Ratnesh Kumar Soni
Assistant Professor
Department of Zoology
E-Mail: rajbiology1@gmail.com

K.N. Govt. P.G. College,Gyanpur
Gyanpur, (Bhadohi)

Multiple Choice Questions

M.Sc. Zoology IV Semester Special Paper III C (Cell Biology), Ultrastructure and Morphodynamics of Cell

1. Average thickness of plasma membrane is
   a. 5-10 nm
   b. 10-20 nm
   c. 5-50 nm
   d. 50-100 nm

2. The fluidity of plasma membrane increase with
   a. Increase in saturated fatty acids in the membrane
   b. Increase in unsaturated fatty acids in the membrane
   c. Increase in unsaturated fatty acids in the membrane
   d. Increase in glycolipid content in the membrane

3. Which of the following is NOT the function of plasma membrane?
   a. Intercellular interactions
   b. Responding to external stimuli
   c. Energy transduction
   d. Assisting in chromosome segregation

4. The carbohydrate content of plasma membrane in eukaryotes is:
   a. 2 – 10 % by weight
   b. 20 – 25% by weight
   c. 30 – 50 % by weight
   d. 60 – 70% by weight

5. Carbohydrates in the plasma membrane:
   a. Always face inward to the non-polar portion of membrane
   b. Always face outward to extracellular space
   c. Always face to the lumen of cells
   d. Directed to all sides in the membrane random

6. The main role of carbohydrates in the cell membrane is
   a. Adhesion
   b. Recognition
   c. Locomotion
   d. Reception

7. Glycolipids in plasma membrane are usually located at:
   a. Outer leaflet of plasma membrane
   b. Inner leaflet of plasma membrane
   c. Evenly distributed in both inner and outer leaves of plasma membrane
   d. Cannot be predicted, it varies according to cell types

8. Transverse diffusion (flip-flop) is the movement of
   a. Cholesterol molecule
   b. amino acid
   c. Protein
   d. Phospholipid

9. Which of the following genetic diseases is caused by mutations in a membrane protein?
   a. Alzheimer's disease
   b. Parkinson's disease
   c. Anemia
   d. Hemolytic anemia

10. The protruding invaginated sheets inside mitochondria is known as
    a. Cristae
    b. Fimbrae
    c. Hyphae
    d. Cellular Digestion

11. Which part of mitochondria has almost 70-75% protein content?
    a. Outer membrane
    b. Inner membrane

c. Both outer and inner membrane
d. Intermembrane space

12. In the inner membrane of mitochondria, there is one protein molecule for approximately every
    a. 15 phospholipids
    b. 5 phospholipids
    c. 25 phospholipids
    d. 50 phospholipids

13. Cardiolipin present in inner mitochondrial membrane plays a role in
    a. Formation of the respiratory mechanisms
    b. Activation of proteins involved in Glycolysis
    c. Activation of proteins involved in electron oxidation
    d. Activation of proteins

14. Porins are present in
    a. Inner membrane
    b. Outer membrane
    c. Both inner and outer membrane
    d. Intermembrane space

15. Which of the following together represent an endomembrane system?
    a. macromolecules of the cell
    b. Cell receptors
    c. Cytoplasmic structures
    d. Nuclear structures

16. Proteins are synthesized in which of the following organelle of the endomembrane system
    a. Endoplasmic reticulum
    b. Golgi complex
    c. Lysosomes
    d. Vacuoles

17. There are _____ types of secretory activities of a cell.
    a. One
    b. Two
    c. Three
    d. Four

18. In regulated secretion, materials are
    a. Secreted
    b. Stored
    c. Degraded
    d. Aggregated

19. Which type of endomembrane secretion occurs in nerve cells?
    a. Constitutive
    b. Regulatory
    c. Non-continuous
    d. Intermittent

20. Which of the following biomolecules are contained in the lysosomes?
    a. Nucleic acids
    b. Ribonucleic acids
    c. Proteins
    d. Polysaccharides

21. In animals, the amount of cholesterol present in cell membrane is
    a. 20%
    b. 15%
    c. 50%
    d. 33%

22. Carbohydrates present in cell membrane are generally
    a. Monosaccharides
    b. Disachharides
    c. Oligosaccharides
    d. Polysaccharides

23. Which of the following is described by the fluid mosaic model
    a. Nucleus
    b. Plasma membrane
    c. Endoplasmic reticulum
    d. Ribosome

24. Which of the following organelle control intracellular digestion of macromolecules with the help of hydrolytic enzymes?
    a. Plastid
    b. Peroxisome
    c. Lysosome
    d. Actin

25. Which of these are not the hydrolytic enzymes of lysosome?
    a. Lipases
    b. Sulfatases
    c. Phosphatases
    d. Aldolase

26. Digestion of cell's own component is known as
    a. Autophagy

b. Heterophagy
c. Phagocytosis
d. Pinocytosis

27. Which of the following organelle takes part in the secretion?
a. Cytoplasm
b. Ribosomes
c. ER compartments
d. Golgi apparatus

28. Which of the following is not the function of the Golgi apparatus?
a. Processing and shorting of glycoprotein
b. Lipid metabolism
c. Carbohydrate metabolism
d. Amino acid metabolism

29. What is microsome?
a. Compartment of Golgi
b. Smaller ribosomes
c. Small ER compartments
d. Small vesicles of fragmented ER

30. Which of the following coated vesicle transport protein from ER to Golgi?
a. Clathrin
b. COP II
c. COP I
d. COP III

31. Genetic information stored in mRNA is translated to polypeptide by
a. Ribosome
b. Nucleus
c. Endoplasmic reticulum
d. Golgi apparatus

32. Which of the following Scientist discovered ribosome for the first time?
a. George Emil Palade
b. Theodor Schwann
c. Antonie van Leeuwenhoek
d. Robert Hook

33. Which of the following is not a sorting signal present of protein
a. Signal patch
b. Signal peptide
c. Carbohydrate sequence
d. Amino acid sequence

34. Which of the following statement is defines polysomes?
a. Lysosomal aggregation
b. Multiple units of ribosomes
c. Attachment of many ribosomes to common mRNA
d. Attachment of many mRNA to ribosomes

35. Name the antibiotic which inhibits protein synthesis in eukaryotes?
a. Penicillin
b. Cycloheximide
c. Cinhonine
d. Chlorophenicol

36. Which of the following is NOT the type of cancer?
a. Carcinomas
b. Sarcomas
c. Leukemia
d. Caspases

37. What is the origin of the cancerous cells?
a. Monoclonal
b. Polyclonal
c. Stem cells
d. Mesodermal cells

38. Which of the following is the characteristic of a cancer cell?
a. Density dependent inhibition
b. Contact inhibition
c. Loss of anchorage dependence
d. Apoptosis

39. If DNA is damaged, which of the following gene arrest cell cycle?
a. Rb
b. p53
c. Hedgehog receptor
d. p16

40. Name the cells which lost their control of the regulated division, differentiation, and apoptosis?
a. Tumor cell
b. Immune cell
c. Platelets
d. Stem cells

41. Chromosome is the thickest during
a. Prophase
b. Metaphase
c. Anaphase
d. Telophase

42. The structure help in chromosome separation during cell division are
    a. Microtubules
    b. Microfilaments
    c. Intermediate filaments
    d. All

43. The mitotic apparatus of animal cells comprises of
    a. Kinetochore microtubules
    b. Polar microtubules
    c. Both
    d. None

44. Which microtubule motor proteins conserved in all spindle fibre
    a. BimC
    b. CENP-E
    c. Cytosolic dynein
    d. All

45. During cell division the (-) end of microtubule towards
    a. Pole
    b. Chromosome
    c. Any side
    d. None

46. Name the components participate in attaching chromosomes to microtubules during cell division
    a. Centromere
    b. Kinetochore
    c. Spindle proteins
    d. All

47. Which of the following cells lacks cytoskeleton?
    a. Eukaryotic plant cell
    b. prokaryotic bacterial cells
    c. Bot A and B
    d. Prokaryotic cells and eukaryotic animal cells

48. Cytoskeletons are chemically
    a. Nucleoprotein filaments
    b. Nucleoprotein filaments and lipids
    c. Ribonucleoproteins filaments
    d. Protein Filament

49. Microtubules are made up of
    a. Flagellin
    b. Desmin
    c. Tubulin
    d. Actin and myosin

50. Which of the following is a microtubule associated protein (MAP_S)
    a. 'tus' protein
    b. 'tau' protein
    c. 'rho' protein
    d. G protein

51. The microtubule assembly is inhibited by
    a. Colchicine
    b. Vincristine
    c. Vinblastine
    d. All of these

52. Chromosome movement during cell division is regulated by
    a. Microtubules
    b. Microfilaments
    c. Intermediate filaments
    d. All of these

53. Which of the following statements are true
    a. Intermediate filaments are resistant to colchicine and cytochalasin-B
    b. Microtubules are made up of tubulins
    c. Microfilaments are made up of actin
    d. All of these

54. Cilia and flagella of Eukaryotic cells are made up of
    a. Keratin
    b. Tubulin
    c. Lamin
    d. Desmi

55. Which of the following is the most heterogeneous type of cytoskeletal filament
    a. Microtubules
    b. Microfilaments
    c. Intermediate filaments
    d. None of these

56. Microfilaments are involved in
    a. Cyclosis
    b. Amoeboid movement
    c. Furrow formation during cell division
    d. All

57. Which of the following is a microtubule organizing center?
    a. Centrosome
    b. Kinetochore
    c. G2 phase

d. Centrioles

58. Name the protein which holds two sister chromatids?
    a. Securin
    b. Separase
    c. Cohesin
    d. APC

59. Which of the following microtubule pulls the chromosomes towards pole?
    a. Astral
    b. Polar
    c. Kinetochore
    d. Centrioles

60. Spindle fiber attached to the chromosome by a process known as_____
    a. Congression
    b. Binding
    c. Alignment
    d. Search and capture

61. What is congression?
    a. Attachment of microtubule to chromosomes
    b. Attachment of two sister chromatids
    c. The endpoint of the spindle pole
    d. The midpoint of two spindle poles

62. Which of these proteins is responsible for depolymerization of microtubule?
    a. Kin I kinesin
    b. CENP-E
    c. Dynein
    d. Actin

63. Name the medication which hinders the shortening of the microtubule.
    a. Colchicine
    b. Cytochalasin
    c. Taxol
    d. Vinblastine

64. Crossing over occurs between
    a. Two daughter nuclei
    b. Two different bivalents
    c. Non sister chromatids of bivalent
    d. Sister chromatids of bivalents

65. Colchicine arrests which of the following stages of cell division?
    a. Anaphase
    b. Telophase
    c. Interphase
    d. Metaphase

66. Polyploidy can be artificially induced by
    a. Self pollination
    b. Line breeding
    c. Inbreeding
    d. Colchicine

67. Chiasmata formation takes place during
    a. Prophase I
    b. Metaphase I
    c. Anaphase I
    d. Telophase I

68. Anaphase is brought about by the change in which cytoskeletal element?
    a. Tubulin
    b. Actin
    c. Myosin
    d. Dyani

69. Chromosomal compaction is brought about by
    a. Cohesin
    b. Thrombin
    c. Condensin
    d. Sequrin

70. P53 activates transcription of
    a. P5
    b. p27
    c. p21
    d. p35

71. Name the cells which lost their control of the regulated division, differentiation, and apoptosis?
    a. Tumor cell
    b. Immune cell
    c. Platelets
    d. Stem cells

72. Cancer cells can easily be destroyed by radiations due to
    a. Fast mutation
    b. Rapid cell division
    c. Lack of mutation
    d. Lack of oxygen

73. Oncogenes are the cancer causing genes in the cells but they do not express usually. This is because of the presence of
    a. Proto oncogenes
    b. Tumour promoters
    c. Tumour suppressor genes

d. Transposons or jumping genes

74. Blastoma is a cancer involving which tissue
    a. Bones
    b. Connective tissue
    c. Epithelial cells
    d. Embryonic tissue

75. Which on of the following is used in treatment of thyroid cancer?
    a. U-238
    b. I-131
    c. C-14
    d. Ra-240

76. Migration of cancerous cells from the site of origin to other part of the body forming secondary tumours is called
    a. Diapedesis
    b. Metastasis
    c. Proliferation
    d. None of these

77. The basic difference between a cancer cell and a normal cell is
    a. Cancer cells divide continuously but normal cells do not divide
    b. Normal cell is bigger than cancer cells
    c. Normal cells are immortal but cancer cells are mortal
    d. Cancer cells divide do not differentiate like normal cells

78. Cancer of β lymphocytes is called
    a. Sarcoma
    b. Melanoma
    c. Myeloma
    d. Carcinoma

79. Cancer cells are
    a. BHK
    b. Veo
    c. HL-8
    d. HeLa cells

80. Cancer is caused by
    a. Uncontrolled mitosis
    b. Uncontrolled meiosis
    c. Rupturing of cells
    d. Loss of immunity of the cells

81. Which one of the following genes is involved in the conversion of proto-oncogenes into oncogenes causing Cancer?
    a. Metastasis genes
    b. Angiogenesis genes
    c. Transposons
    d. Tumour suppressor genes

82. Name the enzyme which causes ubiquitylation and destruction of cyclin.
    a. Acid hydrolases
    b. Hyaluronidase
    c. Ubiquitin ligase
    d. Phosphatase

83. Name the cyclin which takes part in M phase?
    a. Cyclin E
    b. Cyclin A
    c. Cyclin D
    d. Cyclin B

84. Cyclin dependent kinases are activated by which of the following?
    a. Binding to cyclin
    b. Binding to cyclin and CDK activating protein kinases
    c. Phosphorylation with CDK activating kinase
    d. Phosphorylation with tyrosine kinase

85. Name the regulatory component of the cell cycle?
    a. Cyclin
    b. CDK
    c. DNA
    d. APC

86. How many hours does the M phase take to complete a cycle?
    a. 8hr
    b. 1 hr
    c. 4 hr
    d. 11 hr

87. Name the state where never dividing cells of neurons and skeletal muscle present?
    a. G0
    b. G1
    c. G2
    d. M

88. The most common solid tumors – breast, colon etc. arise in ____cells.
    a. Epithelial
    b. Mesothelial
    c. Nerve cells

d. Muscle cell

89. Proto-oncogenes are possessed by the
    a. RNA virus
    b. DNA virus
    c. Cells themselves
    d. Pathogenic bacteria

90. The first tumor-suppressor gene to be studied is associated with
    a. Myeloma
    b. Sarcoma
    c. Retinoblastoma
    d. Carcinoma

91. p53 is a
    a. Translation factor
    b. Polymerase
    c. Endonuclease
    d. Transcription factor

92. The immortality exhibited by the cancer cells is due to presence of
    a. Telomerase
    b. Nuclease
    c. Kinase
    d. Proteas

93. The cancer cells are protected from
    a. Transcription
    b. Mutation
    c. Apoptosis
    d. Contamination

94. The regulatory subunit of maturation-promoting factor (MPF) is called
    a. Kinase
    b. Cyclin
    c. Tetracyclin
    d. Interleukin

95. Which of the following are found only in animal cells?
    a. Intermediate filaments
    b. Microtubules
    c. Nucleus
    d. Microfilaments

96. Cyclin binding leads to a change in the ____ of kinase
    a. PH
    b. Temperature
    c. Concentration
    d. Conformation

97. Name the structure which is used to transfer macromolecules between the cytoplasm and nucleus.
    a. Microtubules
    b. Nuclear pores
    c. Cilia
    d. Centrioles

98. Non-membrane bound body of the nucleus which disappears in the late prophase and reappears in telophase
    a. Nucleolus
    b. Chromosome
    c. Nucleoplasm
    d. Nuclear pore

99. Which region of chromatin is transcriptionally silent?
    a. Nucleoid
    b. Centromere
    c. Euchromatin
    d. Heterochromatin

100. Gaucher disease is caused due to deficiency of
    a. Hexosaminidase A
    b. Lysosomes
    c. Glucocerebrosidase
    d. Mannose phophate

Answer

1.a	2.b	3.d	4.a	5.b	6.b	7.a	8.d	9.d	10.a	11.b	12.a	13.c	14.c	15.c
16.a	17.b	18.b	19.b	20.c	21.c	22.d	23.b	24.c	25.d	26.a	27.d	28.d	29.d	30.b
31.a	32.a	33.c	34.c	35.b	36.d	37.a	38.c	39.b	40.a	41.b	42.a	43.c	44.d	45.a
46.d	47.b	48.d	49.c	50.b	51.d	52.a	53.d	54.b	55.c	56.d	57.a	58.c	59.c	60.d
61.d	62.a	63.c	64.c	65.d	66.d	67.a	68.a	69.c	70.c	71.a	72.b	73.c	74.d	75.b
76.b	77.d	78.c	79.d	80.a	81.d	82.c	83.d	84.b	85.a	86.b	87.a	88.a	89.c	90.b
91.d	92.a	93.c	94.b	95.a	96.d	97.b	98.a	99.d	100.c					

Answer Explanation:

9. Answer: d
Explanation: Hemolytic anemia is caused by the abnormal shapes of erythrocytes which have been traced to the mutations in ankyrin or spectrin which are plasma membrane proteins found in erythrocytes.

11. Answer: b
Explanation: The outer membrane of mitochondria is composed of approximately 50% lipid by weight and contains a mixture of different enzymes. The inner membrane contains more than 100 different polypeptides and has a very high protein to lipid ratio. The protein content exceeds 70% by weight.

12. Answer: a
Explanation: The inner membrane contains more than 100 different polypeptides and has a very high protein to lipid ratio. The protein content exceeds 70% by weight. This corresponds to about one protein molecule for every 15 phospholipids.

13- Answer: c
Explanation: The inner membrane of mitochondria is virtually devoid of cholesterol and rich in unusual phospholipid and cardiolipins, which is the characteristics of bacterial membrane, from which the inner mitochondrial membrane has presumable evolved. Cardiolipin plays a role in facilitating the activity of several large protein complexes involved in lector transport and ATP synthesis.

14. Answer: c
Explanation: Porins are integral proteins that have relatively large internal channel surrounded by a barrel of Beta strands. The porins of outer mitochondrial membrane are dynamic structures that are more permeable to molecules such as ATP, NAD and Coenzyme A. The inner mitochondrial membrane is highly impermeable and all molecules and ions require special membrane transporters to gain entrance.

15- Answer: c
Explanation: The cytoplasmic organelles of a cell namely endoplasmic reticulum, Golgi complex, lysosomes, vacuoles; together represent the endomembrane system where individual components function as a part of a coordinated unit.

16- Answer: a
Explanation: Proteins are synthesized in the endoplasmic reticulum and then modified in the Golgi complex. From the Golgi complex, the proteins are further transported to different destinations depending upon their function and fate.

17- Answer: b
Explanation: Secretory activities lead to the discharge of proteins synthesized in the endoplasmic reticulum. There two types of secretory activities of a cell namely constitutive secretion and regulated secretion.

18- Answer: b
Explanation: In regulated secretion activities of the cell, materials are stored in membrane bound packages and released only when there is an invoked response.

19- Answer: a
Explanation: Tumor cells work opposite to normal cells; a normal cell has regulated division, differentiation, and programmed cell death. When the normal cell loses its ability to undergo apoptosis and regulated cell division, it becomes a tumor cell.

21. Answer: c
Explanation: In animal cell, cholesterol constitutes up to 50% of the lipid molecules present in plasma membrane. In plants however, it is not yet discovered whether they lack cholesterols or not. Plant cells however have cholesterol-like sterol.

22. Answer: c
Explanation: The modification of membrane proteins by addition of carbohydrates occurs by a process called glycosylation. The carbohydrate of glycoproteins is present as short, branched hydrophilic oligosaccharides. In contrast to long-chained polysaccharides, they only have upto 15 sugars per chain.

23-Answer: b
Explanation: Jonathan Singer and Garth Nicolson in 1972, proposed a fluid mosaic model for the structure and composition of the plasma membrane. This model is now accepted worldwide for the plasma membrane study.

25- Answer: d
Explanation: Lysosomes contain 40 types of hydrolytic enzymes which include lipases, sulphatases, phosphatases, glycosidases etc. These enzymes work optimally in the acidic environment and the lysosome provides an acidic environment for these enzymes.

28- Answer: d
Explanation: Golgi apparatus involves the metabolism of carbohydrates, and lipids, but not of amino acid, so, amino acid metabolism is incorrect. Synthesis of glycolipids and sorting of glycoprotein also takes place in Golgi apparatus.

29-Answer: d
Explanation: Microsomes are small vesicles formed by the breakdown of ER membrane into fragments. Microsomes which are derived from RER are known as rough microsomes while microsomes lacking ribosomes are called smooth microsome.

30- Answer: b
Explanation: COP II vesicles form for an anterograde pathway from ER to the Golgi. These transport vesicles arise from specialized coated regions of the membrane.

32- Answer: a
Explanation: Ribosomes are ribonucleoproteins which are made up of RNAs and protein. These are used to translate genetic information stored in mRNA to polypeptides. These are globular in structure.

33- Answer: c
Explanation: Sorting signals present on proteins help them to transport and target to specific organelles such as ER, mitochondria, nucleus, plastids etc. Sorting signals present on protein can be a signal patch or signal peptide which is in the form of an amino acid sequence.

34- Answer: c
Explanation: Polysome is also known as polyribosome, it is a structure where a single mRNA holds a number of ribosomes translocating in 5’ to 3’ direction.

35- Answer: b
Explanation: Cyclohexamide produced by the Streptomyces griseus, and interfere with the translocation step of protein synthesis and block translational elongation in eukaryotes.

36- Answer: d
Explanation: Caspases is incorrect as caspases are protease enzyme which causes apoptosis, which is opposite to tumor formation. Carcinoma is endodermal/ectodermal tissue tumor, sarcoma is a tumor of mesodermal connective tissue, and leukemia is blood cancer.

37-Answer: a
Explanation: Cancer arises from a single abnormal cell or it has a monoclonal origin. It is initiated by the change in DNA sequences or change in the pattern of gene expression.

38- Answer: c
Explanation: Cancer cell loses contact inhibition, anchorage dependence, does not undergo apoptosis, become immortal, invasive and invade normal tissue in the body.

39- Answer: b
Explanation: p53 is a tumor suppressor gene which acts as a transcription factor and arrests the cell cycle if DNA is damaged. These genes also encode checkpoint control proteins and maintain genomic stability during mitotic proliferation.

40. Answer: a
Explanation: Tumor cells work opposite to normal cells; a normal cell has regulated division, differentiation, and programmed cell death. When the normal cell loses its ability to undergo apoptosis and regulated cell division, it becomes a tumor cell.

57. Answer: a
Explanation: Microtubule organizing center (MTOC) is centrosome, present outside the nuclear membrane. It regulates the cycle of cell division as well as microtubule formation.

58. Answer: c
Explanation: SMC (Structural Maintenance of Chromosome) protein cohesin hold together the sister chromatids at centromere while separase is ubiquitous cysteine protease which degrades cohesin during anaphase.

60. Answer: d
Explanation: Search and capture is a process by which plus end of microtubule search the kinetochore site at the chromosome and attach to it. These microtubules radiate from the MTOC of the poles.

61.Answer: d
Explanation: The arrangement of chromosomes at the center of the poles or at the metaphase plate, which is a midpoint and this midpoint is called congression.

62. Answer: a
Explanation: CENP-E, Kin I kinesin, and dynein are the motor proteins which contain kinetochores. Out of them only Kin I kinesis is responsible for depolymerization of microtubule from its plus end while dynein generates poleward forces toward its minus end.

63. Answer: c
Explanation: All of these drugs affect the process of cell division at different stages like colchicine inhibits microtubule formation, cytochalasin inhibits cytokinesis, and taxol prevents the shortening of microtubules.

65. Answer: d
Explanation: Colchicine is an alkaloid. It is used to treat acute attacks of gout. Colchicine arrests Metaphase stage of cell division.

69. Answer: c
Explanation: The condensing molecule has two parts where each bind to two coils of a chromosome and bring them close. This results in chromosome compaction. Cohesin brings two chromosomes together during synapsis.

70. Answer: c
Explanation: The increased amount of P53 as a result of DNA damage leads to increased transcription of WIP1/ Cip1p21 gene which leads to increase in p21 levels.

71. Answer: a
Explanation: Tumor cells work opposite to normal cells; a normal cell has regulated division, differentiation, and programmed cell death. When the normal cell loses its ability to undergo apoptosis and regulated cell division, it becomes a tumor cell.

82. Answer: c
Explanation: Destruction of cyline takes place by ubiquitin dependent proteolysis. It is catalyzed by ubiquitin ligase, an enzyme which acts upon either G1-S phase or M phase cyclin.

83. Answer: d
Explanation: Different events of the cell cycle are controlled by the association of CDK with different cyclins. Cyclin B is mitotic cyclin which works in M phase while cyclin E is S phase cyclin, and cyclin D is G1 cyclin.

84. Answer: b
Explanation: The activation of CDK is triggered by the association of cyclin and phosphorylation with associated kinases. Kinases are the enzymes which add a phosphate group to the target substrate.

85. Answer: a
Explanation: Cyclin is the regulatory component of the cell cycle as it undergoes synthesis and degradation in each division of the cell cycle. CDK is cyclin-dependent kinases which are catalytic in nature.

86. Answer: b
Explanation: A cell cycle of the eukaryotic cell takes 24 hr to divide. In total 24 hrs, the G1 phase takes 11 hr, S phase completed in 8 hrs, G2 about 4 hrs, and M phase about 1 hr.

87. Answer: a
Explanation: G0 is the state where cell division never occurs; cells can remain in this state for days, weeks, and even a year. It is terminally differentiated state and most of the cell in our body like neurons and skeletal muscle cells are in G0 state.

88. Answer: a
Explanation: Since tumors usually arise from cells that have indefinite capacity to divide, solid tumors usually arise from the epithelial cells that are engaged in high level of cell division.

89. Answer: c
Explanation: Proto-oncogenes are the genes present in cells themselves, these genes have the ability to avert a normal cell into a cancerous one. The initial event that led to the discovery of proto-oncogenes was made in 1976 when src gene from avian sarcoma virus was identified.

90. Answer: b
Explanation: The first tumor-suppressor gene to be studied is associated with retinoblastoma – a rare childhood cancer of the retina. The incidence of this disease follows a distinct two patterns: it occurs in children of certain families and sporadically at an older age.

91. Answer: a
Explanation: p53 is a transcription factor that activates the expression of a wide array of proteins responsible for cell cycle regulation and apoptosis. There are six most common mutations in human cancers that are required for disabling the p53.

92. Answer: a
Explanation: In culture, the cancer cells possess the capability of growing infinitely unlike normal cells that do not grow beyond a certain number of mitotic divisions. This immortality exhibited by the cancer cells is due to the presence of enzyme telomerase.

93.Answer: c
Explanation: The cancer cells are protected from apoptosis and usually do not activate a cell destruction pathway even when there is a presence of aberrant chromosome number and inhibitory signals from the environment.

94. Answer: b
Explanation: The regulatory subunit of maturation-promoting factor (MPF) is called cyclin. The concentration of this regulatory protein changes in a predictable pattern. When the cyclin concentration is low, the enzyme is inactive.

95. Answer: a
Explanation: Nucleus is found in all living matter, although in contrasting morphology. Of the three cytoskeletal elements, intermediate filaments are only found in the animals.

96. Answer: d
Explanation: Cyclin binding leads to a change in the conformation of catalytic subunit of kinase enzyme by binding to its catalytic site. This binding allows the cyclin dependent kinase (CDK) to phosphorylate its substrates.

100. Answer: c
Explanation: Gaucher's disease is caused by the deficiency of the lysosomal enzyme glucocerebrosidase. Due to this deficiency, large quantities of glucocerebroside accumulate in the lysosomes of macrophages.