

Subject: Bt201 notes mid term

CR: Muhammad Nouman

**Group of VU medical Zone
Biotechnologists & Zoologists**

**Admins Hafiza Mubeen,
Muhammad Nouman, Tasha
Khan, Vu medical zone**

1) _____ has become a cross-disciplinary science.

a) Chemistry

b) Biology

Bt201 objective and subjective notes for mid term

- c) Physics
 - d) Bioinformatics
- 2) _____ required for this new biology (bioinformatics).
- a) Developing the high throughput technologies
 - b) Computational tools
 - c) mathematical tools
 - d) all of the above
- 3) Ideas for what to produce these huge datasets? Biological background needed. This indicates which of the following term of new and modern biology (i.e. bioinformatics)?
- a) Why
 - b) Where
 - c) What
 - d) How
- 4) Patterns in datasets that can be analyzed using computers. Various data models and their respective algorithms are needed. This indicates which of the following term of new and modern biology?
- a) Why
 - b) Where
 - c) What
 - d) How
- 5) The field of biology specializing in developing hardware and software to store and analyze the huge amounts of data being generated by life scientists is called _____.
- a) Misinformation
 - b) Bioinformation
 - c) Bioinformatics
 - d) Bio hard and soft science
- 6) How many different definitions of bioinformatics can be found from Google!
- a) 5
 - b) 10
 - c) 15
 - d) More than 20
- 7) What is the Key Challenge of Bioinformatics?
The world of biology is very different from what it was even ten years ago. To bridge the considerable gap between technical data production and its use by scientists for biological discovery.
- 8) In a fully sequenced genome, genes are found by _____ the sequence using gene-predicting computer programmes and assigning putative functions by searching for similarities in already existing databases.
- a) Printing
 - b) Scanning

Bt201 objective and subjective notes for mid term

- c) Calculating
 - d) Profiling
- 9) For many organisms under investigation in ecological genomics, no _____ is available and genes must be identified in other ways.
- a) Genomic projects
 - b) genomic database
 - c) genomic labs
 - d) genomic researchers
- 10) In some cases the primary structure of a gene product (a protein) may be the _____ of gene discovery.
- a) starting point
 - b) middle point
 - c) end point
 - d) non
- 11) The starting point holds especially for proteins that can be isolated relatively easily by _____ that are highly induced by some experimental treatment.
- a) some marker
 - b) bioassay
 - c) proteins
 - d) all of the above
- 12) As an example we discuss the isolation of the metallothionein (mt) gene in a species of springtail, *Orchesella cincta* by Hensbergen et al in the year of _____.
- a) 1869
 - b) 1899
 - c) 1996
 - d) 1999
- 13) Attempts to pick up the gene by polymerase chain reaction (PCR) using primers from the then-known *Drosophila* mt sequence remained _____.
- a) unsuccessful
 - b) successful
 - c) cheap
 - d) costly
- 14) In the word genomics the suffix -ome is the collectivity of units given by _____ in 2001.
- a) Lederberg
 - b) McCray
 - c) Robert Davis
 - d) Both a and b

Bt201 objective and subjective notes for mid term

- 15) In aiming to investigate many genes at the same time genomics _____ from ecology, which although investigating many phenotypes, usually deals with only a few genes at a time.
- a) Differs
 - b) Resemble
 - c) Contrast
 - d) Non
- 16) In between genomics, with its focus on the single genome of a model organism, studying all the genes that it contains, and in the ecology, studying _____ in many species.
- a) Also all the genes
 - b) half genes
 - c) a few genes
 - d) non
- 17) Dover sketched in 1999 as an internal tangled bank on the idea of Darwin (1859) that the 'internal tangled bank' is called the _____.
- a) The genome
 - b) The ecology
 - c) The paleontology
 - d) Entomology
- 18) The microtechnology, computing, communication. Three major technological developments of _____.
- a) 1960s
 - b) 1970s
 - c) 1980s
 - d) 1990s
- 19) Phylogenetic systematics (cladistics) is a method of taxonomic classification based on their evolutionary history. It was developed by Willi Hennig, a German entomologist, in _____.
- a) 1650
 - b) 1750
 - c) 1850
 - d) 1950
- 20) Dover sketched in 1999 as an internal tangled bank on the idea of Darwin (1859) that the 'external tangled bank' is called the _____.
- a) The genome
 - b) The ecology
 - c) The paleontology
 - d) Entomology
- 21) Give the importance of computing technology?

Bt201 objective and subjective notes for mid term

To assemble a genome from a series of sequences requires tremendous computational power. Extensive calculations are also necessary for the analysis of expression matrices and protein databases. Without the advent of high-speed computers and data-storage systems of vast capacity all this would have been impossible.

22) _____ states that groups of similar organisms are descended from a common ancestor.

- a) Ascending theory
- b) Descending theory
- c) Evolutionary theory
- d) Production theory

23) What are the major reasons to use phylogenetics?

- Understand the lineage of different species
 - Organizing principle to sort species into a taxonomy
- Understand how various functions evolved
 - Understand forces and constraints on evolution
- Perform multiple sequence alignment
- Predict gene function (phylogenetic footprint)

24) How species and Gene Trees are related?

- Species tree (how are my species related?)
 - contains only one representative from each species
 - when did speciation take place?
 - all nodes indicate speciation events
- Gene tree (how are my genes related?)
 - often contains a number of genes from a single species.
 - nodes relate either to speciation or gene duplication events.

25) Using entire genomes to infer a species tree is given by _____ in 2003.

- a) Eisen and Fraser
- b) Ciccarelli et al
- c) Daubin et al
- d) None of the above

26) What do you know about Phylogenomics: Genome trees?

- Explore genome evolution based on large data sets of DNA or protein sequences.
- Using entire genomes to infer a species tree (Eisen and Fraser 2003).
- Based on maximum genetic information and average out the anomalies.
- Has become the standard for reconstructing reliable phylogenies (Ciccarelli et al, 2006; Daubin et al. 2002).

27) The international human genome project initiated by the _____, was launched in 1990.

- a) US national institutes of health
- b) US department of energy

Bt201 objective and subjective notes for mid term

- c) Both a and b
d) None
- 28) The international human genome project was launched in _____.
a) 1990
b) 1991
c) 1992
d) 1993
- 29) When commentators have qualified the announcement about genome completion as more a matter of public communication than scientific achievement. At that time the accepted criterion for completion of a genome sequence, namely that only a few gaps or gaps of known size remained to be sequenced and that the error rate was _____ in 10 000 bp.
a) below 1
b) 1
c) Greater than 1
d) None
- 30) The euchromatin part of the genome was not completed until _____.
a) 2000
b) mid-2004
c) 2005
d) 2006
- 31) The human genome project can be regarded as one of the most successful scientific endeavours in history and the assembly of the _____ billion bp of DNA,
a) 3.02
b) 3.12
c) 3.20
d) 3.26
- 32) The human genome project can be regarded as one of the most successful scientific endeavours in history and the assembly of the 3.12 billion bp of DNA, requiring _____ million trillion sequence comparisons, was the most extensive computation that had ever been undertaken in biology.
a) 5
b) 50
c) 500
d) Non
- 33) The number of organisms whose genome has been sequenced completely and published is now approaching _____.
a) 200
b) 250
c) 300
d) 500
- 34) Bacteria dominate, as _____ makes these organisms well-suited for whole genome sequencing.

Bt201 objective and subjective notes for mid term

- a) Ability of being unseen
 - b) The small size of their genomes
 - c) Ability of reproducing
 - d) Due to being fear
- 35) By June 2005, no fewer than _____ prokaryotic organisms and _____ eukaryotes were the subject of ongoing genome sequencing projects.
- a) 600, 300
 - b) 600, 400
 - c) 650, 450
 - d) 730, 496
- 36) _____ species had already proven their usefulness as models before the genomics revolution and were adopted by genomicists because so much was known about their genetics and biochemistry, and, perhaps just as important, because a large research community was interested, could support the work, and use the results.
- a) Yeast, and C. Elegans
 - b) Drosophila
 - c) Mouse and rat
 - d) All of the above
- 37) A relatively _____ genome was a major advantage for a sequencing project.
- a) Small
 - b) Large
 - c) Very large
 - d) Non
- 38) The genome size of living organisms ranges across nine orders of magnitude, from _____ bp (0.001 mbp) in RNA viruses to nearly _____ bp (1 000 000 mbp) in some protists, ferns, and amphibians.
- a) 100, 1000
 - b) 10³, 10¹²
 - c) 112, 1012
 - d) 150, 1050
- 39) The puffer fish, *takifugu rubripes*, was indeed chosen because of its relatively small genome which is _____ of the human genome.
- a) 1/2
 - b) 1/4
 - c) 1/6
 - d) 1/8
- 40) The introduction of constructs in the genome that can report activity of certain genes by means of signal molecules is very important. This can only be done if the species is accessible using _____.
- a) Genetic and molecular marker techniques
 - b) Recombinant gene techniques
 - c) recombinant- DNA techniques

Bt201 objective and subjective notes for mid term

- d) both a and c
- 41) _____ were chosen because of their pathogenicity to humans.
- a) Many bacteria
 - b) parasitic protists
 - c) animals
 - d) both a and b
- 42) Bacteria and fungi were taken as genomic models because of their potential to cause _____.
- a) plant disease
 - b) animal disease
 - c) bacterial disease
 - d) non
- 43) Foreign DNA can be introduced using transposons; for example, modified p-elements that can 'jump' into the DNA of _____ that can transfer a piece of DNA to a host plant.
- a) Drosophila
 - b) Bacteria
 - c) Mice
 - d) Both a and b
- 44) DNA can also be introduced by physical means, especially in cell cultures, using _____.
- a) Electroporation
 - b) Microinjection
 - c) bombardment with gold particles
 - d) all of the above
- 45) The sequencing of rice was motivated by the huge importance of this species as a staple food for the world population by Adam _____.
- a) 1990
 - b) 2000
 - c) 2005
 - d) 2010
- 46) The marine bacterium **Alcanivorax borkumensis** is a genomic model because it produces surfactants and is associated with the biodegradation of hydrocarbons in oil spills by roling et al in the year of _____.
- a) 2003
 - b) 2004
 - c) 2005
 - d) 2006
- 47) The sea squirt, **ci. Intestinalis**, was chosen as a model because it belongs to a group, the Urochordata, with properties similar to the ancestors of _____.

Bt201 objective and subjective notes for mid term

- a) Vertebrates
 - b) Invertebrates
 - c) Both a and b
 - d) Non
- 48) Comparative genomics is developing an increasing array of bioinformatics techniques, such as _____.
- a) synteny analysis
 - b) phylogenetic footprinting
 - c) phylogenetic shadowing
 - d) all of the above
- 49) Give the three main categories Zhou et al. (2004) proposed a classification?
- I. Approach (structural or functional),
 - II. Scientific discipline (evolutionary genomics, ecological genomics, etc.),
 - III. And object of study (plant genomics, microbial genomics, etc.).
- 50) Transcriptomics is the study of all the transcripts that are present at any time in the _____.
- a) Cell
 - b) Nucleolus
 - c) Cytoplasm
 - d) Non
- 51) The main activity in transcriptomics is to obtain a profile of global gene expression in relation to some condition of interest write those conditions?
- I. Which genes are turned 'on' and 'off' during certain phases of the cell cycle?
 - II. Which genes are upregulated by certain physiological conditions?
 - III. Which genes change their expression in response to adaptation to the environment?
 - IV. The study of transcriptomes is part of functional genomics, because it does not look at the DNA as such, but at its functions.
- 52) Mass spectrometry may also be used to determine the amino acid sequence of a _____.
- a) Protein
 - b) DNA
 - c) Carbohydrates
 - d) Lipids
- 53) What is the posttranslational modification?
- Posttranslational modification or protein processing, processes that can greatly affect the function of a protein, for example by acetylation or ubiquitination of the n-terminal residue, hydroxylation of prolines, or cleavage of the molecule into smaller units.
- 54) What is the **Biotechnological significance of the bacteria?**
- Many bacteria and fungi are important as producers of valuable products, for example antibiotics, medicines, vitamins, soy sauce, cheese, yoghurt and other foods made from

Bt201 objective and subjective notes for mid term

milk. There is considerable interest in analyzing the genomes of these (pühler and selbitschka 2003). For example, the marine bacterium **Alcanivorax borkumensis** is a genomic model because it produces surfactants and is associated with the biodegradation of hydrocarbons in oil spills (roßling et al. 2004).

55) Metabolomics is the study of all low _____ cellular constituents.

- a) molecular weight
- b) molecular structure
- c) molecular function
- d) attractions

56) Usually only metabolites belonging to a limited category are included, for example all soluble carbohydrates, or all metabolites that can be measured by a certain analytical technique such as _____.

- a) Pyrolysis gas chromatography
- b) Infrared spectrometry
- c) Spectrophotometer
- d) Both a and b

57) Genomic responses to drugs, analysis of expression profiles that indicate similarity of action across compounds, indicate which of the following?

- a) Pathogenomics
- b) Pharmacogenomics
- c) Toxicogenomics
- d) Ecotoxicogenomics

58) Define Pathogenomics, Pharmacogenomics, Toxicogenomics, Ecotoxicogenomics and Ecotoxicogenomics

Pathogenomics:

Genomes of human pathogens: analysis of genes involved in disease generation

Pharmacogenomics:

Genomic responses to drugs, analysis of expression profiles that indicate similarity of action across compounds, analysis of genetic polymorphisms that determine a person's disposition to drug action.

Toxicogenomics:

Mode of action of toxic compounds, development of expression profiles that indicate similarity of toxic action across compounds .

Ecotoxicogenomics:

Genomic responses of organisms exposed to environmental pollution.

Ionomics

All mineral nutrients and trace elements in an organism, for example using inductively coupled plasma mass spectrometry (ICPMS).

59) Working backwards from protein structure to gene characterization is very laborious and may only be applicable in cases where _____ functions can be associated a priori with a suspected protein.

Bt201 objective and subjective notes for mid term

- a) Sociological
 - b) Biological
 - c) Ecological
 - d) Paleontological
- 60) Two important measures ecologists use to describe the composition of a community are.
- a) species richness and species diversity
 - b) species growth and species diversity
 - c) species habitat and species diversity
 - d) non
- 61) write the circumstances where the Communities with the highest species richness and the Communities with the highest species richness are found?
- Communities with the highest species richness tend to be found in areas near the equator, which have lots of solar energy (supporting high primary productivity), warm temperatures, large amounts of rainfall, and little seasonal change. Communities with the lowest species richness lie near the poles, which get less solar energy and are colder, drier, and less amenable to life. This pattern is illustrated below for mammalian species richness (species richness calculated only for mammal species, not for all species). Many other factors in addition to latitude can also affect a community's species-richness.
- 62) The highest number of mammal species, _____ per square kilometer, occurs in the Amazon region of South America.
- a) 79-179
 - b) 100-200
 - c) 179-228
 - d) 200-250
- 63) In general, ecologists think that more diverse ecological communities are _____ stable.
- a) More
 - b) Less
- 64) The structure of a community is the result of _____.
- a) abiotic factors
 - b) biotic factors
 - c) both a and b
 - d) none of these
- 65) Write some important factors that influence community structure?
- I. The climate patterns of the community's location.
 - II. The geography of the community's location.
 - III. The heterogeneity (patchiness) of the environment
 - IV. The frequency of disturbances, or disruptive events.
 - V. Interactions between organisms.

Bt201 objective and subjective notes for mid term

- 66) Some species have unusually strong impacts on community structure, preserving the balance of the community or even making its existence possible. These "special" species include _____ species.
- a) foundation
 - b) keystone
 - c) Both a and b
 - d) Non
- 67) A foundation species plays a unique, essential role in creating and defining a _____.
- a) Specie
 - b) Community
 - c) Structure
 - d) Non
- 68) Kelp (brown algae) is a foundation species that forms the basis of the kelp forests off the coast of _____.
- a) California
 - b) Africa
 - c) China
 - d) Korea
- 69) Define Keystone species?
- A keystone species is a species that has a disproportionately large effect on community structure relative to its biomass or abundance. Keystone species differ from foundation species in two main ways: they are more likely to belong to higher trophic levels (to be top predators), and they act in more diverse ways than foundation species, which tend to modify their environment.
- 70) _____ are species that have been introduced into areas outside their native range and can cause—or have caused—harm in their new area.
- a) Invasive species
 - b) Keystone species
 - c) Foundation species
 - d) Non
- 71) The kudzu plant was introduced to the United States from Asia in the late _____.
- a) 1800s
 - b) 1850s
 - c) 1900s
 - d) 1850s
- 72) Many of the invasive species are found in the _____.
- a) united state
 - b) united kingdom
 - c) Asia
 - d) Africa

Bt201 objective and subjective notes for mid term

- 73) The kudzu of the aquatic worlds has speedy reproduction and now forming up to _____ of the biomass in some mississippi and illinois rivers United States.
- a) 60%
 - b) 70%
 - c) 80%
 - d) 95%
- 74) Which one of the following is not the characteristic of animal?
- a) Multicellular
 - b) Eukaryotic
 - c) Autotrophs
 - d) Organisms with cells without cell walls
- 75) Invertebrates make up _____ of all animal species.
- a) 50%
 - b) 60%
 - c) 80%
 - d) 95%
- 76) Vertebrates make up only _____ of all animal species.
- a) 5%
 - b) 25%
 - c) 50%
 - d) 70
- 77) Sponges are the example of which type of body plane?
- a) Asymmetrical
 - b) Radial Symmetry
 - c) Bilateral Symmetry
 - d) None of these
- 78) Crabs, insects, fish and humans are the example of which type of body plane?
- a) Asymmetrical
 - b) Radial Symmetry
 - c) Bilateral Symmetry
 - d) None of these
- 79) Examples: starfish, jellyfish, and sea anemones are the example of which type of body plane?
- a) Asymmetrical
 - b) Radial Symmetry
 - c) Bilateral Symmetry
 - d) None of these
- 80) Write 3 Main groups of protists?
- I. Protozoans

Bt201 objective and subjective notes for mid term

II. Algae

III. fungus-like

81) _____ are Animal like protists.

- a) Protozoans
- b) Algae
- c) Fungus
- d) All of the above

82) Write down the Characteristics of Protozoans?

No cell wall

Free-living or parasitic

Consumers

Habitat – aquatic (ponds, lakes, oceans)

Examples: amoeba, paramecium, dinoflagellates

83) _____ of all ciliate species are free-living and mobile.

- a) 30%
- b) 40%
- c) 50%
- d) 65%

84) How many species of Arthropoda are found?

- a) 900
- b) 9,000
- c) 90,000
- d) 900,000

85) Arthropoda contribute to _____ of all known species?

- a) 25%
- b) 40%
- c) 50%
- d) 75%

86) Write Arthropod Groups?

1. Subphylum Trilobita

- extinct trilobites

2. Subphylum Chelicerata

- horseshoe crabs, spiders, ticks, mites, and some extinct groups

3. Subphylum Myriapoda

- centipedes, millipedes

4. Subphylum Crustacea

- crabs, lobsters, shrimps, barnacles

5. Subphylum Hexapoda

- Insects

Bt201 objective and subjective notes for mid term

- 87) By the end of the cambrian period, _____ million years ago, an astonishing variety of animals inhabited earth's oceans.
- a) 54
 - b) 40
 - c) 540
 - d) 450
- 88) Enlist the Biodiversity of functions on the Earth?
- Maintaining balance of the ecosystem
 - Recycling and storage of nutrients
 - Combating pollution
 - Stabilizing climate
 - Protecting water resources
- 89) Biodiversity is the result of _____ billion years of evolution.
- a) .5
 - b) 1.5
 - c) 2.5
 - d) 3.5
- 90) Approximately 600 million years ago, all life consisted of _____.
- a) Archaea
 - b) Bacteria
 - c) Fungus
 - d) Both a and b
- 91) About _____ of human food supply comes from 20 kinds of plants.
- a) 50%
 - b) 60%
 - c) 70%
 - d) 80%
- 92) Humans use _____ species for food, clothing and shelter.
- a) 40
 - b) 400
 - c) 4,000
 - d) 40,000
- 93) Genetic modification of plants is achieved by adding a specific gene or genes to a plant, or by knocking down a gene with _____, to produce a desirable phenotype. The plants resulting from adding a gene are often referred to as transgenic plants.
- a) RNAi
 - b) RNAg
 - c) RNAb
 - d) mRNA
- 94) Habitat destruction is a major cause for loss of _____.
- a) Biodiversity
 - b) Specie
 - c) Community
 - d) Non

Bt201 objective and subjective notes for mid term

- 95) Over _____ of global fisheries are being overfished at unsustainable levels.
- a) 25%
 - b) 50%
 - c) 60%
 - d) 80%
- 96) Coral reefs bwhich are biodiversity hotspots will disappear in _____ years.
- a) 20-40
 - b) 30-40
 - c) 40-50
 - d) 50-60
- 97) _____ of all species might become extinct by 2015.
- a) 5%
 - b) 10%
 - c) 15%
 - d) 20%
- 98) Flora are the _____ found in a particular area.
- a) Plants
 - b) Animals
 - c) Insects
 - d) Non
- 99) Fauna are the _____ found in a particular area.
- a) Plants
 - b) Animals
 - c) Insects
 - d) Non
- 100) _____ Park is the first Reserve Forest in Paksitan.
- a) Central Karakoram National Park
 - b) Khunjerab National Park
 - c) Ayubia National
 - d) Chitral Gol National Park
- 101) _____ Plant breeding started with sedentary agriculture and particularly the domestication of the first agricultural plants, a practice which is estimated to date back _____ years.
- a) 500 to 1,000
 - b) 5,000 to 1,000
 - c) 9,000 to 11,000
 - d) 1,000 to 15,000