UEE ON CELL BIOLOGY (2003 – 2010)

1. Which one of the following is largely made up of phospholipids? (2003)
   (A) Cell wall
   (B) Cell membrane
   (C) Nucleus
   (D) Chromosomes
2. Choose the name of the researcher/scientist who introduced the term cell for the first time? (2003)
   (A) Aristotle
   (B) Anton Van Leeuwenhoek
   (C) Robert Hooke
   (D) Robert Brown
3. Which of the following is a process by which cells take in fluid by means of vesicles? (2003)
   (A) Pinocytosis
   (B) Endocytosis
   (C) Osmosis
   (D) Phagocytosis
4. Which of the following pairs are both organelles concerned with energy transformation? (2003)
   (A) Nucleus and nucleolus
   (B) Mitochondria and nucleus
   (C) Chloroplasts and vacuole
   (D) Chloroplasts and mitochondria
5. Which of the following organelles are likely to be more abundant in active cells such as the muscle cells of human heart? (2003)
   (A) Lysosomes
   (B) Chromosomes
   (C) Mitochondria
   (D) Golgi bodies

6. Sodium ions pass from a region where they are at lower concentrations to a region where they are found at higher concentrations in human cells. This is an example of which of the following processes? (2003)
    (A) Osmosis
    (B) Simple diffusion
    (C) Passive transport
    (D) Active transport
7. Choose the structure that is usually present only in the cells of animals. (2003)
    (A) Vacuole
    (B) Cell wall
    (C) Nucleus
    (D) Centriole
8. Which of the following statements is in agreement with the modern cell theory? (2004)
    (A) Cells come from nothing.
    (B) Cells come from existing cells.
    (C) Cells come from non-living material.
    (D) Cells arise by means of spontaneous generation.
9. Which of the following ideas in the cell theory was contributed by Rudolf Virchow? (2004)
    (A) All plants are made up of cells.
    (B) All animals are made up of cells.
    (C) Cells are the structural unit of life.
    (D) Cells come from pre-existing cells.
10. Which of the following modes of material transport across the cell membrane is NOT governed by the concentration gradient of the transported material? (2004)
    (A) Simple diffusion
    (B) Facilitated diffusion
    (C) Osmosis
    (D) Active transport
11. Which means of particle transport requires input of energy by the cell? (2004)
    (A) Simple diffusion
    (B) Facilitated diffusion

(C) Osmosis

(D) Active transport

12. Suppose we consider four hypothetical cells (designated A, B, C, and D) having cubic shape with their sides measuring 2, 4, 6, and 8 arbitrary units, respectively. Which of these cells has the largest surface area to volume ratio? (2004)

    (A) Cell A

    (B) Cell B

    (C) Cell C

    (D) Cell D

13. Suppose three potato cylinders are kept for some time 15%, 8% and 4% sucrose solutions, respectively, and the fourth cylinder is kept in distilled water, which of the cylinders will be more flaccid? (2004)

    (A) The cylinder in 4% solution

    (B) The cylinder in 8% solution

    (C) The cylinder in 15% solution

    (D) The cylinder in distilled water

14. What type of molecules CANNOT pass across the cell membrane by simple diffusion? (2004)

    (A) Charged molecules

    (B) Non-polar molecules

    (C) Lipid soluble molecules

    (D) Molecules of very small size

15. Which unit is best to use for measuring the smallest cells and organelles? (2005)

    (A) Micrometere

    (B) Millilitre

    (C) Millimetre

    (D) Nanometre

16. If the size of a cell increases, which one of the following gets smaller? (2005)

    (A) The volume of the cell

    (B) The surface area of the cell

    (C) Surface area to volume ratio of the cell

(D) Volume to surface area ratio of the cell

17. If a suspension of a mixture of cellular organelles is spun in a centrifuge, which organelle settles to the bottom first? (2005)
    (A) Mitochondria
    (B) Nuclei
    (C) Chloroplasts
    (D) Ribosomes
18. Which of the following is an important function of the Golgi apparatus? (2005)
    (A) Protein synthesis
    (B) Packaging of proteins for export out of the cell
    (C) Removing of debris from cell
    (D) Storage of waste materials not needed by the cell
19. In which of the following features are eukaryotic cells distinguished from prokaryotic cells? (2005)
    (A) They have mitochondria.
    (B) Their nuclei lack membranes.
    (C) They have no DNA.
    (D) They have smaller ribosomes.
20. What will happen if human red blood cells are kept in a hypotonic solution? (2005)
    (A) Lose water by osmosis and burst
    (B) Lose water by osmosis and shrink
    (C) Take in water by osmosis, swell and burst.
    (D) Take in water by osmosis, swell and remain turgid.
21. In which type of solution is the water potential more negative than in the cells? (2005)
    (A) Hypotonic
    (B) Hypertonic
    (C) Isotonic
    (D) Equal solute and solvent concentration
22. Which of the following paired organelles are membrane-bound? (2005)
    (A) Ribosomes and peroxisomes
    (B) Chloroplasts and ribosomes

(C) Mitochondria and ribosomes

(D) Chloroplasts and mitochondria

23. Most cell membranes are primarily composed of which compounds? (2005)

(A) Protein and lipids

(B) DNA and ATP

(C) Chitin and starch

(D) Nucleotides and amino acids

24. If red blood cells shrink when placed in a certain solution, what is the strength of the solution relative to the strength of the protoplasm of the cells? (2005)

(A) Hypotonic

(B) Isotonic

(C) Hypertonic

(D) Isoosmotic

25. Which of the following cell types can be rich in lysosomes? (2005)

(A) Red blood cells

(B) Nerve cells

(C) Phagocytic cells

(D) Muscle cells

26. One of the following would be harder to see under the ordinary light microscope that is more likely to be available in school laboratories. (2005)

(A) Nucleus

(B) A bacterium

(C) A mitochondrion

(D) A ribosome

27. Which one of the following cellular forms did Robert Hooke observe under his crude microscope? (2006)

(A) Bacteria

(B) Protozoa

(C) Yeast

(D) Empty cell wall

28. On which of the following organelles of the eukaryotic cell does protein synthesis take place? (2006)

(A) The nucleus

(C) The chloroplast

(B) The ribosome
(D) The mitochondrion

29. Which of the following structures is **NOT** present in animal cells? (2006)
    (A) Cell wall
    (B) Nucleus
    (C) Protoplasm
    (D) Nucleic acid
30. What is the general term for the part of the protoplasm that lies outside the nucleus? (2006)
    (A) Cytosol
    (B) Cytoplasm
    (C) Central vacuole
    (D) Plasma membrane
31. Which of the following cellular structures is possessed by all cells? (2006)
    (A) Cell membrane
    (B) Nucleus
    (C) Cell wall
    (D) Golgi apparatus
32. Which one of the following eukaryotic cell organelles was a free living cell before eukaryotic cells evolved? (2006)
    (A) Nucleus
    (B) Ribosome
    (C) Chloroplast
    (D) Nucleolus
33. Which of the following mechanisms moves digested amino acids and glucose across the plasms membrane of the cells lining the wall of the small intestine? (2006)
    (A) Osmosis
    (B) Simple diffusion
    (C) Facilitated diffusion
    (D) Active transport
34. If a cell fails to clear its cellular debris, which one of its organelles is most likely **NOT** functioning? (2006)
    (A) Nucleus
    (B) Mitochondria
    (C) Endoplasmic reticulum

(D) Lysosomes

35. Among the following identify the organelle in which nucleic acid is **NOT** found? (2006)
    (A) Mitochondria
    (B) Chloroplast
    (C) Ribosome
    (D) Golgi apparatus
36. Suppose a hypothetical cube-shaped cell has sides of 10 micrometers, what is the surface area to volume ratio of this cell? (2006)
    (A) 6 : 10
    (B) 10 : 10
    (C) 3 : 6
    (D) 4 : 8
37. In which of the following solutions does an animal cell undergo haemolysis? (2006)
    (A) In hypotonic solution
    (B) In hypertonic solution
    (C) In isotonic solution
    (D) In both hypotonic & hypertonic solutions
38. What does the absence of chloroplasts in a unicellular organism indicate? (2006)
    (A) Reproduction by sexual means
    (B) Autotrophic nutrition
    (C) Heterotrophic nutrition
    (D) Complete lack of metabolic processes
39. Which of the following will happen if a plant cell is kept in a solution that is stronger than its protoplasm? (2006)
    (A) The cell will become turgid
    (B) The central vacuole will expand
    (C) The protoplasm will get plasmolyzed
    (D) The cell will swell and burst
40. Which of the following units of measurement is more convenient to express the size of cellular organelles? (2007)
    (A) Meter

(B) Centimeter

(C) Millimeter

(D) Micrometer

41. Which of the following is **NOT** true about mitochondria and chloroplasts? (2007)

(A) Both contain chlorophyll

(B) Both contain nucleic acid

(C) Both have double membrane

(D) Both transduce energy

42. Among the following scientists who contributed to the cell theory, identify the one who stated '*a cell can arise only from another cell like it*'. (2007)

(A) Robert Hooke

(B) Theodor Schwann

(C) Matthias Schleiden

(D) Rudolf Virchow

43. What does it mean when biologists express the cell membrane as a unit membrane? (2007)

(A) A cell is covered by a single membrane.

(B) A membrane is only one lipid layer thick.

(C) All cells have essentially similar membrane.

(D) A membrane is covered by a single layer of protein.

44. Which of the following classes of molecules **CANNOT** pass easily across the cell membrane by simple diffusion? (2007)

(A) Small non-polar molecules

(B) Lipid soluble molecules

(C) Non-polar molecules

(D) Polar molecules

45. Which of the following modes of transport is used by cells to move substances against their concentration gradients? (2007)

(A) Osmosis

(B) Simple diffusion

(C) Facilitated diffusion

(D) Active transport

46. Which of the following factors determines the rate at which organelles settle out of cell homogenate if spun in a centrifuge? (2007)
    (A) Mass of the organelle.
    (B) Function of the organelle in the cell.
    (C) Location of the organelle in the cell.
    (D) Thickness of the membrane covering the organelle.
47. Which of the following will primarily happen if the enzymes in the lysosomes of a cell are defective? (2007)
    (A) Cellular debris will not be removed
    (B) Chromosome replication will cease
    (C) ATP production will stop
    (D) Diffusion process will stop
48. Of the following four cells whose surface area to volume ratio is given, which cell can more efficiently transport its needs of materials across the cell surface? (2007)
    (A) 24 : 8 ratio
    (B) 54 : 27 ratio
    (C) 96 : 64 ratio
    (D) 150 : 125 ratio
49. What is the purpose of the infoldings of the inner-membrane of the mitochondrion? (2007)
    (A) Increasing the photosynthetic capacity of the cell.
    (B) Speeding up the loss of CO_2 during fermentation.
    (C) Speeding up the process of glycolysis.
    (D) Increasing the surface area for ATP production.
50. Who was the person that first observed living cells moving around when he examined drops of water under the microscope? (2008)
    (A) Robert Brown
    (B) Robert Hooke
    (C) Anton van Leeuwenhoek
    (D) Theodor Schwann
51. What is the best term that expresses the movement of substances in cells against their concentration gradients? (2008)

(A) Active transport

(B) Passive transport

(C) Osmosis

(D) Diffusion

52. Which of the following has a bigger size than all the others? (2008)

(A) A ribosome taken from an animal cell

(B) A mitochondrion taken from a plant cell

(C) A nerve cell taken from a human brain

(D) A glucose molecule taken from a plant cell

53. Which of the following parts of the plant cell is NOT a living component of the cell? (2008)

(A) Cell membrane

(B) Cell wall

(C) Cytoplasm

(D) Nucleus

54. According to the fluid-mosaic model of the plasma membrane, what does the word 'mosaic' refer to? (2008)

(A) The hydrophobic property of fatty acids

(B) The bilayer nature of the membrane

(C) The arrangement of the proteins

(D) The movement of the phospholipids

55. What is the substance that helps to keep the biological membrane in a fluid state? (2008)

(A) Waxes

(B) Water

(C) Cholesterol

(D) Phospholipids

56. What happens when a plant cell absorbs in more water? (2009)

(A) It shrinks

(B) It becomes turgid

(C) It becomes wilted

(D) It swells and bursts

57. Which of the following organelles is common to both plant and animal cells? (2009)

(A) Cell wall

(B) Chloroplast

(C) Mitochondria

(D) Central vacuole

58. If a cell fails to form lysosomes, which of the following cellular functions will get disrupted first? (2009)

(A) Protein synthesis

(B) Chromosome replication

(C) Removal of cellular debris

(D) Transport across cell membrane

59. For a substance to easily pass across the cell membrane by simple diffusion which of the following properties should it possess? (2009)

(A) Large size

(B) Ability to dissolve in lipid

(C) Positive charge

(D) Negative charge

60. What happens when human red blood cells are kept in a hypotonic solution? (2009)

(A) The same net gain and loss of water

(B) More water gets into the cell than leaving it

(C) More water goes out of the cell than getting in

(D) The cells prevent water from getting in or leaving out

61. Which knowledge about cell biology did scientists discover after all the others? (2009)

(A) The first understanding that living things are made of cells

(B) Knowledge about how chromosomes behave during mitosis

(C) First understanding about the double helix structure of DNA

(D) First understanding about the DNA sequence in human genome

62. Cells were first seen using the microscope by: (2010)

(A) Robert Hooke

(B) Schleiden

(C) Schwann

(D) Leeuwenhoek

63. Who was the first person who believed to have seen live moving cells under a microscope? (2010)

(A) Anton van Leeuwenhoek
(B) Rene Dutrochet
(C) Robert Hooke
(D) Theodor Schwann

64. Through which process can inorganic ions from the soil be absorbed into the root hairs? (2010)
(A) Active transport
(B) Diffusion
(C) Dehydration
(D) Osmosis

65. Which of the following organelles settles out last when homogenized cells are centrifuged? (2010)
(A) Ribosome
(B) Nucleus
(C) Mitochondria
(D) Chloroplast

66. Cell organelles that contain hydrolytic enzymes are called (2010)
(A) Lysosomes
(B) Peroxisomes
(C) Mesosomes
(D) Ribosomes

67. Which part of the cell makes necessary changes, packages and secretes proteins? (2010)
(A) cell wall
(B) Endoplasmic reticulum
(C) Mitochondria
(D) Golgi apparatus

68. Of the following models describing the nature of the cell membrane, which one was proposed before all the others? (2010)
(A) The sandwich model
(B) Fluid mosaic model
(C) Phospholipid bilayer model
(D) The unit membrane model

69. The organelle of the cell which is concerned with the synthesis of lipids in addition to being associated with carbohydrate metabolism and detoxification is: (2010)
(A) golgi body/apparatus
(B) smooth endoplasmic reticulum
(C) thylakoid membrane
(D) rough endoplasmic reticulum

70. Which of the following is **NOT** a requirement for a molecule to directly diffuse across the cell membrane? (2010)
(A) Large size and polarity
(B) Non-polarity
(C) Lipid solubility
(D) Small size