

BT101 – ECOLOGY, BIODIVERSITY & EVOLUTION

FINAL TERM MOST IMPORTANT QUESTIONS

Prepared by: **Sir Mughal Admin** (BS Zoology Announcement)

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CONTACT NO: 0313-2310940

1. What are characteristics of mammals?

- Females of mammals have specialized mammary glands to feed their young ones. These mammary glands produce milk.
- Presence of hair is a unique character in mammals.
- A muscular diaphragm separates the heart and lungs from abdominal cavity.
- Mammals possess Non-nucleated RBCs while all other animals have nucleated RBCs.
- Mammals are viviparous and have a reproductive cycle that helps in internal fertilization and successful development of fetus.
- Mammals have external ear or pinna which all other vertebrates lack.
- Sweat glands are present in skin to regulate water content.
- Metanephric kidneys are present to which allow mammals to excrete urea without excessive loss of water.

2. Explain inheritance theory.

In the theory of evolution, inheritance involves the transmission of genetic information from one generation to the next. Genetic variation arises through mutations and recombination, and advantageous traits are passed on through natural selection. Over time, adaptations accumulate, enhancing an organism's fitness. Genetic drift and speciation contribute to the diversity of species. The concept of common ancestry suggests that all living organisms share a common origin, and the study of genetics provides insights into the molecular mechanisms underlying heredity. Evolutionary inheritance explains the remarkable diversity and interconnectedness of life on Earth through the processes of descent with modification.

3. What is Binomial Nomenclature?

Binomial nomenclature is the biological system of naming the organisms in which the name is composed of two terms, where, the first term indicates the genus and the second term indicates the species of the organism. For example, *Homo sapiens* is biological name of human being in which *Homo* represents genus and *sapiens* indicates species of an organism.

4. Write characteristics of Archea.

Archaea is a domain of single-celled organisms. These microorganisms lack cell nuclei and are therefore prokaryotes. Archaea were initially classified as bacteria, receiving the name archaebacteria, but this term has fallen out of use.

Following are the important characteristics of archaebacteria:

- Archaebacteria are obligate or facultative anaerobes, i.e., they flourish in the absence of oxygen and that is why only they can undergo methanogenesis.

Compiled by: Sir Mughal

+923132310940

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- The cell membranes of the Archaeobacteria are composed of lipids.
- The rigid cell wall provides shape and support to the Archaeobacteria. It also protects the cell from bursting under hypotonic conditions.
- The cell wall is composed of Pseudomurein, which prevents archaeobacteria from the effects of Lysozyme. Lysozyme is an enzyme released by the immune system of the host, which dissolves the cell wall of pathogenic bacteria.
- These do not possess membrane-bound organelles such as nuclei, endoplasmic reticulum, mitochondria, lysosomes or chloroplast. Its thick cytoplasm contains all the compounds required for nutrition and metabolism.
- They can live in a variety of environments and are hence called extremophiles. They can survive in acidic and alkaline aquatic regions, and also in temperature above boiling point.
- They can withstand a very high pressure of more than 200 atmospheres.
- Archaeobacteria are indifferent towards major antibiotics because they contain plasmids which have antibiotic resistance enzymes.
- The mode of reproduction is asexual, known as binary fission.
- They perform unique gene transcription.
- The differences in their ribosomal RNA suggest that they diverged from both prokaryotes and eukaryotes.

5. What is polymorphism?

Polymorphism occurs in a population when two or more distinct forms exist without a range of phenotypes between them..

6. Explain circulatory system of mammals.

In mammals, the circulatory is a closed type and blood is transported through blood vessels. The heart in mammals is four-chambered with two auricles and two ventricles. Oxygenated blood from the right ventricle is carried by arteries to the whole body parts. There are three pathways or circuits of blood in mammals, the systemic circuit, pulmonary circuit and coronary circuit.

7. Define taxis & limiting factor.

Taxis the movement of an organism in response to a stimulus such as light or the presence of food. Taxes are innate behavioural responses. Taxis can be either positive (towards stimulus) or negative (away from stimulus).

A limiting factor is anything that constrains a population's size and slows or stops it from growing. Some examples of limiting factors are biotic, like food, mates, and competition with other organisms for resources.

8. Write composition of Nucleus.

The nucleus is composed of several substructures and highly dynamic intra-nuclear regions, including a double lipid bilayer and ribosomes. Traffic between the nucleus and cytoplasm is mediated by nuclear pores, which are composed of proteins and are actively transported by importin/karyopherin proteins and the RanGTP family of small GTPases. The nuclear lamina is composed of lamin proteins and provides mechanical strength. DNA is packaged extensively to fit inside the nucleus. The nucleus is composed of two types of chromatin, euchromatin and heterochromatin, and the nucleolus. The nucleolus is enriched with tandem repeats of rDNA and is responsible for the synthesis of rRNA and the assembly of ribosomes. Additionally, dozens of

smaller assemblies are observed, indicating a high level of functional compartmentalization and organization within the nucleus.

9. Write three properties of thermosphere.

- This layer is present directly above the mesosphere and below the exosphere.
- Height is about 80 km.
- Extreme ultraviolet radiation causes photoionization/photodissociation of molecules, creating ions.
- Known as ionosphere, temperature increase with altitude due to absorption of highly energetic solar radiation.
- In thermosphere, temperature can raise up to 1700 °C or more.
- Highly diluted gas in this layer can reach 2,500 °C during the day.

10. Explain biogeography.

Biogeography is the study of the geographic distribution of plants, animals, and other forms of life. It is concerned not only with habitation patterns but also with the factors responsible for variations in distribution.

11. What are biological clocks?

Biological clocks are fundamental to the functioning of life and to the organization and coordination of behavior. Simple behavioral functions, such as timing active and inactive periods during the day/night cycle to maximize productivity and minimize risk rely on internal clock functions. There are five types of biological clocks. Diurnal (day and night), Circadian (24 hours), Ultradian (less than 24 hours), Circalunar (1 month) and circannual (1 year).

12. Explain balanced polymorphism.

Balanced Polymorphism

It occurs when different phenotypes are maintained at relatively stable frequencies in the population. It resembles a population in which disruptive selection operates.

13. Differentiate between methanogens and halophiles.

Methanogens are microorganisms that produce methane as a metabolic by-product in oxygen-limited environments. Methanogens are mostly anaerobic organisms that cannot function under aerobic conditions. However, several species, for example, *Methanotrix paradoxum*, can generate methane under aerobic environments. They release methane (CH₄) as a waste product. Many live in mud at the bottom of lakes and swamps because it lacks oxygen. Some live in the intestinal tracts of animals to help break down food. They could play a role in garbage/sewage cleanup by eating garbage.

Halophiles are organisms represented by archaea, bacteria, and eukarya for which the main characteristic is their salinity requirement, halophilic “salt-loving”. Halophilic microorganisms constitute the natural microbial communities of hypersaline ecosystems, which are widely distributed around the world. They can live in water with salt concentrations exceeding 15%. The ocean’s concentration is roughly 4%. One habitat of halophiles is Great Salt Lake. Actually three to five times saltier than the ocean.

14. Write characteristic of sub-phylum mastigophora.

- They are unicellular or colonial.
- Locomotion is by flagella, pseudopodia, or both.
- Autotrophic (self-nourishing), saprozoic (living in decaying organic matter), or heterotrophic (obtains energy from organic compounds).
- Single type of nucleus is present.
- Sexual reproduction (usually)
- Phylum Mastigophora has two classes.
 1. Phytomastigophora
 2. Zoomastigophora

15. Write a note on Platyhelminthes.

Platyhelminthes are usually dorsoventrally flattened. They are triploblastic and have acoelomate body. The body is bilaterally symmetrical. Their body is unsegmented. Cephalization begins with an anterior cerebral ganglion. Longitudinal nerve cords are present. Protonephridia are present as excretory structures. All the members of Platyhelminthes are hermaphrodite. They have complex reproductive system.

Classification

1. Class Turbellaria (Free-Living Flatworms)
2. Class Monogenea
3. Class Trematoda (Flukes)
4. Class Cestoidea (Tapeworms)

16. Write a short note on Golgi apparatus.

The Golgi apparatus is an organelle present in most eukaryotic cells. It is made up of membrane-bound sacs, and is also called a Golgi body, Golgi complex, or dictyosome.

The job of the Golgi apparatus is to process and bundle macromolecules like proteins and lipids as they are synthesized within the cell.

Structure

- Located near the end of the ER close to the nucleus
- Composed of several layers of cisternae (fluid-filled sacs)
- Has three different parts:
 1. cis-Golgi
 2. medial-Golgi
 3. trans-Golgi

Functions

- Transport vesicles are used to move back and forth between the ER and Golgi bodies
- One side of the Golgi body receives transport vesicles produced by the ER.
- This side is called cis face.
- Opposite side releasing vesicle is trans face.
- The Golgi body marks and sorts the molecules into different groups.
- These groups are sent in secretory vesicles inside or outside of the cell.
- Proteins are modified before sending by adding specific sugar molecules are added to a core oligosaccharide that is attached to a protein.

17. Explain relationship between evolution and paleontology.

Paleontology is key to the study of evolution for two reasons. The discovery of fossils showing forms of animals that had never previously been seen began to cast serious doubt upon creationist theories. Fossils provide the only direct evidence of the history of evolution. Paleontological resources, or fossils, are any evidence of past life preserved in geologic context. They are a tangible connection to life, landscapes, and climates of the past. They show us how life, landscapes, and climate have changed over time and how living things responded to those changes.

18. Define heterotrophs.

Class of animals that lack chlorophyll and cannot synthesize their own food are called heterotrophs. These animals depend on other organisms for their food.

19. Explain water pollution.

Water pollution is when any physical or chemical pollutant gets dissolved or suspended in the water and affects the health of humans and other organisms. It is a global issue as there is scarcity of disease-free water across the globe. Sewage produced as the result of domestic activities is added to water on daily basis, disease-causing agents such as pathogens and toxins, Sediment pollution, Inorganic and algal nutrients, Organic compounds, Inorganic chemicals, Radioactive substances, and Thermal pollution are all important water pollutants. Sewage is the release of waste water from drains or sewers containing human wastes, soaps, and detergents, which causes serious environmental problems such as enrichment of nutrients and eutrophication. Disease causing agents are also an important water pollutant as many diseases & pathogens are waterborne. Sediment pollution is caused by the suspended soil particles when they are in excessive amounts in the water, which limit the penetration of light within the water body and bring various insoluble toxins into waterways.

20. Explain acid rain.

Acid rain is when the pH of the rain is abnormally low and the water droplets contain higher levels of hydrogen ions (H^+). It can be of two types wet (rain, snow, sleet, fog, cloud water and dew) and dry acidic components (acidifying particles, dust, and gases). Acid rains are caused by natural as well as human activities, such as volcanic eruptions, nitrogen fixation, lightening, and acid deposits in glacial ice. Human activities include sulfur and nitrogen compounds, electricity generation, factories and motor vehicles, and coal combustion for electricity generation in coal power plants. Acid rain is formed when SO_2 gas is oxidized to SO_3 due to reaction with hydroxyl radical (OH). When the clouds are formed, the SO_3 in the presence of water is rapidly converted into sulfuric acid (H_2SO_4) and nitrogen dioxide reacts with OH and forms nitric acid (HNO_3). These acids are then precipitated to ground in the form of acid rain. The effects of acid rains can be very drastic as not many life forms can survive and grow in acidic conditions, and low pH coupled with higher aluminum concentrations can be hazardous for fishes and other aquatic organisms. Soils can be damaged by the hydronium ions which mobilize aluminum and causes leaching of minerals such as magnesium etc. Monuments made of Lime stone and marbles essentially containing Calcium Carbonate will react with acid rain to form gypsum.

21. Write composition of Mitochondria.

Mitochondria contain deoxyribonucleic acid (DNA) and ribosomes, protein-producing organelles in the cytoplasm. Within the mitochondria, the DNA directs the ribosomes to produce proteins as enzymes, or biological catalysts, in ATP production.

22. How trophic passes energy?

Energy can pass from one trophic level to the next when organic molecules from an organism's body are eaten by another organism. However, the transfer of energy between trophic levels is not usually very efficient.

23. Write a note on Carbon cycle.

Carbon cycle is the process where carbon compounds are interchanged among the biosphere, geosphere, pedosphere, hydrosphere, and atmosphere of the earth.

Following are the major steps involved in the process of the carbon cycle:

1. Carbon present in the atmosphere is absorbed by plants for photosynthesis.
2. These plants are then consumed by animals and carbon gets bioaccumulated into their bodies.
3. These animals and plants eventually die, and upon decomposing, carbon is released back into the atmosphere.
4. Some of the carbon that is not released back into the atmosphere eventually become fossil fuels.
5. These fossil fuels are then used for man-made activities, which pump more carbon back into the atmosphere.

24. Write note on origins of eukaryotes.

Eukaryotes are believed to be originated from prokaryotes through endosymbiosis. They are divided into four kingdoms: Protista, fungi, plantae and animalia. Protista include animal-like protists, plant like protists, algae and fungi like protists. Protozoan protists include zooflagellates, euglena, paramecium, amoeba and sporozoans. Fungi are eukaryotic, filamentous, absorptive organisms which obtain food by decomposing the dead and decaying organic matter. Plants are autotrophic, non-motile and multicellular eukaryotes which synthesize food by photosynthesis. Animals are heterotrophic and motile and obtain their food from other animals and plants. Prokaryotes lack a well-defined nucleus and DNA is directly dispersed in cytoplasm. They possess larger ribosomes which sediment at 80S. Eukaryotic cells are mostly diploid and undergo asexual reproduction via mitosis.

25. What is aestivation?

Aestivation is cessation or slowing of activity during the summer; especially slowing of metabolism in some animals during a hot or dry period. Aestivation is generally defined as a type of dormancy, which is a survival strategy used to sustain lack of food and other extreme conditions. Animals that aestivate become inactive and stop feeding in response to warm temperatures.

26. What are k selected and r selected species?

The two evolutionary "strategies" are termed r-selection, for those species that produce many "cheap" offspring and live in unstable environments and K-selection for those species that produce few "expensive" offspring and live in stable environments.

27. Write characteristics of ciliophora.

Also known as ciliated protozoans, the phylum Ciliophora consists of single-celled organisms within the subkingdom Protozoa that move by means of cilia. Currently, there are over 7,500 described species within the group. However, it is suspected that there are many others yet to be identified. Some of the species are free-living organisms found in different habitats around the world while others exist as parasites of vertebrates, invertebrates, and some mammals.

28. What are effects of global warming?

The global warming is the phenomenon of gradual increase in the average temperature of earth's atmosphere in last century. The average atmospheric temperature is 1 °C warmer than it was at the beginning of twentieth century. Major sources of global warming are greenhouse effect, pollution and deforestation. The analysis of Antarctic ice has revealed that earth's climate has been stable for over last 400,000 years. However, there has been a 30% increase in temperature was observed in past few centuries. The amount of carbon dioxide increased from 270 ppm (parts per million) to 370 ppm. Information about atmospheric carbon dioxide concentrations can be measured using various techniques such as observations of tree-ring, deep ocean sediment, ice core records, and corals.

29. What are orders of amphibians?

There are three orders of amphibians. Anura (frogs), Caudata (salamanders) and Gymnophiona (caecilians).

30. Write name of nitrogen fixing bacteria.

Nitrogen-fixing bacteria examples comprise Rhizobium (formerly Agrobacterium), Frankia, Azospirillum, Azoarcus, Herbaspirillum, Cyanobacteria, Rhodobacter, Klebsiella, etc. N-fixing bacteria synthesize the unique nitrogenase enzyme responsible for N fixation.

31. What are ozone depleting substances?

Ozone depleting substances include:

- chlorofluorocarbons (CFCs)
- hydrochlorofluorocarbons (HCFCs)
- hydrobromofluorocarbons (HBFCs)
- Methyl bromide.
- Carbon tetrachloride.
- Cethyl chloroform.

32. Define parasitism.

Parasitism is a type of symbiosis where one partner benefits at the expense of the other. Parasites may or may not kill their hosts. There are different types of parasites; Micro-parasites such as bacteria and viruses these organisms reproduce inside the host body. Micro-parasites organisms which is live in the host body but release their offsprings outside the host such as tapeworms, tapeworms etc. Endoparasites are the parasites which live inside the host body such as liver fluke trypanosoma etc. Ectoparasites the parasites which live outside the host properties for example lice, mosquito, mites etc.

33. Differentiate between oscillatory and frequency dependent selection.

Frequency-dependent selection is defined as a situation where fitness is dependent upon the frequency of a phenotype or genotype in a population. Our focus here is on negative frequency-dependent selection, whereby fitness of a phenotype or genotype increases as its frequency in a population decreases.

34. Explain genetic drift with example.

Genetic drift is the random changes to the genetic makeup of populations living in the patches. It also leads to reduction in genetic diversity and increases homozygosity. Overall higher population sizes are favored in natural selection as smaller populations are weak in adaptations and are susceptible to changes. As a result smaller populations are at the risk of elimination. Habitat fragmentation also affects the predator-prey relationship as the division of habitat affects the population dynamics either by reducing the available space for the prey to hide from predators or by making it hard for predator to find its prey. Either way one of the two will be at disadvantage.

35. Write three examples of zoomastigophora.

Examples of zoomastigophora are: Hexamita, Giardia, Diplomonad.

36. What is panting?

Panting is a controlled increase in respiratory frequency accompanied by a decrease in tidal volume, the purpose of which is to increase ventilation of the upper respiratory tract, preserve alveolar ventilation, and thereby elevate evaporative heat loss.

37. Explain reproduction in arthropods.

Arthropods reproduce by sexual reproduction, which involves the generation and fusion of gametes. Most arthropods are either male or female, and they undergo internal fertilization. Once the egg has been fertilized, the female usually lays the egg, and it continues developing outside of the mother's body.

However, some arthropods are hermaphroditic, meaning they have the organs of both sexes, such as in barnacles. Few crustaceans and insects can reproduce by means of parthenogenesis. They revert to reproducing sexually when conditions become more favorable again.

38. Write note on aposematic.

Aposematism is the advertising by an animal to potential predators that it is not worth attacking or eating. This unprofitability may consist of any defences which make the prey difficult to kill and eat, such as toxicity, venom, foul taste or smell, sharp spines, or aggressive nature.

39. Define autolysis and putrefaction.

By autolysis we mean the non-bacterial postmortem self- decomposition of animal or plant tissues. Salkowski (1890) first recognized the phenomenon as due to enzymatic action, and called it "autodigestion." The name "autolysis" was introduced later by Jacobi (1900).

Putrefaction is the decay of organic matter by the action of microorganisms resulting in the production of a foul smell. It occurs between 10 to 20 days after the death of an organism. Putrefaction involves the decomposition of proteins, breakdown of the tissues, and liquefaction of the organs.

40. What are factors affecting population growth.

In the natural world, limiting factors like the availability of food, water, shelter, and space can change animal and plant populations. Other limiting factors, like competition for resources, predation, and disease also impact populations.

41. What is meant by extinction? What are causes of extinction?

Extinction is the termination of a kind of organism or of a group of kinds, usually a species. The moment of extinction is generally considered to be the death of the last individual of the species, although the capacity to breed and recover may have been lost before this point.

Humans can cause extinction of a species through overharvesting, pollution, habitat destruction, introduction of invasive species (such as new predators and food competitors), overhunting, and other influences. Explosive, unsustainable human population growth is an essential cause of the extinction crisis.

42. Write classification of pollution.

Pollutants can be classified as primary and secondary pollutants. Primary pollutants are carbon dioxide, nitrogen oxides, sulphur dioxide, carbon monoxide and CFC. Secondary pollutants are acid rain and ozone.

43. Explain types of flagella.

The three types of flagella are bacterial, archaeal, and eukaryotic. The flagella in eukaryotes have dynein and microtubules that move with a bending mechanism. Bacteria and archaea do not have dynein or microtubules in their flagella, and they move using a rotary mechanism.

44. Explain excretory system of amphibians.

Amphibians have two kidneys, just like humans, and those kidneys filter wastes out of the blood and combine them with water to form urine. Urine then travels from the kidneys via the ureters to the bladder, and then out through the cloaca.

45. What is third layer of earth?

The earth is made up of three different layers: the crust, the mantle and the core.

46. Explain troposphere.

The troposphere is the lowest layer of the atmosphere of the Earth, and contains 75% of the total mass of the planetary atmosphere, 99% of the total mass of water vapour and aerosols, and is where most weather phenomena occur.

47. What are types of omnivores?

Omnivores are divided into three subcategories: frugivores, insectivores, and granivores. These animals have higher food security because they are omnivores.

48. Differentiate in grazers and browsers.

Different herbivores make use of different plant parts. Some eat grass and other herbaceous plants and are known as 'grazers'. Others eat different parts of woody vegetation and are known as 'browsers'. They feed on non-grass plant material such as leaves, soft shoots, twigs, fruits, and woody plants such as shrubs. Examples: Goats, deer, giraffe, elephants.

49. Name the factors that control the ecosystem.

There are two types of factors that control ecosystem. Biotic factors and Abiotic factors. (detail by yourself).

50. What vestigial organs? What is their association with evolution?

A vestigial organ is a term used for organs which are degenerated, underdeveloped or useless for an organism. Examples of vestigial organs in humans usually include the appendix, the coccyx (tail bone), and the tonsils. Body hair, wisdom teeth, nipples on males, nictitating membrane of eye, tonsils are also the vestigial organs of humans.

Vestigial structures are homologous to fully functioning structures inherited by related lineages. Thus, they provide strong evidence of common ancestry and can help us trace the evolutionary origin of the species with the vestigial structures. For example: Dewclaws.

51. What is difference between coxal and malpighian tubules?

The coxal gland is a gland found in some arthropods, for collecting and excreting urine. They are found in all arachnids, and in other chelicerates, such as horseshoe crabs. The coxal gland is thought to be homologous with the antennal gland of crustaceans.

The Malpighian tubule system is a type of excretory and osmoregulatory system found in some insects, myriapods, arachnids and tardigrades. The system consists of branching tubules extending from the alimentary canal that absorbs solutes, water, and wastes from the surrounding hemolymph.

52. Write the role of Madison University in restoration of ecology.

The University of Wisconsin–Madison Arboretum has pioneered restoration ecology.

- The restoration of the prairie was at an early stage in November 1935.
- The prairie as it looks today. This picture was taken at approximately the same location as the 1935 photograph.

53. Explain Darwin's speciation.

Darwin proposed that species can change over time, that new species come from pre-existing species, and that all species share a common ancestor. In this model, each species has its own unique set of heritable (genetic) differences from the common ancestor, which have accumulated gradually over very long time periods.

54. What is endomembrane?

The endomembrane system is a series of compartments that work together to package, label, and ship proteins and molecules. In your cells, the endomembrane system is made up of both the endoplasmic reticulum and the Golgi apparatus. These compartments are folds of membranes that form tubes and sacs in your cells.

55. Explain consumer resource system?

There is an intricate balance between members of food chain/web. This balance is maintained by direct and indirect relationships between producers, consumers and apex predators for example if any in an ecosystem has no predator then the primary consumers will eliminate all the population of primary producers such as cattle grazing in a grass field but if there is a predator (such as wolf, tiger, or lion) in the area then it can directly increase the population of primary

producers by reducing the number of consumers. With the help of these direct and indirect relationships an ecosystem maintains balance.

56. What is top down and bottom up effect?

- Top down effect; when any change occurs at the top of the food web such as increase or decrease in the population of apex predator this will directly influence the population of its prey i.e. consumers and indirectly the producers.
- Bottom up effect opposite to top down effect if there is any change in the population of primary producer this change directly flows through the food chain in the ecosystem. Reduction in primary producers' population directly affects the consumers' population which in turn influences the population of the predator and vice versa. species level cascades this effect can be a result of a change in the population of SPC which interns can affect the entire community and Ecosystem as well which is also known as community caster level cascade.

57. Explain endoplasmic reticulum.

It is a network of tube like membranes known as cisternae, spreading throughout the cytoplasm and in contact with nuclear envelope at one side. This organelle is absent in spermatozoa and RBCs. It has two types i.e. smooth endoplasmic reticulum (SER) and rough endoplasmic reticulum (RER). These are named according to the presence and absence of ribosomes, respectively. RER due to the attached ribosomes is associated with protein synthesis while SER has multiple other functions like synthesis and metabolism of lipids, detoxification of harmful substances, stores and metabolize carbohydrates, calcium storage and synthesis of new membranes etc. ER also participate in degradation of misfolded proteins found in cells through endoplasmic reticulum associated degradation (ERAD) pathways. ER also participates in stress response pathways under diseases conditions like diabetes, alzheimers, certain cancers and bowl disease. In muscle cells, these organelles are called as Sarcoplasmic Reticulum. Calcium is crucial for muscle contraction activities. It is released by calcium channels found in membrane of ER.

58. Define autotrophs, heterotrophs and saprozoic nutrition.

Producers (autotrophs) are the organisms which can obtain energy from abiotic resources and do not depend on other organisms for their food or energy. If these organisms obtain energy from sunlight they are called photoautotrophs for examples plants algae and cyanobacteria etc. The other type of autotrophs are those organisms which obtain energy from inorganic chemical oxidation reactions. Such organisms convert chemicals into glucose and do not require sunlight and thus can survive in dark for example bacteria capable of metabolizing sulfur compounds.

The second group of organisms after autotrophs is the heterotrophs. These are the organisms which cannot harvest energy from sun nor from any inorganic chemical reactions and are hence dependent on producers/autotrophs for their food and energy requirements. They consume other organisms for food and break down the consumed carbohydrates and other biomolecules to obtain energy during respiration and fermentation.

59. Write composition and functions of microfilaments.

Microfilaments are composed of two strands of actin monomers twisted into helical filaments that have intrinsic polarity. All cells, including neurons, have a microfilament-rich, mesh-like network on the cytoplasmic side of the plasma membrane.

Microfilaments assist with cell movement and are made of a protein called actin. Actin works with another protein called myosin to produce muscle movements, cell division, and cytoplasmic streaming. Microfilaments keep organelles in place within the cell.

60.