

DEPARTMENT OF PLANT BIOLOGY AND BIOTECHNOLOGY
FACULTY OF LIFE SCIENCES
UNIVERSITY OF BENIN, BENIN CITY

FIRST SEMESTER EXAMINATION, 2023/2024 ACADEMIC SESSION TYPE A

COURSE TITLE/CODE: BIO 101 GENERAL BIOLOGY 1 (2 CREDIT) Time: 1 hour, DATE: SEPTEMBER, 2024

- The name of chromosomal abnormality with XXY chromosome is _____ (a) Klinefelter's syndrome (b) Trisomy (c) Turner's syndrome (d) Down's syndrome (e) Huntington's disease
- Which of the following is not one of the nucleotide bases (a) guanine (b) Thiamine (c) Cytosine (d) Thymine (e) Adenine
- Chromosomes house _____ which are sequences of _____ (a) that code for proteins and other molecules essential for life (a) DNA. genes (b) Genes, DNA (c) DNA, information (d) Genes, information (e) all of the above
- Which of the following is not an asexual means of reproduction _____ (a) spore formation (b) binary fission (c) fragmentation (d) budding (e) none of the above
- Haploid number of chromosome is *Sus scrofa domestica* is _____ (a) 40 (b) 23 (c) 38 (d) 19 (e) 21
- An example of one-sided metabolic dependent relationship is (a) commensalism (b) mutualism (c) parasitism (d) predation
- The relationship between the sea anemone and the clownfish could best be described as (a) commensalism (b) competition (c) parasitoidism (d) carnivory
- Which of these best explain "phoresy" relationship? (a) temporary attachment of one organism to another for transportation purposes (b) a relationship that involves direct interaction between individuals via aggression (c) occurs when organism compete for new territory by being the first to occupy it (d) both organism depend entirely on each other for survival and cannot live independently
- Which of these causes immune response to their host? (a) predators (b) parasites (c) commensals (d) none of the above
- The following are saprotrophs except (a) Molds (b) Bacillus (c) Fleas (d) Pseudomonas
- Lipid synthesis and detoxification is carried out by the _____ (a) golgi bodies (b) ribosomes (c) lysosomes (d) smooth endoplasmic reticulum (e) rough endoplasmic reticulum
- _____ is a gel like substance inside the cell, excluding the nucleus, where cellular processes occur? (a) vacuole (b) cytoplasm (c) protoplasm (d) ribosome (e) none of the above
- The gradual change in a population over time due to natural selection is called _____ (a) genetic crossing (b) revolution (c) mutation (d) evolution (e) none of the above
- The highest taxonomy rank is the _____ followed by (a) kingdom, phylum (b) kingdom, domain (c) domain, kingdom (d) domain, phylum (e) none of the above
- Currently life is divided into three domains namely _____ & _____ (a) Animalia, plantae, fungi (b) Archaea, Bacteria, Eukarya (c) Protista, Animalia, Plantae (d) Archeae, Protista, fungi (e) none of the above
- Saprotrophs have found their application in the following fields except (a) Bioremediation (b) Agriculture (c) medical (d) all of the above
- The following are sex-linked except (a) red-white eye color in drosophila (b) premature balding (c) hemophilia (d) height
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- Which of these carry hereditary materials (a) nucleus (b) chromosomes (c) cytoplasm (d) proteins
- Where is the genetic information encoded? (a) DNA (b) RNA (c) ATP (d) ADP
- Common variations in DNA sequence that occur in a population without necessarily affecting health or development is known as (a) polymorphisms (b) sickle cell anaemia (c) Mutation (d) Cystic fibrosis (e) none of the above
- Which of the following is not a Protista (a) plasmodium falciparum (b) saccharomyces cerevisiae (c) Amoeba proteus (d) paramecium caudatum (e) Euglena gracilis
- Which of the following is an odd one (a) Rattus norvegicus (b) Mus musculus (c) Zea mays (d) Panthera leo (e) Equus ferus caballus
- Maintenance of a stable internal environment despite external changes is called (a) mutation (b) Homeostasis (c) Adaptation (d) response to stimuli (e) none of the above
- Cell division that reduces the chromosome number by half, resulting in four daughter cells each with half the number of chromosomes of the parent cell is _____ (a) Mitosis (b) Binary fission (c) Binary Fusion (d) Meiosis (e) none of the above
- How many pairs of chromosomes are present in humans? _____ (a) 23 (b) 24 (c) 25 (d) 26
- Independent assortment of chromosomes and crossing over cause? (a) Genetic code (b) Genetic similarity (c) Genetic variation (d) Genetic recombination
- Another word for Lamarckism is (a) theory of possession (b) theory of inheritance of acquired characteristics (c) theory of dominance (d) theory of evolution
- Biotic interactions may be _____ or _____ (a) intra-specific or inter-specific (b) inter-specific or intra-specific (c) intra-specific or inter-specific (d) intra-specific or intra-specific
- _____ is a biological interaction where one organism, hunts, kills and consumes another organism. (a) predator/prey relationship (b) predation (c) consumption (d) parasitoidism
- _____ contain digestive enzymes to break down waste materials and cellular debris (a) peroxysomes (b) chloroplasts (c) Lysosomes (d) Vacuole (e) none of the above
- Which of the following is not the characteristic of non-living things? (a) excretion (b) reproduction (c) respiration (d) feeding (e) all of the above
- One advantage of sexual reproduction is _____ (a) genetic diversity (b) genetic variation (c) one type of sex cell is involved except? (d) none beneficial mutations (e) none of the above

34. All of the following are parts of the compound microscope: (i) eyepiece, (ii). Objective, (iii). Condenser, (iv). Fine & coarse adjustment (v) stage (a) v only (b) iii & iv (c) i & ii (d) none of the above
- *35. In the natural system of classification, plants are classified based on _____ (i) their ultimate use (ii). The similarities and differences in morphological and reproductive characters, (iii) The evolutionary relationship of plants reflecting the genetic relationship between plants and to establish their progenitors, (iv) All the characters are considered in determining whether a plant is related to the other (a) only iv is correct (b) i and ii are correct (c) only iii is correct (d) ii and iv are correct (e) all of the above
36. Based on species, competition can be _____ (a) intra-specific or inter-specific (b) infra-specific or intra-specific (c) infra-specific or inter-specific (d) interference or apparent
37. _____ occurs when resource used by one organism depletes the total amount available for other organism (a) intra-specific competition (b) inter-specific competition (c) interference competition (d) exploitative competition
38. Types of mutualism include the following except (a) obligatory (b) diffuse (c) inquilinism (d) facultative
39. _____ is a form of feeding in which organisms get their nutrients from dead and decaying organic substances (a) saprophytism (b) parasitism (c) metabiosis (d) saprophytic nutrition
40. _____ is a type of commensalism in which one organism indirectly benefits from another species (a) chemical (b) metabiosis (c) phoresy (d) inquilinism
- *41. In the five kingdoms classification system, actinomycetes are placed in the kingdom _____ while the Ulothrix and acetabularia are placed (a) Monera/ Plantae (b) Fungi/ Protista (c) Monera/Protista (d) Bacteria/Protista
42. Which of the statements is not true about the viruses? (i) they lack ribosomes (ii) They contain both RNA and DNA, (iii) Outside the host cell is a non-living particle called viron (iv) the central core is surrounded by a protein coat called capsid (v) they contain either DNA or RNA (a). ii only (b) v only (c) iii and iv (d) none of the above
- *43. Carrageenan, a mucilaginous polysaccharide produced from _____ is useful in making agar for culturing media. (a) Rhodophyta (b) seaweeds (c) Phaeophyta (d) chlorophyta (e) a & b are correct
44. The club fungi and the sac fungi are also known as _____ and _____ respectively (a) Ascomycota and basidiomycota (b) ducteromycota and Zygomycota (c) basidiomycota and ascomycota (d) Zygomycota and saccharomycota
45. The _____ were thought of as fungi because of their branched mycelium but are now known to be prokaryotes are called _____ (a) Acetabularia (b) chlamydias (c) Rickettsias (d) Actinomycetes
46. _____ is a segment of DNA that contains instruction for building a specific protein or set of proteins (a) Genome (b) Genes (c) Alleles (d) Genotype
47. _____ refers to the tendency of genes located close to each other on the same chromosome to be inherited together. (a) genetic linkage (b) gene expression (c) gene mutation (d) none of the above
48. _____ refers to the changes in the DNA sequence, which introduces new genetic variations. (a) hybridization (b) genetic variation (c) mutation (d) DNA recombination
49. _____ is the father of heredity? (a) Jean Baptiste Lamarck (b) Robert Hooke (c) Charles Darwin (d) Johann Gregor Mendel
50. Which of Mendel's law is connected to the chain that each individual has two alleles and that only one allele is passed on to the progeny? (a) law independent assortment (b) law of segregation (c) law of dominance and uniformity (d) none of the above
51. One of the following is a unique feature among the prokaryotic cells (a) nucleoid (b) nucleus (c) peroxosome (d) microtubules
- *52. The algae division is classified based on all but one of the following criteria (a) pigmentation (b) food storage product (c) flagellation (d) mode of reproduction
53. Which of these is common among only animals, plants and fungi (a) cell has defined nucleus (b) cell without membrane bound organelles (c) cell wall components present (d) reproductive capacity
54. The metabolic processes within an organism that result in the building up of materials referred to _____ (a) catabolism (b) regulation (c) anabolism (d) development
55. The classification of organism is important for the following reasons except? (a) provide unequivocal, unique name for organisms (b) aids memory (c) improves ability to explain relationship (d) reveals order and harmony between organisms as originally pre-planned by God
56. The process through which people who possess advantageous features have a higher probability of surviving and procreating is known as _____ (a) speciation (b) natural selection (c) genetic drift (d) gene flow
57. Use and disuse are terms associated with (a) Lamarckism (b) Darwinism (c) Mendalism (d) none of the above
58. Common descent, the process by which a new species evolves from a surviving ancestral species while both remain in the same geographic area, is known as _____ (a) sympatric speciation (b) parapatric speciation (c) peripatric speciation (d) allopatric speciation
59. The assemblage of a group of individuals of the same species is called _____ (a) herd (b) population (c) flock (d) speciation
60. One of the following terrestrial habitats is the most biologically diverse (a) savannah (b) tundra (c) rainforest (d) mountains
- *61. _____ is the system of classification based on the similarities and differences in morphological and reproductive characters (a) artificial (b) natural (c) phylogenetic (d) taxonomic system
- *62. Which of the following does not describe the habit of plant? (a) herb (b) tree (c) tuber (d) shrub
63. Modern classification of organism incorporates the following except (a) morphological analysis (b) doctrine of signature (c) phylogenetics (d) genetics analysis
64. Choose the domain that contains the most primitive bacteria that lives in extreme environment (a) eukarya (b) Protista (c) eubacteria (d) archaea
65. Which of these is the correct scientific name of wheat derived from binomial nomenclature? (a) *Oryza sativum* (b) *Triticum aestivum* (c) *Triticum vulgare* (d) *Zea mays*
66. One of the following is associated with low temperatures, permafrost and limited vegetation. (a) montane (b) arctic tundra (c) alpine tundra (d) polar montane
67. One of the following is a characteristic of boreal forest except _____ (a) cold climates (b) coniferous trees (c) located in northern region (d) tropical

68. An appropriate term for human resident flora is _____ (a) commensals (b) parasites (c) pathogens (d) mutualism
 69. The characteristics of organisms involved in symbiotic relationship have developed _____ (a) by chance (b) through co-evolution (c) by character displacement (d) through resource partitioning
 70. What will happen to a species when there is severe interspecific competition regarding the distribution of bird habitats? (a) birds' distribution is multidirectional (b) competition eliminates the species (c) The species spreads to the next habitats (d) animals restricted to narrow habitat range and optimum condition

Solutions to BIO101 2023/2024

1. XXY indicates an extra X chromosome in a male.
Answer: (a) Klinefelter's syndrome
2. Recall the nucleotide bases in DNA and RNA. The options are guanine, thymine, cytosine, and adenine. Thiamine is a vitamin, not a nucleotide base.
Answer: (b) Thiamine
3. Chromosomes contain DNA, which is organized into genes. Genes are sequences of DNA that code for proteins.
Answer: (b) Genes, DNA
4. Spore formation, binary fission, fragmentation, and budding are all forms of asexual reproduction.
Answer: (e) none of the above
5. *Sus scrofa domestica* is the domestic pig. The diploid number of chromosomes in pigs is 38. The haploid number is half the diploid number.
 Divide the diploid number by 2. $38/2 = 19$
Answer: (d) 19
6. Commensalism is a relationship where one organism benefits and the other is neither harmed nor benefited. Mutualism is where both benefit. Parasitism is where one benefits and the other is harmed. Predation is where one organism kills and consumes another. Parasitism is a one-sided metabolically dependent relationship.
Answer: (c) parasitism
7. Clownfish live among the stinging tentacles of sea anemones, gaining protection from predators. The anemone is generally not harmed or helped.
Answer: (a) commensalism
8. Phoresy is the temporary attachment of one organism to another for transportation.
Answer: (a) temporary attachment of one organism to another for transportation purposes
9. Parasites elicit immune responses from their hosts.
Answer: (b) parasites
10. Saprotrophs are organisms that obtain nutrients from dead organic matter. Fleas are parasites.
Answer: (c) Fleas
11. The smooth endoplasmic reticulum is responsible for these functions.
Answer: (d) smooth endoplasmic reticulum
12. Cytoplasm is the gel-like substance within the cell membrane, excluding the nucleus.
Answer: (b) cytoplasm
13. Evolution is the gradual change in a population over time due to natural selection.
Answer: (d) evolution
14. Recall the taxonomic hierarchy. The highest rank is domain, followed by kingdom.
Answer: (c) domain, kingdom
15. Recall the three domains of life. The three domains are Archaea, Bacteria, and Eukarya.
Answer: (b) Archaea, Bacteria, Eukarya
16. Saprotrophs are used in bioremediation, agriculture, and medicine.
Answer: (d) all of the above
17. Red-white eye color in *Drosophila*, premature balding, and hemophilia are sex-linked traits. Height is not typically considered sex-linked.
Answer: (d) height
18. ***
19. Hereditary material refers to the genetic information passed from parents to offspring. Chromosomes are structures within the nucleus that contain DNA, the molecule carrying this information.
Answer: (b) chromosomes
20. Genetic information is encoded in the sequence of nucleotides within DNA molecules.
Answer: (a) DNA
21. Polymorphisms are common variations in DNA sequence within a population that don't usually cause health problems. Sickle cell anaemia, cystic fibrosis, and mutations are specific examples of genetic variations, some of which can be harmful.
Answer: (a) polymorphisms
22. *Saccharomyces cerevisiae* is a yeast, a fungus, not a protist. The others listed are protists.
Answer: (b) saccharomyces cerevisiae
23. All options except *Zea mays* (corn) are animals. *Zea mays* is a plant.
Answer: (c) Zea mays
24. Homeostasis is the process of maintaining a stable internal environment.
Answer: (b) Homeostasis
25. Meiosis is a type of cell division that reduces the chromosome number by half, resulting in four daughter cells.
Answer: (d) Meiosis
26. Humans have 23 pairs of chromosomes.
Answer: (a) 23
27. Independent assortment and crossing over during meiosis create genetic variation.
Answer: (c) Genetic variation
28. Lamarckism is also known as the theory of inheritance of acquired characteristics.
Answer: (b) theory of inheritance of acquired characteristics
29. Biotic interactions can be intraspecific (between individuals of the same species) or interspecific (between individuals of different species)
Answer: (c) intra-specific or inter-specific
30. Predation is a biological interaction where one organism (predator) hunts, kills, and consumes another (prey)
Answer: (b) predation

31. Lysosomes are organelles containing digestive enzymes that break down waste and cellular debris.
Answer: (c) Lysosomes
32. Reproduction is a characteristic of living things, not non-living things.
Answer: (b) reproduction
33. Sexual reproduction leads to genetic diversity and variation.
Answer: (a) genetic diversity & (b) genetic variation
34. All the listed components are parts of a compound microscope.
Answer: (d) none of the above
35. Natural classification systems group organisms based on evolutionary relationships, reflected in shared morphological and reproductive characteristics.
 Option (iii) accurately describes this.
 Options (i) and (iv) are incorrect as they don't reflect the core principle of natural classification.
Answer: (c) only iii is correct
36. Competition can occur between individuals of the same species (intraspecific) or different species (interspecific)
Answer: (a) intra-specific or inter-specific
37. Exploitative competition occurs when one organism's resource use limits resources available to others.
Answer: (d) exploitative competition
38. Mutualism types include obligatory, diffuse, and facultative. Inquilinism is a type of commensalism, not mutualism.
Answer: (c) inquilinism
39. Saprophytism is the process of obtaining nutrients from dead organic matter.
Answer: (a) saprophytism
40. Metabiosis is a type of commensalism where one organism benefits indirectly from another.
Answer: (b) metabiosis
41. Actinomyces are bacteria (Monera), while Ulothrix and Acetabularia are protists (Protista)
Answer: (c) Monera/Protista
42. Viruses lack ribosomes, contain either DNA or RNA (not both), exist as non-living virions outside host cells, and have a protein coat (capsid)
Answer: (a) ii only
43. Carrageenan is a polysaccharide from Rhodophyta (red algae), a type of seaweed.
Answer: (e) a & b are correct
44. Club fungi are Basidiomycota, and sac fungi are Ascomycota.
Answer: (c) basidiomycota and ascomycota
45. Actinomyces were initially mistaken for fungi due to their branched structure but are prokaryotes.
Answer: (d) Actinomyces
46. A gene is a DNA segment coding for a specific protein or protein set.
Answer: (b) Genes
47. Genetic linkage describes the inheritance of genes close together on a chromosome.
Answer: (a) genetic linkage
48. Mutation causes changes in DNA sequence, introducing genetic variation.
Answer: (c) mutation
49. Gregor Mendel is considered the father of heredity.
Answer: (d) Johann Gregor Mendel
50. Mendel's Law of Segregation states that each individual has two alleles, and only one is passed to offspring.
Answer: (b) law of segregation
51. Analyze the options. Nucleoid is a prokaryotic feature. Nucleus, peroxisome, and microtubules are eukaryotic features.
Answer: (a) nucleoid
52. Algae classification considers pigmentation, food storage, and flagellation. Mode of reproduction is also a factor, but not the only one.
Answer: (d) mode of reproduction
53. Animals, plants, and fungi all have cells with defined nuclei.
Answer: (a) cell has defined nucleus
54. Anabolism is the building up of materials. Catabolism is the breaking down of materials.
Answer: (c) anabolism
55. Classification provides unique names, aids memory, and improves understanding of relationships. It doesn't reveal pre-planned order by God.
Answer: (d) reveals order and harmony between organisms as originally pre-planned by God
56. Natural selection describes organisms with advantageous traits surviving and reproducing more.
Answer: (b) natural selection
57. Use and disuse are central concepts in Lamarckism.
Answer: (a) Lamarckism
58. Sympatric speciation involves new species evolving from an ancestor in the same geographic area.
Answer: (a) sympatric speciation
59. A population is a group of individuals of the same species.
Answer: (b) population
60. Rainforests have the highest biodiversity among the given options.
Answer: (c) rainforest
61. Natural classification uses similarities and differences in morphology and reproduction.
Answer: (b) natural
62. Herb, tree, and shrub are plant habits. Tuber is a modified stem, not a habit.
Answer: (c) tuber
63. Modern classification uses morphology, phylogenetics, and genetics. The doctrine of signatures is outdated.
Answer: (b) doctrine of signature
64. Archaea contains extremophiles.
Answer: (d) archaea
65. The correct scientific name for wheat is Triticum aestivum. Triticum vulgare is an older synonym.
Answer: (c) Triticum vulgare
66. Arctic tundra is characterized by low temperatures, permafrost, and limited vegetation.
Answer: (b) arctic tundra
67. Boreal forests are not tropical; they are located in northern regions with cold climates and coniferous trees.
Answer: (d) tropical
68. Commensalism describes a relationship where one organism benefits and the other is neither harmed nor helped. Human resident flora often fall under this category.
Answer: (a) commensals
69. Co-evolution explains the development of characteristics in symbiotic relationships.
Answer: (b) through co-evolution
70. Severe interspecific competition can lead to the elimination of one species or niche partitioning. The question lacks a precise option for niche partitioning. Elimination is the most likely outcome given the question's wording.
Answer: (b) competition eliminates the species