslurping.
 - (c) Phytoremediation.
 - (d) Monitored natural attenuation.
34. Which group of herbicides inhibits the enzyme protoporphyrinogen oxidase (PPO) ?
- (a) Group 2.
 - (b) Group 4.
 - (c) Group 9.
 - (d) Group 14.
35. Which type of DNA repair mechanism utilizes DNA ligase to seal the nick left after excision of damaged DNA ?
- (a) Base excision repair.
 - (b) Mismatch repair.
 - (c) Nucleotide excision repair.
 - (d) Homologous recombination.
36. Which disease is characterized by a defect in collagen synthesis, leading to hyperelasticity of the skin and hypermobility of joints ?
- (a) Marfan syndrome.
 - (b) Ehlers-Danlos syndrome.
 - (c) Osteogenesis imperfecta.
 - (d) Scurvy.
37. Which of the following diseases is associated with abnormalities in glycoprotein synthesis and processing ?
- (a) Alzheimer's disease.
 - (b) Cystic fibrosis.
 - (c) Diabetes mellitus.
 - (d) Sickle cell anemia.
38. What does it mean if the K_m value of an enzyme-substrate reaction is very high ?
- (a) The enzyme-substrate complex forms quickly.
 - (b) The enzyme has low affinity for the substrate.
 - (c) The enzyme is highly efficient.
 - (d) The reaction rate is maximum.

39. Which of the following antibiotics inhibits cell wall synthesis by binding to the transpeptidase enzyme ?
- (a) Penicillin. (b) Streptomycin.
(c) Tetracycline. (d) Erythromycin.
40. Which type of bonds primarily contribute to the flexibility of the hinge region ?
- (a) Hydrogen bonds. (b) Disulfide bonds.
(c) Ionic bonds. (d) Van der Waals forces.
41. Which insect order includes insects commonly known as beetles ?
- (a) Coleoptera. (b) Hymenoptera.
(c) Diptera. (d) Orthoptera.
42. What is the ideal temperature range for the anaerobic, digestion process in biogas production ?
- (a) 0°C - 10°C. (b) 20°C - 30°C.
(c) 40°C - 50°C. (d) 60°C - 70°C.
43. Which step of the NGS workflow involves the breaking of DNA into smaller fragments ?
- (a) Denaturation. (b) Amplification.
(c) Library preparation. (d) Sequencing.
44. Which enzyme is responsible for catalyzing the rate-limiting step of glycolysis ?
- (a) Phosphofructokinase-1 (PFK-1). (b) Hexokinase.
(c) Aldolase. (d) Pyruvate kinase.
45. What is the typical duration of ethanol fermentation process ?
- (a) 1-2 hours. (b) 6-12 hours.
(c) 24-48 hours. (d) 5-7 days.
46. What is the correct order of the stages of embryonic development in animals ?
- (a) Blastula, Gastrula, Morula. (b) Morula, Blastula, Gastrula.
(c) Gastrula, Blastula, Morula. (d) Morula, Gastrula, Blastula.

Turn over

47. Fertilidisc is commonly utilized in which stage of plant growth ?
- (a) Flowering.
 - (b) Vegetative.
 - (c) Maturation.
 - (d) Dormancy.
48. Chimeric antibodies have been particularly successful in treating which type of cancer ?
- (a) Breast cancer.
 - (b) Lung cancer.
 - (c) Leukemia.
 - (d) Prostate cancer.
49. Which condition is associated with Type II hypersensitivity reactions against self-antigens ?
- (a) Rheumatoid arthritis.
 - (b) Myasthenia gravis.
 - (c) Multiple sclerosis.
 - (d) Systemic lupus erythematosus.
50. Which phase of the cell cycle is most susceptible to apoptosis ?
- (a) G1 phase.
 - (b) S phase.
 - (c) G2 phase.
 - (d) M phase.