Ahmedabad University

School of Arts and Sciences

BIO107 Concepts of Biology

End Semester Examination 2023 (Winter Semester)

Total Marks = 60 **Time – 1 hour**

Date: 06-05-2023
No. of printed pages: 8

Q1. State true or false (2)

A. Smaller molecules move through the pores in the gel faster than larger molecules.
B. A set of proteins with altered expression levels is called a biomarker.

Q2. The phosphate group is attached to the 5' carbon of one nucleotide and the _____ of the next nucleotide.

A. 5' carbon
B. 4' carbon
C. 3' carbon
D. 2' carbon

Q3. Ribose has a hydroxyl group at the _____, unlike deoxyribose, which has only a hydrogen atom

A. 2' carbon
B. 3' carbon
C. 4' carbon
D. 1' carbon

Q4. DNA is wrapped around proteins known as histones to form structures called _____.

Q5. _____ is an example of an antibiotic resistant strain

A. E.coli
B. Clostridium botulinum
C. Salmonella typhi
D. MRSA

Q6. A _____ is the entire set of proteins produced by a cell type.

A. Genome
B. Proteome
C. Proteomics
D. Genomics

Q7. Protists are _____.

A. Single-cellular and parasitic
B. multicellular and photosynthetic
C. single-cellular and saprophytic
D. all of the above

Q8. Fungi can be:

A. parasitic
B. photosynthetic
C. both A and B
D. None of the above

Q9. Mitochondria most likely evolved from _____.

A. a photosynthetic cyanobacterium
B. cytoskeletal elements
C. aerobic bacteria
D. membrane proliferation

Q10. *Saccharomyces cerevisiae* is:

A. a fungus
B. a bacterium
C. a protist
D. none of the above

Q11. Which polysaccharide is usually found in the cell walls of fungi?

A. Starch
B. Glycogen
C. Chitin
D. Cellulose

Q12. Which of the following consist of prokaryotic cells?

A. bacteria and fungi
B. archaea and fungi
C. protists and animals
D. bacteria and archaea

Q13. Prokaryotes stain as Gram-positive or Gram-negative because of differences in the _____.

A. cell wall
B. cytoplasm
C. nucleus
D. chromosome

Q14. A relationship between 2 organisms wherein both are benefitted from each other is:

A. parasitism
B. symbiosis
C. Commensalism
D. None of the above

Q15. Which species causes sleeping sickness?

A. *Trypanosoma cruzi*
B. *Trypanosoma brucei*
C. *Plasmodium vivax*
D. *Plasmodium falciparum*

Q16. The start codon is:

A. UAA
B. UAG
C. UGA
D. AUG

Q17. The enzyme that removes primers from the DNA template during DNA replication is:

A. Helicase
B. Primase
C. Ligase
D. Exonuclease

Q18. Which of the following is not a post transcriptional modification?

A. Dissociation of mRNA transcript from the DNA template.
B. Splicing
C. Addition of Poly A tail
D. Addition of a nucleotide cap

Q19. Gram-negative bacterium_____

A. describes a bacterium whose cell wall contains little peptidoglycan but has an outer membrane
B. describes a bacterium that contains mainly peptidoglycan in its cell walls
C. describes a bacterium with no peptidoglycan in its cell wall
D. describes a bacterium with only lipopolysaccharides in its cell wall

Q20. Which parasitic causes late blight of potato?

A. Paramecium caudatum
B. Trypanosoma brucei
C. Plasmodium falciparum
D. *Phytophthora infestans*

Q21. The process of transfer of DNA from one bacterium to another through bacteriophages is called:

A. Transformation
B. Conjugation
C. Transduction
D. Binary fission

Q22. Bacteria are:

A. Chemotrophic
B. Phototrophic
C. Parasitic
D. All of the above

Q23. Aflatoxins are toxic and carcinogenic compounds released by the fungus _____.

A. *Saccharomyces cerevisiae*
B. *Aspergillus*
C. *Histoplasma capsulatum*
D. All of the above

Q24. Fungi can be:

A. parasitic
B. photosynthetic
C. both A and B
D. None of the above

Q25. Ribose and deoxyribose are:

A. Purines
B. Sugars
C. Pyrimidines
D. Nitrogen bases

Q26. Which nitrogen base does RNA not have?

A. Adenine
B. Cytosine
C. Thymine
D. Guanine

Q27. Cell walls are not found in:

A. Plant cells
B. Bacterial cells
C. Fungal cells
D. Amoeboid cells

Q28. If a skin cell of a typical organism has 30 chromosomes, how many chromosomes will be in a gamete of that same organism?

A. 6
B. 15
C. 30
D. 60

Q29. The genotype XXY corresponds to:

A. Klinefelter syndrome
B. Turner syndrome
C. Triplo-X
D. Jacob syndrome

Q30. The part of meiosis that is similar to mitosis is _____.

A. meiosis I
B. anaphase I
C. meiosis II
D. interkinesis

Q31. Meiosis produces _____ daughter cells.

A. two haploid
B. two diploid
C. four haploid
D. four diploid

Q32. At which stage of meiosis are sister chromatids separated from each other?

A. prophase I
B. telophase II
C. anaphase I
D. anaphase II

Q33. If black and white true-breeding mice are mated and the result is all gray offspring, what inheritance pattern would this be indicative of?

A. dominance
B. codominance
C. multiple alleles
D. incomplete dominance

Q34. The observable traits expressed by an organism are described as its _____.

A. phenotype
B. genotype
C. alleles
D. zygote

Q35. A recessive trait will be observed in individuals that are _____ for that trait.

A. heterozygous
B. homozygous or heterozygous
C. homozygous
D. diploid

Q36. Two different forms of the same gene are known as:

A. traits
B. chromatids
C. phenotype
D. alleles

Q37. What is the reason for doing a test cross?

A. to identify heterozygous individuals with the dominant phenotype
B. to determine which allele is dominant and which is recessive
C. to identify homozygous recessive individuals in the F2
D. to determine if two genes assort independently

Q38. _____ describes a trait whose expression is masked by another trait when the alleles for both traits are present in an individual.

A. Dominant
B. Recessive
C. Epistasis
D. Codominance

Q39.Genes distribute equally into gametes such that offspring have an equal likelihood of inheriting any combination of factors. This is known as:

A. Law of dominance
B. Law of independent assortment
C. Law of segregation
D. Incomplete dominance

Q40. _____ and _____ are purines.

Q41. Which of the following does cytosine pair with?

A. guanine
B. thymine
C. adenine
D. a pyrimidine

Q42. _____ enzyme separates the two strands of DNA during DNA replication.

A. Helicase
B. Primase
C. Polymerase
D. Ligase

Q43. Purines pair with purines.

A. True
B. False

Q44. Thymine dimers are corrected by:

A. Nucleotide excision repair
B. Mismatch repair
C. Mutation
D. Exposure to sunlight

Q45. Okazaki fragments are short pieces of DNA synthesized on the:

A. Leading strand
B. Lagging strand

Q46. _____ in mRNA do not encode functional proteins.

Q47. What is the role of *Agrobacterium tumefaciens* in the production of transgenic plants?

A. Genes from *A. tumefaciens* are inserted into plant DNA to give the plant different traits.
B. Transgenic plants have been given resistance to the pest *A. tumefaciens*.
C. *A. tumefaciens* is used as a vector to move genes into plant cells.
D. Plant genes are incorporated into the genome of *Agrobacterium tumefaciens*.

Q48. Genomics can be used in agriculture to:

A. generate new hybrid strains
B. improve disease resistance
C. improve yield
D. all of the above

Q49. _____ is a technique used to rapidly increase the number of copies of specific regions of DNA for further analyses

A. Gel electrophoresis
B. Polymerase chain reaction
C. Reproductive cloning
D. Recombinant DNA technology

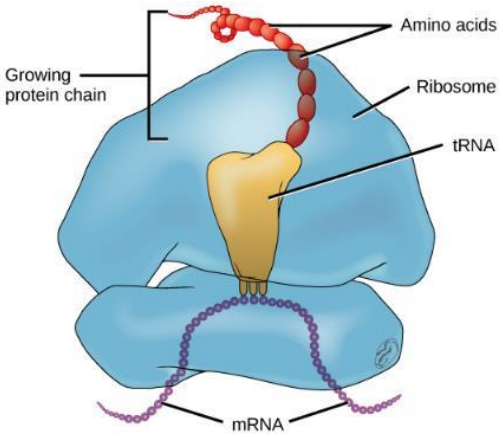
Q50. Prokaryotes can be used for bioremediation for:

A. biotransformation of toxic elements into nontoxic forms
B. Cleaning up oil spills
C. To remove pollutants from drinking water
D. All of the above

Q51. State true or false (5)

- Fungi can reproduce sexually and asexually
- Fungi can be aerobic as well as anaerobic
- Cell walls of fungi contain glucans
- All fungi are saprobes
- Fungi have an external digestion mechanism using exoenzymes

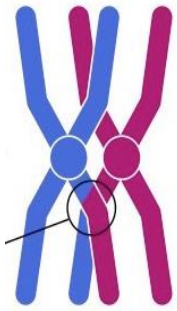
Q52. What does the following image represent?



Q53. Crossing over occurs between homologous _____.

A. Sister chromatids
B. Non-sister chromatids
C. Sister chromosomes
D. None of the above

Q54. What does the circle indicate?



Bivalent / tetrad

Q55. Plasmids with foreign DNA inserted into them are called _____ because they contain new combinations of genetic material.

A. Recombinant proteins
B. Recombinant DNA molecules
C. Recombinant DNA technology
D. Molecular cloning