CELL BIOLOGY

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1. Omnis 'cellula-e-cellula' stated by
1) Schleiden 2) Schwann 3) Virchow 4) Robert Hook

2. Secondary wall is present between
1) Primary wall & Protoplasm 2) Primary wall and middle lamella
3) Primary wall and plasma membrane 4) Plasma membrane and protoplasm

3. Chemicals present in middle lamella [ ]
1) Cellulose 2) Lignin 3) Hemicellulose 4) Pectin

4. True statement regarding functions of cell wall
I: It is protective in function. II: It helps in osmoregulation
III: It gives definite shape to the cell.
1) I & III 2) I, II & III 3) II & III 4) I & II

5. Assertion A: Plasma membrane is not visible in normal cells.
Reason R: It is thin and closely appressed to the cell wall
1) Both A, R are true and R is the correct explanation of A.
2) Both A, R are true but R is not the correct explanation of A.
3) A is true but R is false 4) A is false but R is true

6. Biological property of the cell
1)Coagulation 2) Colloidal nature
3) Growth 4) Brownian movement

7. In a sandwich model
1) Proteins are sandwiched between lipids
2) Lipid bilayer is sandwiched between protein
3) Protein sandwiched between another protein
4) Lipids are sandwiched between other lipids.

8. Fluid mosaic model proposed by
1) Davson and Danielli 2) Corti & Fontana
3) Robertson 4) Singer & Nicholson

9. Movement of cytoplasm around a single vacuole in regular direction is
1) Circulation 2) Rotation 3) Brownian movement 4) Solation

10. Assertion A: Plants are autotrophic
Reason R: Chloroplasts are present in plant cells
1) Both A, R are true and R is the correct explanation of A.
2) Both A, R are true but R is not the correct explanation of A.
3) A is true but R is false 4) A is false but R is true

11. Plastids storing fats and oil are
1) Aleuroplast 2) Elaioplast 3) Amyloplast 4) Oleoplasts

12. Pigment present in roots of Daucus
1) Xanthophyll 2) Phycobilins
3) Anthocyanin 4) Carotenes

13. Chloroplast is called as a semi-autonomous organelle because 1) It shows ATP production 2) It shows DNA and Self replication.
3) They inherit from cell to cell 4) They break down into two.

14. Pigment in Brown Algae
1) Xanthophyll 2) Anthocyanin
3) Fucoxanthins 4) Chlorophyll

15. Assertion A: Ribosomes are considered as primitive cell organelles.
Reason R: They are the smallest cell organelles
1) Both A, R are true and R is the correct explanation of A.
2) Both A, R are true but R is not the correct explanation of A.
3) A is true but R is false 4) A is false but R is true

16. Not a function of Endoplasmic reticulum
1) Glycogen storage 2) Intra cellular transport
3) Lipid-synthesis 4) Protein synthesis

17. Cell organelle that converts Kinetic energy into potential energy.
1) Chloroplast 2) Mitochondria 3) Ribosomes 4) Lysosomes

18. Cell organelle responsible for degradation of lipids,carbohydrates or proteins.
1) Mitochondria 2) Lysosomes
3) Chloroplast 4) Glyoxysomes

19. Baker's body is produced from
1) ER 2) Plasma membrane 3) Ribosomes 4. Nucleus

20. Function of universal cell organelle
1) ATP production 2) Digestion 3) Protein synthesis 4) Repository

21. 70s ribosomes are present in
1) Only prokaryotes 2) Only Eukaryotes
3) Both Prokaryotes and Eukaryotes
4) Always in prokaryotes but occasionally in Eukaryotes.

22. 80s ribosomes can be separated into subunits
1) 50s & 30s 2) 60s & 40s 3) 60s & 20s 4) 70s & 10s

23. Enzyme present in the larger sub-unit of ribosome
1) Peroxidase 2) Peptidyle oxydase
3) Amylase 4) Peptidyl transferase

24. Function of cell organelle discovered by Bridenbach
1) Synthesis of phospholipids 2) Conversion of fats into carbohydrates
3) Breakdown of H_2O_2 4) Digestion of food materials

25. Organelle considered as secretory in function is
1) Lysosome 2) Vacuole 3) ER 4) Golgi

26. Organelle without a membrane
1) Ribosome 2)Vescicle 3) Vacuole 4) Glyoxysome

27. Cell organelles participating in photorepression
1) Only peroxysome 2) Peroxysome & Glyoxysome
3) Peroxysome, Mitochondria & Chloroplast 4) Only Mitochondria

28. Pigment present in the repository of the cell is
1) Carotene 2) Anthocyanin
3) Chlorophyll 4) Xanthophyll

29. Secretory substance present in the repository of the cell
1) Lipid 2) Protein
3) Latex 4) Sugar

30. Ergastic body is
1) Ribosome 2) Mitochondria
3) Vacuole 4) Non Living Inclusion

31. Coenocytic Algae
1) *Mucor* 2) *Rhizopus* 3) *Vaucheria* 4) *Chlorella*

32. Dikaryotic condition is seen in
1) Tapetal cell & *Mucor* 2) Tapetal cells & *Vaucheria*
3) Tapetal cells & Ascomycotina 4) Ascomycotina & *Mucor*

33. Plasmosome is present in
1) Cytoplasm 2) Outside protoplasm 3) In Plasma membrane 4) Nucleus

34. DNA & RNA polymerases are present in
1) DNA 2) Nucleoplasm
3) Nucleolus 4) Vacuole

35. Ribosomes are produced at the
1) ER 2) Golgi
3) Plasmosome 4) Nucleoplasm

36. Tonoplasm is
1) Membrane covering the vacuole
2) Liquid present in Vacuole
3) Protein present in membrane
4) Secretory substance present in protoplasm

37. Degradation of H_2O_2 takes place in
1) Peroxysome 2) Glyoxysome
3) Vacuole 4) Lysosome

38. ER discovered by
1) Palade 2) Rhodin 3) Brown 4) Porter

39. Binding site & Condensing site is present in
1) Small sub unit of ribosome 2) Large sub unit of ribosome
3) In a complete ribosome 4) ER

40. The site of formation of glycoproteins and glycolipids is
1) ER 2) Golgi complex 3) Ribosome 4) Nucleus

Cell Organelles

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3	**3**	**4**	**1**	**1**	**3**	**2**	**4**	**2**	**1**	**2**	**2**	**2**	**3**	**2**	**4**	**1**	**2**	**1**	**3**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
3	**2**	**4**	**2**	**4**	**1**	**3**	**2**	**3**	**4**	**3**	**3**	**4**	**2**	**3**	**2**	**1**	**4**	**3**	**2**

Questions on chromosomes and nucleic acids

1. Match the following

List A	**List B**
A) Hofmeister	1) The term nucleosome
B) Waldeyer	2) Deep staining dark structures in pollen mother cell
C) Sutton & Boveri	3) Nucleosome model
D) Oudet	4) Chromosomes are the vehicles of heredity
	5) Naming of chromosomes

	A	B	C	D		A	B	C	D
1)	2	5	4	3	2)	2	5	4	1
3)	4	3	2	1	4)	5	4	1	2

2. Each chromosome consists of
1) Two chromatids and two DNA 2) Two chromatids many DNA
3) One centromere and one arm 4) many centromere many arms and many DNA

3. Tip of each arm is called
1) Terminals 2) Telomere 3) Kargotype 4) Satellite

4. Lowest number of chromosomes in plant kingdom is seen in
1) *Pisum* 2) *Zea mays* 3) *Oryza* 4) *Haplopappus*

5. Assertion (A): In anaphase chromosomes appear in different shapes.
Reason(R)**:** Chromosomes are pulled apart by their contomeres in anaphase
1) Both A and R are true and R is correct explanation of A
2) Both A and R are correct but R is not correct explanation of A
3) A is true and R is false 4) A is false and R is true

6. Chromosome with only one arm is
1) Metacentric 2) Telocentric 3) Sub-meta centric 4) Acro centric

7. Histone proteins with Lysine rich are
1) H_1 2) H_3 & H_4 3) H_{2A} & H_{2B} 4) H_1 & H_2

8. H_3 and H_4 are rich in
1) Methionine 2) Valine 3) Lysine 4) Arginine

9. Histone protein that is not a part of nucleosome
1) H1 2) H_2 3) H_3 4) H_4

10. True statement regarding chromosome
A) All the chromosomes in a cell are not identical
B) All the cells in a species have same number of chromosomes
C) All species of plants have same number of chromosomes
D) All chromosomes in plants are identical
1) A & B 2) B & C 3) C & D 4) A & D

11. Longest chromosomes in plants are seen in
1) *Allium* 2) *Pisum* 3) *Trillium* 4) *Saccharum*

12. Spindle fibres are attached to chromosomes to their
1) Centromeres 2) Kinetochores 3) Satellites 4) Arms

13. True statement regarding secondary constriction is
1) Chromosomes bend at secondary constriction
2) Chromatids separate from this point
3) Some are concerned with formation of nucleoli
4) Every chromosome show secondary constriction

14. Haploid number of which plant is equal to three times less than *Oryza*
1) *Nicotiana* 2) *Zea* 3) *Pisum* 4) *Allium*

15. The number of chromosomes in the endosperm of *Pisum* resulting from a cross between diploid male and tetraploid female plants
1) 28 2) 35 3) 28 or 35x 4) 21

16. Spacer DNA
1) Space between DNA 2) Distance between two nucleosomes
3) Part of DNA between centromere and telomere
4) Part of DNA which joins two nucleosomes

17. Shapes of sub-metacentric and acrocentric chromosomes respectively are
1) V and J 2) L and J 3) T & I 4) V and L

18. Every chromosome has
A) Two kinetochores B) Two arms
C) One or two centromeres D) Two chromatids
1) A & B 2) B & C 3) C & D 4) A & D

19. Major difference between DNA and RNA lies in
1) Number of carbon atoms in sugar 2) Number of oxygen atoms in sugar
3) Number of phosphates attached to sugar 4) Bases attached to sugar

20. Difference between nucleoside and nucleotide is
1) Phosphate 2) Nitrogen base 3) Sugar 4) Sugar and Base

21. Chargaff's rule is
1) A+ T = G+ C 2) A+C = G+T 3) A+G = C+T 4) A= T & G = C

22. True statement regarding DNA is
1) DNA is always two stranded 2) DNA molecule with proteins is acidic
3) DNA is found only in the nucleus 4) DNA can exist in many forms

23. DNA can absorb U.V. light at
1) 265 nm 2) 260 nm 3) 300 nm 4) 70 nm

24. The number of nucleotides in 20 complete helices of a DNA is
1) 1000 2) 200 3) 800 4)400

25. Assertion (A) : Molecular weight of Thymine is more than that of uracil
Reason(R) : Thymine shows an additional methyl group.
1) Both A and R are true and R is correct explanation of A
2) Both A and R are correct but R is not correct explanation of A
3) A is true and R is false 4) A is false and R is true

26. True statement regarding mRNA is
1) It's life span is very short 2) It is the smallest RNA
3) It forms pseudohelices 4) It is produced by translation

27. The length of DNA with 20 base pairs is
1) 210 A^o 2) 340 A^o 3) 68 A^o 4) 126 A^o

28. Low salt concentrations and high pH values in a cell can
1) Break DNA 2) denature DNA
3) Uncoil DNA 4) Condense DNA

29. In autocatalysis
1) DNA undergo lysis and get denature 2) DNA multiplies
3) DNA coils to form chromosome 4) DNA produces m RNA

30. TΨC loop is a part of
1) DNA 2) mRNA 3) tRNA 4) rRNA

31. Arrange the different RNAs in the increased order of their percentage in a cell
1) t RNA → m RNA → r RNA 2) m RNA → r RNA → t RNA
3) r RNA → t RNA → m RNA 4) m RNA → t RNA → r RNA

32. The smallest RNA is
1) t RNA 2) m RNA 3) r RNA 4) Both rRNA & tRNA

33. Shape of t RNA is
1) Pinnate 2) Palmate 3) Linear 4) Clover leaf

34. Nucleotide absent in termination codons
1) Adenine 2) Guanine 3) Cytocine 4) Uracil

35. Number of tRNA based on their anticodons are
1) 64 2) 20 3) 3 4) 61

36. Function of Topoisomerases is
1) Polymerization 2) Breaking DNA
3) Reduce tension in two strands 4) Ligation

37. The number of nucleotides if the length of DNA is 1020 A^o
1)300 2) 600 3) 1020 4) 340

38. If Adenines to Thymine ratio in one strand of DNA is 2 the ratio of Adenine to Thymine on the opposite strand is
1) 10 2) 2 3) 0.5 4) 5

39. Genetic material in viruses
1) DNA 2) RNA 3) DNA & RNA 4) DNA or RNA

40. Assertion (A) : Pseudohelices does not form in mRNA
Reason(R) **:** mRNA is short lived
1) Both A and R are true and R is correct explanation of A
2) Both A and R are correct but R is not correct explanation of A
3) A is true and R is false 4) A is false and R is true

Chromosomes , Nucleic acids

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	**1**	**2**	**4**	**2**	**2**	**3**	**4**	**1**	**1**	**3**	**2**	**3**	**4**	**2**	**4**	**2**	**4**	**2**	**1**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
3	**3**	**2**	**4**	**1**	**1**	**3**	**2**	**2**	**3**	**4**	**1**	**4**	**3**	**4**	**3**	**2**	**3**	**4**	**2**

<u>Questions on cell division</u>

1. In Mitosis spindle fibers form during
1) Prophase 2) Metaphase 3) Anaphase 4) Telophase

2. In cell cycle shortest time period is for
1) M 2) S 3) G1 4) G2

3. Barrel shaped structure formed during cell division is
1) Mitotic spindle 2) Nuclear membrane
3) Phragmoplast 4) Cell plate

4. True statement regarding Mitosis
A: Chromosome number reduces to half.
B: Amount of DNA reduces to half.
C: Number of cells always doubles.

1) A & C 2) Only B 3) B & C 4) A & B

5. Assertion A: Mitotic division is called as equational division.
Reason R: After division daughter cells are identical in size & characters
1) Both A & R are true and R is the correct explanation of A.
2) Both A & R are true but R is not the correct explanation of A.
3) A is true, R is false 4) A is false, R is true.

6. After G_1 phase number of chromosomes in a mitotic cell cycle.
1) Same that of a parent 2) Half that of a parent
3) Double that of a parent 4) May be less or more

7. The stage which is most active biochemically
1) M 2) G2 3) Interphase 4) Cytokinesis

8. True statement regarding daughter chromosome
A: They don't have centromere
B: They don't have arms.
C: They don't have two chromatids.

1) A & B 2) B & C 3) C & D 4) Only C

9. Bivalent stage is
1) Zygotene 2) Pachytene 3) Diplotene 4) Dlakinesis

10. Assertion A: Due to meiosis genetic variations are seen in population.
Reason R: Meiosis produces haploid number in gametes
1) Both A & R are true and R is the correct explanation of A.
2) Both A & R are true but R is not the correct explanation of A.
3) A is true, R is false 4) A is false, R is true.

11. Spindle fibers formation starts in meiosis during
1) Metaphase I 2) Metaphase I & Metaphase II
3) Zygotene & Metaphae II 4) Only Zygotene.

12. Nuclear membrane in meiosis disappears after
1) Leptotene 2) Diplotene 3) Metaphase 4) Diakinesis

13. Stage of segregation is
1) Anaphase - I 2) Pachytene
3) Anaphase - I & Anaphase – II 4) Pachytene & Anaphase – II

14. True statement regarding cell division.
A : All type of cell divisions increase the body.
B : For all cell divisions a life cycle can be drawn.
C : Cell division in some organisms help in reproduction.

1) A & B 2) Only C 3) B & C 4) A & C

15. True statement regarding meiosis
A) Meiosis results in the formation of four identical cells.
B) First spindle apparatus is parallel to the cell plate.
C) Cytokinesis may or may not take place after meiosis—I
D) After first meiotic division chromatid number is same at both poles.

1) A & B 2) B & C 3) C & D 4) A & D

16. Chromosomes are separated into chromatids in
1) Only in Mitosis 2) Only in Meiosis
3) Mitosis and Meiosis – II 4) Mitosis and Meiosis – I

17. Crossing over takes place between
1) Sister chromatids of Homologous chromosomes
2) Non sister chromatids of Heterologous chromosomes.
3) Two chromatids of a single chromosome.
4) Non sister chromatids of Homologous chromosomes.

18. Stage of terminalization is
1) Mitosis 2) Diakinesis
3) Diplotene 4) Pachytene

19. Stage in which bivalents are separated.
1) Anaphase – I 2) Pachytene
3) Anaphase – II 4) Cytokinesis

20. Longest phase in meiosis is
1) Prophase - I 2) Meiosis – I
3) Meiosis - II 4) Pachytene

21. Number of bipolar spindle apparatuses formed during meiosis
1) One 2) Two 3) Three 4) Four

22. In Diakinesis
A) Non-sister chromatids are separated
B) Sister chromatids are separated
C) Homologous chromosomes are separated
D) Bivalents are released into the cytoplasm
1) A &B 2)B & C 3)C & D 4)Only D

23. For the first time mitosis is reported in plants by.
1) Walter Flemming 2) Strasburger
3) August Weisman 4) Farmer & Moore

24. The protein present in spindle fibers.
1) Fibrin 2) Spindlin 3) Tubulin 4) Pilin

25. Correct sequence of different phases in a cell cycle
1) M---G_2----G_1-----S 2) S-----G_2----M -----G_1
3) G_1-----S----M----G_2 4) M---G_1 ----G_2----- S

26. True statement regarding pachytene stage

A) It is the longest phase in meiosis
B) Synapsis occurs between homologous chromosomes
C) Between non-sister chromatids one or two chiasma form
D) Spindle fibres attach to the kinetochore.

1) A & B 2) B, C & D 3) Only C 4) A, C & D

27. Match the following

	List I		List II
A	Anaphase	I	Terminalization
B	Anaphase-I	II	Separation of chromatids
C	Diakinesis	III	Segregation
D	Zygotene	IV	Crossing over
		V	Pairing

	A	B	C	D		A	B	C	D
1.	IV	III	II	I	2.	III	IV	I	II
3.	II	V	III	IV	4.	II	III	I	V

28. Meiosis can be observed in

1) Pollen grain & egg 2) Functional megaspore
3) Sporogenous tissue 4) Gametes

29. If 20 somatic cells undergo mitosis for 8 generations total numbers of cells produced are

1)20 X 8 2) 20^8 3) 8^{20} 4) 20 X 2^8

30. Correct sequence of different phases in decreasing order of their time periods

1) S-----G_1---G_2----M 2)S-----G_2-----G_1----M
3)S-----M----G_2----G1 4) S----G_2----M----G_1

31. Assertion (A): Chromosomes attain maximum stability at metaphase

Reason (R): Chromosomes are firmly attached and held by spindle fibres
1) Both A & R are true and R is the correct explanation of A.
2) Both A & R are true but R is not the correct explanation of A.
3) A is true, R is false 4) A is false, R is true.

32. Assertion (A): In metaphase each chromosome has two chromatids.

Reason(R): In other phases each chromosome has only one chromatid.
1) Both A & R are true and R is the correct explanation of A.
2) Both A & R are true but R is not the correct explanation of A.
3) A is true, R is false 4) A is false, R is true.

33. True statement among the following

A) Chromosomal spindle fibres attach to the centromere.
B) In mitosis both the kinetochores of single chromosome are attached to the spindle fibres.
C) In meiosis—I both the kinetochores of single chromosome are attached to the spindle fibres.
D) In meiosis –II both the kinetochores of single chromosome are attached to the spindle fibres.

1) A & B 2) B & C 3) C & D 4) B & D

34. Cell plate formation is
1) Random 2) Centrifugal 3) Centripetal 4) Bipolar

35. In a cell with diploid number 24 undergoing meiosis, after anaphase –II the number of chromatids in each daughter cell are.
1) 12 2) 48 3) 24 4) 6

36. The broken chromatids after genetic exchange get united by enzyme
1) Ligase 2) Nuclease 3) Polymerase 4)Ligase & nuclease

37. In meiosis enlargement of nucleus and nucleolus observed respectively during
1) Zygonema & Pachytene 2) Leptonema & Zygonema
3) Leptonema & Pachynema 4) Diakinesis & Metaphase—I

38. 'Chromosomal congression ' is observed in
1) Metaphase 2) Anaphase—I
3) Metaphase—II 4) Metaphase—I

39. The primary step towards the origin of new species is
1) Anaphase—I 2) Anaphase—II
3) Prophase—I 4) Prophase—II

40. Wrong statement among the following
1) Constant chromosome number is maintained from one generation to the next due to meiosis
2) Constant chromosome number is maintained from parent to daughter due to mitosis
3) Constant chromosome number is maintained from one generation to the next due to mitosis
4) Constant chromosome number can never be maintained from one generation to the next

Cell Division

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	**1**	**3**	**3**	**3**	**1**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**3**	**4**	**2**	**1**	**2**
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
3	**4**	**2**	**3**	**2**	**3**	**4**	**2**	**4**	**1**	**1**	**3**	**4**	**2**	**3**	**1**	**2**	**4**	**3**	**3**