Pre-Medical

BOTANY

NCERT CAPSULE

ALLEN CAREER INSTITUTE
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THE LIVING WORLD

1. The number of species that are known and described ranges between :

(1) 1-2 million (2) 1.7 - 1.8 billion

(3) 1.7 - 1.8 million (4) 7 million

2. Grouping of any thing into convenient categories based on some easily observable characters called:

(1) Nomenclature (2) Identification

(3) Classification (4) Taxonomy

3. Branch of biology, which deals with study of evolutionary relationship between organism :-

(1) Plant anatomy (2) Systematics

(3) Ecology (4) Physiology

4. In taxonomic hierarchy plant families are characterised by

(1) Only vegetative features of plant species

(2) Genetic features of plant species

(3) Both vegetative and floral features of plant species

(4) Neither vegetative nor floral features of plant species

5. In botanical gardens various plant species are grown for which purpose?

(1) Identification

(2) Nomenclature

(3) Classification

(4) Both 2 and 3

6. Taxonomical aid which contain actual account of habitat and distribution of plants of a given area :

(1) Flora (2) Fauna

(3) Manual (4) Monograph

7. The taxonomic aid, which is useful in providing information for identification of names of species found in an area, called :

(1) Flora (2) Museum

(3) Manual (4) Monograph

8. Monographs are concerned with :

(1) Information of any species only

(2) Information of any genus only

(3) Information of any family only

(4) Information of any one taxon

9. ICZN is used for

(1) Virus

(2) Bacteria

(3) Cultivated plants

(4) Animals

10. Plant *Ocimum sanctum* belongs to kingdom plantae. As per taxonomic terminology term kingdom and plantae are respectively :

(1) taxon and category

(2) category and taxon

(3) taxon and division

(4) taxonomy and systematics

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	3	3	2	3	1	1	3	4	4	2

BIOLOGICAL CLASSIFICATION

1. Which group shows the most extensive metabolic diversity ?

(1) Plantae (2) Animalia

(3) Monera (4) Fungi

2. Archaebacteria differ from other bacteria in :-

(1) Nucleoid

(2) Composition of cell wall

(3) Composition of cytoplasm

(4) Composition of genetic material

3. Which group of organisms is responsible for the production of biogas from the dung of cows and buffaloes ?

(1) *Methanomonas* (2) Methanogens

(3) Cyanobacteria (4) *Mycoplasma*

4. Choose the correct statement :-

(1) Most of the bacteria are autotrophs

(2) All bacteria are heterotrophs

(3) Some bacteria are heterotrophs

(4) Most of the bacteria are heterotrophs

5. Which of the following character is common in both cyanobacteria and green plants ?

(1) Cell wall composition

(2) Presence of chlorophyll 'a'

(3) Presence of Nif gene

(4) Presence of 80s ribosome

6. *Nostoc* can fix atmospheric nitrogen in specialised cell, called :-

(1) Harmocyst

(2) Harmogonium

(3) Heterocyst

(4) Akinete

7. Which process is not performed by bacterial activity?

(1) Production of antibiotics

(2) Fixing nitrogen in legumes

(3) Making curd from milk

(4) Production of pseudomycelium

8. Choose the correct set of bacterial disease :-

(1) Mumps, cholera, dengue

(2) Chicken pox, typhoid, mumps

(3) Mumps, tetanus, chicken pox

(4) Cholera, typhoid, tetanus

9. Choose the incorrect statement regarding *Mycoplasma* :-

(1) They lack cell wall

(2) They are smallest living cell

(3) They can survive without oxygen

(4) They have mesosome for respiration

10. According to five kingdom system single-celled eukaroytes are placed under :-

(1) Plantae (2) Monera

(3) Protista (4) Fungi

11. According to five kingdom system, kingdom protista includes :-

(1) Dinoflagellates, Diatoms, Euglenoids, Slime mould, Bacteria

(2) Eunglenoids, Fungi, Slime mould, Dinoflagellates, Protozoans

(3) Slime mould, Protozoans, Dionflagellates, Diatoms, Euglenoids

(4) Protozoans, Moss, Euglenoids, Slime mould, Diatoms

12. Cell wall of diatoms are embedded with :-

(1) Calcium oxylate crystals

(2) Silica particles

(3) Iron

(4) Calcium carbonate crystals

13. Which are chief producers of oceans ?

(1) Diatoms (2) Dinoflagellates

(3) Euglenoid (4) Green algae

14. Which organism is responsible for making the sea appear red by rapid multiplication ?

(1) *Euglena* (2) *Noctiluca*

(3) *Gonyaulax* (4) *Trypanosoma*

15. Euglenoids have a protein rich layer instead of a cell wall. This layer is called as :-
(1) Epidermis (2) Skin
(3) Pellicle (4) Middle layer

16. Choose the incorrect statement from following:
(1) Dinoflagellates have stiff cellulosic plates on the outer surface
(2) Euglenoids have two flagella, one lies longitudinally and the other transversely
(3) Slime mould spores are dispersed by air currents
(4) In diatoms, the cell walls form two thin overlapping shells, which fit together as in a soap box.

17. The cell wall of fungi are composed of :-
(1) Chitin and cellulose
(2) Cellulose and polysaccharides
(3) Chitin and polysaccharides
(4) Chitin, polysaccharides and glycogen

18. Which group of organisms is used to make bread and beer ?
(1) *Rhizopus* (2) *Yeast*
(3) *Albugo* (4) *Neurospora*

19. Fungus prefers to grow in :-
(1) Warm and humid places
(2) Cold and humid places
(3) Warm and cold both
(4) Warm, cold and humid places

20. In fungi when the hyphae are continuous and branched tubes and fibled with multinucleated cytoplasm, these are called :-
(1) Unicellular hyphae
(2) Coenocytic hyphae
(3) Multicellular hyphae
(4) Both 1 and 3

21. In fungi sexual reproduction is by :-
(1) Fragmentation, Ascospores and Basidiospores
(2) Budding, Conidia, and Basidiospores
(3) Oospores, Ascospores and Basidiospores
(4) Fission, Zoospores, Oospores

22. Mycelium of members of phycomycetes is :-
(1) Septate and coenocytic
(2) Aseptate and coenocytic
(3) Septate and multicellular
(4) Septate and unicellular

23. Choose the incorrect statement about phycomycetes :-
(1) Members are found in aquatic habitats
(2) Spores are endogenously produced in sporangium
(3) Zygospore is formed by reduction division
(4) Its members reproduce sexually may be isogamous, anisogamous or oogamous.

24. Which is not a member of Phycomycetes ?
(1) *Albugo* (2) *Aspergillus*
(3) *Rhizopus* (4) *Mucor*

25. Which fungus is used extensively in biochemical and genetic work ?
(1) *Agaricus* (2) *Aspergillus*
(3) *Claviceps* (4) *Neurospora*

26. Choose the incorrect statement about ascomycetes :-
(1) Mycelium is branched and septate
(2) Sexual spores are produced endogenously
(3) They have sac like structure in which karyogamy takes place
(4) Reduction division occurs in fruiting bodies and form conidia

27. Which group of organism is related with basidiomycetes ?
(1) Mushroom, *Ustilago*, *Aspergillus*
(2) Puffballs, *Agaricus*, *Aspergillus*
(3) Mushroom, *Ustilago*, *Agaricus*
(4) *Ustilago*, *Aspergillus*, *Agaricus*

28. Which set of diseases is caused by members of basidiomycetes ?
(1) Rust and smut
(2) Ergot and smut
(3) Ergot and rust
(4) Powdery mildew and rust

29. Fungi imperfacti are called,
(1) members of phycomycetes
(2) members of ascomycetes
(3) members of basidiomycetes
(4) members of deuteromycetes

30. Which is not found in members of deuteromycetes ?
(1) Asexual reproduction
(2) Mode of nutrition
(3) Structure of mycelium
(4) Sexual reproduction

31. Which disease is not caused by a fungus ?
(1) Late blight of potato (2) Black rust of wheat
(3) Red rust of pea (4) Ergot of rye

32. Which of the following are noncellular organisms that are characterized by having an inert crystalline structure outside the living cell:-
(1) Bacteria
(2) *Mycoplasma*
(3) Virus
(4) Lichen

33. Select false statement :-
(1) Lichens are symbiotic association between algae & fungi
(2) Viruses are smaller than bacteria
(3) Virus name are obligate parasites
(4) Viruses are facultative parasite

34. Which one of the following statement is true about bacteriophages ?
(1) They are generally single stranded RNA viruses.
(2) They are generally double stranded DNA viruses
(3) They are generally single stranded DNA viruses.
(4) They are generally double stranded RNA viruses

35. Select incorrect statement about viroid :-
(1) Free infectious RNA
(2) It was discovered by T.O. Diener
(3) It causes potato spindle tuber disease
(4) It contains high molecular weight RNA

36. Which is incorrect statement ?
(1) The *Mycoplasma* are organisms that completely lack a cell wall
(2) *Mycoplasma* can survive without oxygen
(3) *Mycoplasma* are the smallest living cells.
(4) *Mycoplasma* are sensitive to penicillin

37. Endomycorrhizal fungus is :-
(1) *Pythium* (2) *Mucor* (3) *Glomus* (4) *Rhizopus*

38. Generally plant viruses are :-
(1) Double stranded DNA viruses
(2) Single stranded RNA viruses
(3) Single stranded DNA viruses
(4) Double stranded RNA viruses

39. Which of the following are not included in the five kingdom system of classification ?
(a) Viruses (b) Viroid (c) Lichen (d) Prions
(1) only a and b
(2) only b, c and d
(3) only a and c
(4) All a, b, c and d

40. Select incorrect statement about lichens :-
(1) These are very good pollution indicators
(2) The algal component of lichen is known as phycobiont
(3) The fungal component of lichen is known as mycobiont
(4) The algal component of lichen is known as mycobiont

41. Select incorrect statement :-
(1) W.M. Stanly showed that viruses could be crystallized.
(2) In addition to protein coat viruses also contain genetic material that could be either RNA or DNA
(3) The small sub units of capsid called capsomeres
(4) The small subunits of capsid are called peplomers

42. Which among the following was not the criteria for classification of organisms into 5 kingdoms proposed by Whittaker ?
(1) Complexity of cell
(2) Phylogenetic relationship
(3) Mode of nutrition
(4) Metabolism

43. Find out the wrong statement about kingdom fungi proposed by Whittaker :

(1) Eukaryotic organism

(2) Chitinous cell wall

(3) Multicellular with well distinct tissue system

(4) Heterotrophic (saprophytic or parastic) mode of nutrition

44. In five kingdom classification of Whittaker, all prokaryotic organism were grouped together under kingdom monera. Among the following statements findout incorrect for Bacteria :

(1) Bacteria are gouped under four groups based on their shape

(2) They are simple in structure, but complex in behaviour

(3) They show most extensive metabolic diversity

(4) The vast majority of bacteria are autotrophs

45. According to five kingdom system of classification, single celled eukaryotes are placed under protista, members of protista are primarily

(1) Terrestrial (2) Aquatic

(3) Saprophytic (4) Epiphytic

46. Which kingdom out of five kingdoms proposed by Whittaker, forms a link with others dealing with plants, animals and fungi ?

(1) Monera (2) Protista

(3) Plantae (4) Fungi

47. Chrysophytes involves :

(1) diatoms (2) dinoflagellates

(3) desmids (4) both 1 and 3

48. Released toxins of which group of protista is the cause of death of other marine animals such as fishes :-

(1) Chrysophytes

(2) Dianoflagellates

(3) Desmids

(4) Euglenoids

49. In deprived of sunlight which group of protista behave like heterotrophs by predating on other smaller organisms :-

(1) Slime moulds (2) Protozoans

(3) Euglenoids (4) Dinoflagellates

50. Single celled eukaryotes placed under protista and they link with fungi, plants and animals. Slime moulds are saprophytic protists. What is incorrect about slime moulds :

(1) Body moves along decaying twigs and leaves engulfing organic matter

(2) Under suitable conditions they form plasmodium which may grow and spread over several feet

(3) Under favourable conditions plasmodium differentiate and form fruiting body

(4) Their spores possesses cell wall

51. Which of the following group of organisms show a great diversity in morphology and habitat :-

(1) Chrysophytes

(2) Dinoflagellates

(3) Protozoan protists

(4) Fungi

52. Fungi constitute a unique kingdom of heterotrophic organisms. About their reproduction which combination is not true :

(1) Fragmentation, Fission, Budding

(2) Conidia, Sporangiospores, Zoospores

(3) Oospore, Ascospore, Basidiospores

(4) Fragmentation, Zoospores, Ascospore

53. On the basis of intervening dikaryotic stage which of the following fungal group is odd :

(1) Phycomycetes (2) Basidiomycetes

(3) Ascomycetes (4) Club fungi

54. Kingdom fungi classify into various classes based on some parameters except :

(1) Morphology of mycelium

(2) Mode of spore formation

(3) Dikaryophase

(4) Fruiting body

55. Which of the following is not applicable on phycomycetes :

(1) Obligate parasites on plants

(2) Found in moist and damp places

(3) Septate, Coenocytic mycelium

(4) Endogenously produced spores

56. In which class of fungi generally sex organs are absent but plasmogamy is brought about by fusion of two vegetative or somatic cells which have different strains or genotypes.

(1) Phycomycetes

(2) Ascomycetes

(3) Basidiomycetes

(4) Deuteromycetes

57. Ones perfect (Sexual) stages of members of deuteromycetes were discovered they were often moved to

(1) Phycomycetes

(2) Ascomycetes only

(3) Basidiomycetes only

(4) Either ascomycetes or basidiomycetes

58. Majority of members of deuteromycetes are

(1) Autotrophs

(2) Parasites

(3) Decomposers

(4) Symbiotic

59. In kingdom plantae, alternation of generation is not associated with

(1) Sporophytic and gametophytic phase

(2) Length of haploid & diploid phases

(3) Number of haploid and diploid phases

(4) Freeliving or dependent nature of haploid & diploid phases

60. Match the column-I (name of scientist) with column-II (their contribution) and select correct option.

	Column-I		**Column-II**
a	D.J. Ivanowsky	i	Discovery of viroids
b	Beijerineck	ii	Crystallisation of virus
c	W.M. Stanley	iii	*Contagium vivum fluidum*
d	T.O. Diener	iv	Discovery of TMV

(1) a(iv), b(iii), c(ii), d(i) (2) a(iv), b(iii), c(i), d(ii)

(3) a(iii), b(iv), c(ii), d(i) (4) a(ii), b(iii), c(iv), d(i)

61. About pathogenecity of viruses which among the following is not correct ?

(1) Plant infecting viruses having ssRNA

(2) Animal infecting viruses having single or double stranded RNA or double stranded DNA

(3) Bacteriophages usually have double stranded RNA

(4) Bacterophages usually have double stranded DNA

62. Virus is a connecting link between living and non living organisms, when it attack on plant, Which among the following donot appear

(1) Gall formation

(2) Mosaic formation

(3) Leaf rolling and curling

(4) Yellowing and vein clearing

63. Which among the following is the characteristic of viroids

(1) Larger than viruses

(2) Have free infectious DNA

(3) Have free infectious RNA

(4) Have high molecular weight RNA

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	3	2	2	4	2	3	4	4	4	3	3	2	1	3	3	2	3	2	1	2
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	2	3	2	4	4	3	1	4	4	3	3	4	2	4	4	3	2	4	4
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	4	4	3	4	2	2	4	2	3	3	4	4	1	3	3	3	4	3	3	1
Que.	61	62	63																	
Ans.	3	1	3																	

PLANT KINGDOM

1. Which group does not produce embryo ?
(1) Algae (2) Moss
(3) Liverworts (4) Club moss

2. Which group of plants conduct water and minerals by xylem tracheids ?
(1) Algae (2) Mosses
(3) Liverworts (4) Gymnosperms

3. In which group the male and female sex organs are called antheridia and archegonia, respectively ?
(1) Blue green algae (2) Eubacteria
(3) Protista (4) Bryophyta

4. The group of plants, in which body is differentiated into root, stem and leaf :-
(1) Chlorophyceae (2) Phaeophyceae
(3) Lycopsida (4) Hepaticopsida

5. Which is not an example of moss plants ?
(1) *Funaria* (2) *Polytrichum*
(3) *Sphagnum* (4) *Colletotrichum*

6. Strobilli or cones are not formed in :-
(1) Lycopods (2) Sphenopsids
(3) Conifers (4) Ferns

7. In which group of plants both male and female gametophytes do not have an independent free living existence ?
(1) Bryophytes (2) Pteridophytes
(3) Gymnosperms (4) Both 1 and 2

8. Sporophylls are arranged spirally along an axis, when they aggregate, to form :-
(1) Strobillus (2) Flowers
(3) Inflorescence (4) Thalamus

9. The gametophyte of pteridophytes require to grow :-
(1) Warm, damp, and shady place
(2) Cool, damp, and shady place
(3) Warm, dry, and shady place
(4) Cool, dry, and place of well sunshine

10. Zygotic meiosis occurs in :-
(1) *Pinus* (2) *Funaria*
(3) *Pteridium* (4) *Chara*

11. The megaspore mother cell in gymnosperms is differentiated from :-
(1) Integument (2) Embryosac
(3) Nucellus (4) Endosperm

12. Which is not common in *Chlorella* and *Spirulina* ?
(1) both are unicellular
(2) both are rich in protein
(3) both are used as food supplement
(4) both are prokaryotes

13. Majority of red algae tend to grow in :-
(1) Marine and warmer areas
(2) Marine and colder areas
(3) Freshwater and warmer areas
(4) Brackish water and colder areas

14. Pyriform, biflagellate gametes are produced in:-
(1) *Ectocarpus*, *Polysiphonia*
(2) *Ectocarpus*, *Laminaria*
(3) *Ulothrix*, *Polysiphonia*
(4) *Fucus*, *Porphyra*

15. Autotrophic aquatic organisms which usually reproduce vegetatively by fragmentation, asexual by non motile spores and perform sexual reproduction also by the non-motile gametes. These organisms are :-
(1) *Polysiphonia, Porphyra, Gracilaria*
(2) *Ectocarpus, Dictyota, Laminaria*
(3) *Laminaria, Fucus, Sargassum*
(4) *Volvox, Chara, Spirogyra*

16. Which is not true about agar ?
(1) It is obtained from red alga
(2) It is used to grow (culture) microbes
(3) It is used to make ice-cream and gellies
(4) It is used as food supplement even by space travellers

17. At present most acceptable system of classification is :-
(1) Artificial system (2) Natural system
(3) Phylogenetic system (4) Practical system

18. Fill in the blanks a, b, c and d by observing the characters given in the table and choose the correct answer from the following options :-

Plant group	Main body	Fertilisation	Vascular tissue	Female sex organ
Bryophyta	Gameto-phyte	By Zoido-gamy	Absent	(c)
Pteridophyta	(a)	By Zoido-gamy	(b)	Arche-gonium
Gymno-sperm	Sporo-phyte	By Siphono-gamy and Zoidogamy	present	(d)

	(a)	(b)	(c)	(d)
(1)	Sporophyte	Present	Archegonium	Archegonium
(2)	Sporophyte	Absent	Oogonium	Archegonium
(3)	Gametophyte	Present	Oogonium	Carpel
(4)	Gametophyte	Present	Archegonium	Carpel

19. A group of algae, having following characters:-

(a) Chlorophyll a and b are present

(b) Chloroplast has one or many pyrenoids

(c) Cell wall made of cellulose and pectose

(d) Reserve food material is starch

Which one of the following is also a very important character including above characters to call it as a member of chlorophyceae ?

(1) Plant body colonial only

(2) Plant body is made of haploid cells called as gametophyte

(3) Its flagellar character may be 2–8 in number, equal and apical

(4) It may occur in fresh water, brackish water or salt water

20. In which member chlorophyll a, c and fucoxantin are present ?

(1) *Ectocarpus* (2) *Gelidium*

(3) *Volvox* (4) *Vaucheria*

21. Floridean starch is characteristic feature of :-

(1) *Polysiphonia, Gracilaria, Porphyra*

(2) *Laminaria, Sargassum, Porphyra*

(3) *Polysiphonia, Laminaria, Porphyra*

(4) *Chara, Dictyota, Polysiphonia*

22. Gemmae are the structures of :-

(1) Asexual reproduction produced in *Marchantia*

(2) Sexual reproduction produced in most mosses

(3) Asexual reproduction produced in most mosses

(4) Sexual reproduction produced in most liverworts

23. Predominant stage of them is gametophyte, they vegetatively reproduce by fragmentation and budding. They produce male and female gametes in antheridia and archegonia, respectively. After fertilisation zygote develops into a sporophyte consisting of foot, seta and capsule, in them spore formed in their capsule form protonema on germination. The above description is about the group :-

(1) Lycopsida (2) Bryopsida

(3) Hepaticopsida (4) Psilopsida

24. Integumented megasporangia are formed in :-

(1) Phanerogames (2) Cryptogames only

(3) Gymnosperms only (4) Pteridophytes only

25. Evolutionary first terrestrial plants to possess vascular tissues xylem and phloem are :-

(1) Psilopsids (2) Lycopods

(3) Pteropsids (4) Sphenopsids

26. Needle like leaves to reduce the surface area, thick cuticle, and sunken stomata to reduce water loss etc. are the xerophytic characters present in :-

(1) Pteridophytes

(2) Gymnosperms

(3) Angiosperms

(4) Sphenopsida

27. Most reduced gametophyte is found in :-

(1) Bryophyta

(2) Pteridophyta

(3) Gymnosperms

(4) Angiosperms

28. Consider the following characters :-

(A) Formation of only one functional megaspore in a megasporangium

(B) Formation of hard covering around megasporangium

(C) Development of embryo from zygote within the female gametophyte

(D) Retention of megaspore inside the megasporangium

These were very essential events occurred during the course of evolution for the phenomenon of:-

(1) Heterospory

(2) Seed habit

(3) Fruit formation

(4) Covered seed formation

29. In gymnosperms, the megaspore forms :-
(1) Endosperm (2) Female gamete
(3) Male gamete (4) Male cone

30. Find the odd one with respect to ploidy?
(1) Spore (2) Sporophyte
(3) Archegonium (4) Antheridium

31. Which of the following is odd one from the following about liverworts ?
(1) Foot, Seta, Capsule
(2) Spore, Archegonium, Antheridium
(3) Multicellular rhizoids , Primary protonema & Secondary protonema
(4) Rhizoids, Gemmae, Scales

32. Which is not true about fern plants ?
(1) They produce sori on sporophylls
(2) They produce male and female cone by spiral arrangement of sporophylls
(3) Some fern plants are heterosporous also
(4) Some ferns are aquatic also

33. In a sphenopsid plant number of chromosome in the cells of scaly leaves is 24, what will be the number of chromosomes in its cells of stem, spore, and prothallus respectively :-
(1) 24, 12, 12 (2) 24, 24, 12
(3) 12, 24, 12 (4) 24, 12, 24

34. Which group of plants is of less economic importance but have ecological importance?
(1) Gymnosperms (2) Angiospems
(3) Bryophyta (4) Pteridophyta

35. Normally in gymnosperms how many archegonia are produced in an ovule ?
(1) One
(2) Two
(3) Two or more
(4) Always one

36. Select the false statement ?
(1) Cyanobacteria, that are also referred to as blue-green algae are not algae any more
(2) Green algae, brown algae, red algae, bryophytes, pteridophytes, gymnosperms and angiosperms are included under the kingdom plantae
(3) Artificial systems gave equal weightage to vegetative and sexual characteristics.
(4) Cytotaxonomy uses the chemical constituents of the plant cells to resolve confusions of taxonomy.

37. The habitat where algae can be found in ?
(1) Moist stones (2) Moist wood
(3) Moist soil (4) All of the above

38. The most common type of spores produced in algae during asexual reproduction are :-
(1) Aplanospores (2) Conidia
(3) Zoospores (4) Hypnospores

39. Fusion between a large, nonmotile (static) female gamete and a smaller, motile male gamete is termed as :-
(1) Isogamy
(2) Oogamy
(3) Anisogamy
(4) Autogamy

40. Non vascular archegoniate plants are :-
(1) Thallophytes
(2) Bryophytes
(3) Pteridophytes
(4) Gymnosperm

41. Vascular plants producing integumented megasporangia but not ovary are :-
(1) Pteridophytes
(2) Gymnosperms
(3) Angiosperms
(4) Bryophytes

42. The same type of relation occuring in magaspore mother cell and nucellus can also be seen in :-
(1) Female gamete and antheridium
(2) Male gamete and endosperm
(3) Egg cell and archegonium
(4) Neck canal cell and antheridium

43. Which is not true about the uses of algae ?
(1) They increase the level of dissolved oxygen in their immediate environment
(2) They are of paramount importance as primary producer of energy
(3) *Porphyra, Laminaria* and *Sargassum* are used as food
(4) Certain marine brown algae produce agar which is used to make ice-creams

44. Which one of the following is not the ecological importance of moss plants ?

(1) Some mosses provide food for herbaceous mammals birds and other animals

(2) Very high water holding capacity of mosses is useful for trans-shipment of living materials

(3) Mosses algong with lichens are the pioneering organisms to colonise rocks

(4) Mosses form dense mats on the soil and reduce the impact of falling rain.

45. In most of the plants reduction division occurs during the formation of :-

(1) Male gamete and female gamete

(2) Male sex organ and female sex organ

(3) Microspore and megaspore

(4) Microsporangium and Megasporangium

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	4	4	3	4	4	3	1	2	4	3	4	1	2	1	4	3	1	3	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	1	2	1	1	2	4	2	1	2	3	2	1	3	3	4	4	3	2	2
Que.	41	42	43	44	45															
Ans.	2	3	4	2	3															

MORPHOLOGY OF FLOWERING PLANTS

1. A slender lateral branch arises from the base of the main axis and after growing aerially for some time arch downwards to touch the ground. Such type of modification is
(1) Runner (2) Sucker
(3) Stolon (4) Offset

2. A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots in aquatic plants, such type of modification is
(1) Runner (2) Stolon
(3) Sucker (4) Offset

3. Lateral branches originate from the basal and underground portion of the main stem, grow horizontally beneath the soil and then comes out obliquely upward giving rise to leafy shoots, such type of modification is
(1) Runner (2) Stolon
(3) Sucker (4) Offset

4. In some leguminous plants the leaf base may become swollen, it is called :-
(1) Pulvinus (2) Lamina
(3) Leaf margin (4) Stipule

5. When the veins run parallel to each other within a lamina, the venation is termed as :-
(1) Parallel (2) Reticulate
(3) Both 1 & 2 (4) Pinnate

6. If the leaflets are present on a common axis, the rachis, leaf is called :-
(1) Palmate compound leaf
(2) Pinnate compound leaf
(3) Simple leaf
(4) Trifoliate leaf

7. If the leaf lets are attached at the tip of petiole, leaf is called :-
(1) Pinnate compound leaf
(2) Palmate compound leaf
(3) Simple leaf
(4) Unipinnate leaf

8. When single leaf arises at each node then phyllotaxy is called :-
(1) Alternate (2) Opposite
(3) Whorled (4) Pinnate

9. Opposite phyllotaxy is present in :-
(1) Mustard (2) Guava
(3) China rose (4) *Alstonia*

10. In flower, different whorls arranged successively on the swollen end of the pedicel, that swollen end is called :-
(1) Thalamus (2) Calyx
(3) Peduncle (4) Corolla

11. Ovary is superior in
(1) Rose (2) Mustard
(3) Peach (4) Guava

12. Ovary is inferior in
(1) Guava (2) Rose
(3) China rose (4) Peach

13. If one margin of the sepal or petal overlaps that of the next one and so on this aestivation is called :-
(1) Twisted (2) Imbricate
(3) Valvate (4) Vexillary

14. If the margins of sepals or petals overlap one another but not in any particular direction, the aestivation is called :-
(1) Imbricate (2) Valvate
(3) Twisted (4) Vexillary

15. Each ovary bears one or more ovules attached to a flattened cusion like structure called :-
(1) Stigma (2) Ovary
(3) Placenta (4) Style

16. In this placentation the ovules develop on the inner wall of ovary or on peripheral part it is called :-
(1) Marginal (2) Parietal
(3) Axile (4) Basal

17. Mango and Coconut develops from
(1) Monocarpellary gynoecium, inferior ovary
(2) Monocarpellary gynoecium, superior ovary
(3) Multicarpellary gynoecium, inferior ovary
(4) Multicarpellary, superior ovary

18. Inflorescence in members of papilionatae is
(1) Racemose (2) Cymose
(3) Cyathium (4) Hypanthodium

19. *Sesbania* belongs to
(1) Liliaceae (2) Fabaceae
(3) Solanaceae (4) Cruciferae

20. In *Solanum*, inflorescence is
(1) Cymose (2) Racemose
(3) Umbel (4) Verticillaster

21. Seeds in fabaceae are
(1) Non endospermic (2) Endospermic
(3) Perispermic (4) Monosporic

22. In monocots fibrous root system arise from
(1) Radicle (2) Apex of stem
(3) Base of stem (4) Any where from stem

23. Regarding to adventitious roots find out the odd one
(1) Grasses (2) *Monstera*
(3) Banyan (4) Mustard

24. Find out the right sequence to various regions of root tip from apex to base
(1) Maturation zone, elongation zone, Meristematic zone & root cap
(2) Root cap, Meristematic zone, elongation zone & Maturation zone
(3) Root cap, elongation zone, Meristematic zone & Maturation zone
(4) Maturation zone, meristematic zone, elongation zone & root cap

25. Regarding to modification of root, find out the odd match
(1) Storage of food – Potato
(2) Support – Banyan
(3) Gaseous exchange – *Rhizophora*
(4) Photosynthesis – *Tinospora*

26. Regarding to conversion of Axillary bud into tendril, which of the following is odd
(1) Cucumber (2) Pumpkins
(3) Watermelon (4) *Bougainvillea*

27. Fleshy cylindrical photosynthetic stem is found in
(1) *Opuntia* (2) *Euphorbia*
(3) *Bougainvillea* (4) *Cuscuta*

28. A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots is found in
(1) Ginger (2) Banana
(3) *Eichhornia* (4) Potato

29. Leaves are lateral, generally flattened structure born on nodes. They originate from ..... and arranged in ..... manner
(1) Apical meristem, Acropetal
(2) Lateral meristem, Acropetal
(3) Apical meristem, Basipetal
(4) Lateral meristem, Basipetal

30. About leaf which of the following statement is not correct ?
(1) Axillary buds are present in axil of leaflets
(2) In pinnately compound leaf leaflets are present on rachis, which represents the midrib
(3) In palmately compound leaf, leaflets are attached at a common point, it is tip of the petiole
(4) In compound leaf incisions of lamina reach upto the mid rib, breaking it into number of leaflets

31. Regarding phyllotaxy which of the following is odd
(1) China rose (2) Mustard
(3) Sunflower (4) *Alstonia*

32. When two leaves arise from same node, this type of phyllotaxy called
(1) Alternate (2) Opposite
(3) Whorled (4) Spiral

33. Arrangement of flowers on the floral axis is termed as inflorescence. Regarding to inflorescence which of the following statement is not correct
(1) In racemose – main axis is continues to grow
(2) In cymose – main axis terminates into flower
(3) In racemose – flowers are in basipetal succession
(4) In cymose –growth of main axis is limited

34. Regarding to symmetry of flower which of the following plant is odd
(1) Pea (2) Mustard
(3) *Datura* (4) Chilli

35. Find out the wrong match

(1) Actinomorphic – Datura
(2) Radial symmetry – Mustard
(3) Zygomorphic – Bean
(4) Bilateral Symmetry – Chilli

36. In which of the following plant flower can not be divided into two similar halves by any vertical plane

(1) Mustard (2) *Cassia*
(3) *Canna* (4) *Datura*

37. In which of the following plant gynoecium occupies the highest position while the other parts situated below it ?

(1) Brinjal (2) Plum
(3) Rose (4) Guava

38. Match the following and select correct option :-

(a) Hypogynous	(i) Lily, Onion
(b) Perigynous	(ii) Cucumber, Ray florets of sunflower
(c) Epigynous	(iii) Plum, Peach
(d) Perianth	(iv) Chinarose, Brinjal

(1) a(iv), b(iii), c(ii), d(i) (2) a(iv), b(ii), c(iii), d(i)
(3) a(iii), b(ii), c(iv), d(i) (4) a(iii), b(iv), c(ii), d(i)

39. Calyx is the outermost accessory whorl of flower. What is the function of calyx?

(1) Helps in pollination
(2) Helps in protection of flower during bud condition
(3) Helps in fertilization
(4) Helps in seed germination

40. The mode of arrangent of sepals or petals in floral buds with respect to other members of the same whorl is known as

(1) Adhesion (2) Cohesion
(3) Aestivation (4) Plancentation

41. Match the following with respect to aestivation in petals and select correct option :-

(a) Valvate	(i) Chinarose
(b) Twisted	(ii) *Calotropis*
(c) Imbricate	(iii) Pea
(d) Vexillary	(iv) *Cassia*

(1) a(ii), b(i), c(iv), d(iii) (2) a(ii), b(iii), c(iv), d(i)
(3) a(i), b(ii), c(iii), d(iv) (4) a(iv), b(iii), c(ii), d(i)

42. Which type of aestivation is found in petals of cotton?

(1) Valvate (2) Twisted
(3) Imbricate (4) Vexillary

43. Match the following

(a) Epiphyllous stamen (i) *Citrus*
(b) Monoadelphous stamen (ii) Pea
(c) Diadelphous stamen (iii) Chinarose
(d) Polyadelphous stamen (iv) Lily

(1) a(ii), b(i), c(iii), d(iv)
(2) a(i), b(ii), c(iii), d(iv)
(3) a(iv), b(iii), c(i), d(ii)
(4) a(iv), b(iii), c(ii), d(i)

44. Variation in length of the filament of stamen with in flower can be seen in

(1) *Salvia* (2) Mustard
(3) Chinarose (4) Both 1 & 2

45. Match the following and select correct option :-

(a) Parietal	(i) *Dianthus*
(b) Axile	(ii) Sunflower
(c) Free central	(iii) Mustard
(d) Basal	(iv) China rose

(1) a(iii), b(iv), c(ii), d(i)
(2) a(iii), b(iv), c(i), d(ii)
(3) a(i), b(ii), c(iii), d(iv)
(4) a(i), b(ii), c(iv), d(iii)

46. In which type of placentation, ovules are present on central axis

(1) Axile (2) Parietal
(3) Free central (4) Both 1 & 3

47. A dot on the top of the floral diagram shows

(1) Adhesion (2) Aestivation
(3) Mother axis (4) Position of ovary

48. In old classifications family leguminosae was classified into of three subfamilies. Which of the subfamily of leguminosae is now considered as Fabaceae

(1) Papilionatae
(2) Caesalpinoidae
(3) Mimosoidae
(4) Compositae

49. Swollen placenta with oblique septum can be seen in

(1) Brassicaceae (2) Fabaceae

(3) Liliaceae (4) Solanaceae

50. Colchicine a mitotic poison can be obtained from a plant of

(1) Brassicaceae (2) Fabaceae

(3) Solanaceae (4) Liliaceae

51. Perianth condition is characteristic of

(1) Brassicaceae (2) Fabaceae

(3) Solanaceae (4) Liliaceae

52. Match the following and select correct option

(a) Mustard	(i) Liliaceae
(b) Mulaithi	(ii) Solanaceae
(c) Ashwagandha	(iii) Fabaceae
(d) *Tulip*	(iv) Brassicaceae

(1) a(iv), b(iii), c(ii), d(i)

(2) a(iv), b(iii), c(i), d(ii)

(3) a(iii), b(iv), c(ii), d(i)

(4) a(i), b(ii), c(iii), d(iv)

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	3	4	3	1	1	2	2	1	2	1	2	1	1	1	3	2	2	1	2	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	1	3	4	2	1	4	2	3	1	1	4	2	3	1	4	3	1	1	2	3
Que.	41	42	43	44	45	46	47	48	49	50	51	52								
Ans.	1	2	4	4	2	4	3	1	4	4	4	1								

ANATOMY OF FLOWERING PLANTS

1. Growth in plants is largely restricted to specialised regions of active cell division, which are called
(1) Permanent (2) Meristems
(3) Both (1) & (2) (4) Xylem

2. Tissue that produce woody axis and appear later than primary meristem is called
(1) Apical meristem
(2) Intercalary meristem
(3) Secondary meristem
(4) Both 1 and 2

3. Example of lateral meristem/s is/are :-
(A) Intrafascicular cambium (Fascicular vascular cambium)
(B) Interfascicular cambium
(C) Cork cambium
(1) Only A (2) Only B
(3) Only C (4) All A, B and C

4. Permanent tissue, having all cells similar in structure and function is called
(1) Simple tissue
(2) Complex tissue
(3) Cambium
(4) Apical meristem

5. Which of the following statement is incorrect for parenchyma?
(1) Cells are generally isodiametric
(2) Their cell walls are thin and made up of cellulose
(3) They perform various functions like photosynthesis, storage etc.
(4) Their cell walls are thick and lignified

6. Collenchyma cells are much thickened at the corners due to deposition of :-
(1) Cellulose, hemicellulose, lignin
(2) Cellulose, hemicellulose, pectin
(3) Cellulose, suberin
(4) Suberin, ligin

7. Sclereids are present in
(A) Fruit wall of nuts
(B) Pulp of guava, pear and sapota
(C) Seed coat of legume
(1) Only A (2) Only B
(3) Only C (4) All A, B and C

8. Consider the following statements.
(a) Phloem fibres are made up of sclerenchy-matous cells
(b) Phloem parenchyma are generally present in monocots
(c) The first formed primary phloem consists of narrow sieve tube and is referred to as protophloem and the later formed phloem has bigger sieve tubes and is referred to as metaphloem
Which statement(s) is/are false ?
(1) Only a (2) Only b
(3) Only c (4) a, b, and c

9. The outside of the epidermis is often covered with a waxy thick layer, called
(1) Hypodermis (2) Cuticle
(3) Root hair (4) Stem hair

10. Cuticle is absent in
(1) Roots (2) Dicot Stem
(3) Leaves (4) Monocot stem

11. Parenchymatous cells with large intercellular spaces which occupy the central portion of the stem constitute
(1) Cortex (2) Pith
(3) Hypodermis (4) Epidermis

12. In grasses, certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These cells are called :-
(1) Bulliform cells (2) Starch sheath cells
(3) Companion cells (4) Complimentary cells

13. In dicot stem, the cells of cambium present between primary xylem and primary phloem is the
(1) Interfascicular cambium
(2) Vascular cambium
(3) Intra fascicular cambium
(4) Cork cambium

14. By the activity of cambium ring, the cells cut off toward pith, mature into
(1) Secondary phloem
(2) Primary xylem
(3) Secondary xylem
(4) Primary phloem

15. During secondary growth in dicot stem, At some places, the cambium forms a narrow band of parenchyma, which passes through the secondary xylem and secondary phloem in radial directions. These are called :-

(1) Sap wood

(2) Heart wood

(3) Secondary medullary rays

(4) Primary medullary rays

16. Bark that is formed early in the season is called

(1) Late bark (2) Soft bark

(3) Hard bark (4) Ring bark

17. At certain regions, the phellogen cuts off closely arranged parenchymatous cells on the outer side instead of cork cells. These are called :-

(1) Phellem (2) Periderm

(3) Bark (4) Complimentary cells

18. The cells of secondary cortex are :-

(1) Sclerenchymatous (2) Parenchymatous

(3) Collenchymatous (4) Meristematic

19. In dicot root, the vascular cambium is.

(1) Primary in origin

(2) Completely secondary in origin

(3) Both primary and secondary in origin

(4) Neither primary nor secondary in origin

20. Which of the following is primary meristem ?

(1) Apical meristem (2) Intercalary meristem

(3) Lateral meristem (4) both 1 and 2

21. Select odd one with respect to origin :-

(1) Interfascicular cambium

(2) Cork cambium

(3) Vascular cambium in dicot roots

(4) Intrafascicular cambium

22. During the formation of primary plant body, specific regions of the apical meristem donot produce :-

(1) Dermal tissues (2) Ground tissue

(3) Bark (4) Vascular tissue

23. Cells of parenchyma are generally isodiametric but different in shape. Which of the following is not a shape of parenchyma :-

(1) Spherical (2) Fibrous

(3) Oval (4) Elongated

24. Collenchyma is consist of cells which are much thickened at the corners due to deposition of

(1) Cellulose only

(2) Hemicellulose only

(3) Pectin only

(4) Pectin, cellulose and hemicellulose

25. Regarding to collenchyma find out the incorrect statement

(1) It's cell walls show pecto-cellulosic unlignified thickenings

(2) Intercellular spaces are generally absent

(3) Provide mechanical support to petiole of a leaf

(4) Found in the form of a layer below epidermis in monocots

26. Match the following :-

(a) Parenchyma	(i) Pericycle of root
(b) Collenchyma	(ii) Hypodermis of dicot stem
(c) Sclerenchymatous fibres	(iii) Pericycle of stem of *Linum*
(d) Sclerenchymatous sclereids	(iv) Pulp of pear

	a	b	c	d
(1)	i	ii	iii	iv
(2)	iv	iii	ii	i
(3)	i	ii	iv	iii
(4)	i	iii	ii	iv

27. Obliterated central lumen (cavity) is the characteristic feature of

(1) Tracheids (2) Vessels

(3) Xylem fibres (4) Xylem parenchyma

28. Select out the incorrect statement regarding to xylem

(1) On the basis of origin xylem is differentiated into primary xylem and secondary xylem.

(2) On the basis of development, secondary xylem is differentiated into protoxylem & metaxylem

(3) In stems, protoxylem lies towards centre and metaxylem towards periphery

(4) In roots, metaxylem lies towards centre & protoxylem towards periphery

29. Phloem fibres are generally present in :-

(1) Primary phloem (2) Secondary phloem

(3) Protophloem (4) Metaphloem

30. Classification of various tissue system is based on

(1) Structure (2) Location

(3) Type of cells (4) Both 1 & 2

31. The innermost layer of cortex of dicot root is characterised by presence of suberin thickening. This suberin thickening occurs on

(1) Radial walls (2) Transverse wall

(3) Tangential wall (4) Both 1 & 3

32. The parenchymatous cells lies between xylem & phloem of root is known as

(1) Cambium (2) Conjunctive tissue

(3) Pith (4) Pericycle

33. Regarding to stele which of the following statement is correct ?

(1) All the tissues lies inner to pericycle

(2) All the tissues lies inner to endodermis

(3) All the tissues lies inner to hypodermis

(4) All the tissues lies inner to epidermis

34. Due to continuous growth of secondary xylem which of the following get crushed gradually

(1) Primary phloem

(2) Earlier formed secondary phloem

(3) Either 1 or 2

(4) both 1 and 2

35. After secondary growth what is the actual future of primary xylem ?

(1) Converts into secondary xylem

(2) Remains more or less intact in or around the centre

(3) Converts into secondary phloem

(4) Gets crushed

36. The activity of cambium is under the control of :-

(1) Phloem activity (2) Physiological factors

(3) Environmental factors (4) Both 2 and 3

37. Regarding to wood find out the wrong statement :-

(1) Vessels of spring wood have wider cavities

(2) Vessels of autumn wood have wider cavities

(3) Spring wood is lighter in colour

(4) Autumn wood has a higher density

38. Match the following

(a) Early wood	(i) Innermost mass of wood
(b) Late wood	(ii) Wood just inner to vascular cambium
(c) Heart wood	(iii) Low density
(d) Sap wood	(iv) High density

	a	b	c	d
(1)	iii	iv	i	ii
(2)	iii	iv	ii	i
(3)	iv	iii	ii	i
(4)	iv	iii	i	ii

39. Impervious nature of cork for water is due to deposition of which chemical ?

(1) Lignin (2) Suberin

(3) Pectin (4) Hemicellulose

40. During secondary growth in root, cambium ring arises from

(1) Tissues located below phloem bundles

(2) Portion of pericycle tissue above protoxylem

(3) Endodermis

(4) Both 1 and 2

ANSWERS KEY

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

CELL - THE UNIT OF LIFE

1. .....was a German scientist, who observed that all plant tissues are made up of cells. At the same time....., British scientist studied different type of animal cells.

(1) Rudolf Virchow and Nageli respectively

(2) Mathias Schleiden and Theodore Schwann respectively

(3) Theodore Schwann and Mathias Schleiden respectively

(4) Robert Hooke and Schleiden respectively

2. Main arena of cellular activities in both plant and animal cells is :-

(1) Nucleus (2) Cell organelles

(3) Cytoplasm (4) Centriole

3. Who proposed *"Omnis cellula e cellula"* ?

(1) Robert Hooke

(2) Rudolf Virchow

(3) Schwann

(4) Anton Von Leeuwenhoek

4. Algal cell wall is made of :-

(1) Cellulose, hemicellulose and pectin

(2) Cellulose, galactans, mannans and minerals

(3) Hemicellulose and xylan

(4) Cellulose, Hemicellulose, protein and pectin

5. The detailed structure of the cell membrane was studied only after the advent of electron microscope in the year :-

(1) 1931 (2) 1913

(3) 1950 (4) 1973

6. Depending upon the....., membrane proteins can be classified as integral or peripheral :-

(1) Size

(2) Sedimentation rate

(3) Ease of extraction

(4) Molecular weight

7. An improved model of the structure of cell membrane was proposed by Singer and Nicolson in.... , widely accepted as.....

(1) 1959, Fluid mosaic model

(2) 1900, Lipoidal model

(3) 1938, Unit membrane model

(4) 1972, Fluid mosaic model

8. According to fluid-mosaic model, the quasi-fluid nature of.....enables lateral movement of.....within the overall bilayer. This ability to move within the membrane is measured as its...

(i) Carbohydrates

(ii) Lipids

(iii) Proteins

(iv) Fluidity

(v) Selective permeability

Correct sequence is :-

(1) ii, iii, iv (2) iii, i, iv

(3) iii, ii, v (4) i, ii, iv

9. The fluid nature of the membrane is also important from the point of view of functions like :-

(i) Cell growth

(ii) Formation of intercellular junctions

(iii) Secretions

(iv) Endocytosis

(v) Cell division

(1) i, iii, iv only (2) ii, iii, v only

(3) i, iii, iv, v only (4) i, ii, iii, iv, v

10. One of the most important functions of the plasma membrane is :-

(1) Formation of nuclear membrane

(2) Transport of molecules across it

(3) Exocytosis

(4) Detoxification

11. .....can not pass through the lipid bilayer, they require a carrier protein of the membrane to facilitate their transport across the membrane

(1) Nonpolar molecules

(2) Polar molecules

(3) Hydrophobic molecules

(4) Both (2) and (3)

12. Na^+/K^+ pump is an example of :-

(1) Passive transport

(2) Osmosis

(3) Active transport

(4) Simple diffusion

13. Mark the incorrect match for transport of molecules across the membrane :-

(1) Neutral solute – simple diffusion

(2) Water – osmosis

(3) Non polar molecules – facilitate diffusion

(4) ATP utilized – active transport

14. Mitochondria :-

(a) are easily visible under the microscope (without specifically stained)

(b) are typically sausage-shaped or cylindrical

(c) are double membrane bound structures

(d) have two aqueous compartments

(1) a, d correct and b, c incorrect

(2) a, b correct and c,d incorrect

(3) a incorrect and b, c, d correct

(4) a, d incorrect and b, c correct

15. Inner mitochondrial membrane forms infoldings called :-

(1) Thylakoid (2) Cisternae

(3) Oxysomes (4) Cristae

16. The number of mitochondria per cell is variable, depending on :-

(1) Size of cells

(2) Shape of cells

(3) Physiological activity of cells

(4) Type of genes present in mt DNA

17. Diameter of Golgi cisternae is :-

(1) 0.5 µm – 1.0 µm (2) 0.2 – 1.0 µm

(3) 1.0 – 4.1 µm (4) 10 – 50 nm

18. A Golgi complex has :-

(1) Fixed number of cisternae

(2) Varied number of cisternae

(3) One cisterna in higher plants

(4) Convex trans face and concave cis face cisternae

19. Which cell organelle divides the intracellular space into two distinct compartments, i.e. luminal (inside) and extra luminal (cytoplasm) compartments ?

(1) Golgibody

(2) Mitochondria

(3) Endoplasmic reticulum

(4) Lysosome

20. Which one of the following is not a component of endomembrane system ?

(a) Endoplasmic reticulum

(b) Golgibody

(c) Lysosome

(d) Vacuole

(e) Nucleus

(1) Both a and c (2) Only c

(3) d and e both (4) Only e

21. Membrane bound vesicular structures formed by the process of packaging in the Golgi apparatus and filled with hydrolytic enzymes, are called :-

(1) Vacuoles

(2) Transitional vesicles

(3) Lysosomes

(4) Centrosome

22. (a) Granular structure

(b) First observed under the electron microscope as dense particles by George Palade

(c) Composed of RNA and proteins

(d) Not surrounded by any membrane

Above given all statements are true for which cell organelle ?

(1) Nucleolus (2) Ribosomes

(3) Cristae (4) Chloroplast

23. Eukaryotes have 80S, while prokaryotes have 70S ribosomes in cytoplasm. Here "S" explains :-

(a) Sedimentation coefficient

(b) Measure of density

(c) Measure of size

(1) a only (2) a and b only

(3) b and c only (4) a, b and c

24. In r-RNA, "r" stands for :-

(1) Ribophorins (2) Ribozyme

(3) Ribosomal (4) Recognition

25. Find incorrect statement with regard to centrosome and centrioles :-

(a) Centrosomes are surrounded by amorphous pericentriolar material

(b) In centrosome, both centrioles lie parallel to each other in which each has an organisation like the cartwheel

(c) Centrioles are made up of nine unevenly spaced peripheral fibrils of tubulin

(d) Hub is the central proteinaceous part of centriole

(e) Proteinaceous radial spokes connect hub to peripheral triplets

(1) a,b, e (2) only b

(3) b, c (4) All are correct

26. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called :-

(1) Endoplasmic reticulum

(2) Plasmalemma

(3) Ribosomes

(4) Cytoskeleton

27. Carotenoid pigments are found in :-

(1) Chromoplast (2) Chloroplast

(3) Leucoplast (4) Both (1) and (2)

28. Interphase nucleus has a loose and indistinct network of nucleoprotein fibres called chromatin, but during different stages of cell division, cells show "*structured chromosomes*" in place of the:-

(1) Nucleus (2) Nucleosome

(3) Solenoid (4) Plasmosome

29. Nucleus as a "cell organelle" was first described by.....as early as.....

(1) Robert Hooke, 1665

(2) Robert Brown, 1831

(3) Flemming, 1931

(4) Strasburger, 1831

30. Term "chromatin" was given by Flemming, after staining of nucleus with.....dyes :-

(1) Acidic (2) Basic

(3) Neutral (4) Both (2) and (3)

31. Space between parallel nuclear membranes is called perinuclear space which is :-

(1) 10–50 nm (2) 0.1 – 0.4 μm

(3) 10 – 50 Å (4) 1 – 4 nm

32. A single human cell has approximately.....long thread of DNA distributed among its....chromosomes:-

(1) 2 cm, 46 (2) 2 metre, 46

(3) 2 cm, 23 (4) 2 metre, 23

33. Important site for formation of glycoproteins and glycolipid is :-

(1) Vacuole

(2) Golgi apparatus

(3) Plastid

(4) Lysosome

34. Peptide bond synthesis in cytoplasm of cell takes place on :-

(1) Chloroplast

(2) Mitochondria

(3) Chromoplast

(4) Ribosomes

35. In eubacteria, a cellular component that resembles eukarotic cell is :-

(1) Plasma membrane (2) Nucleus

(3) Cytoskelton (4) Cell wall

36. Basic unit of life is :-

(1) Cell (2) Tissue

(3) Organ (4) Organ system

37. Cristae are found in :-

(1) Golgi apparatus (2) ER

(3) Both 1 and 2 (4) Mitochondria

38. The physio-chemical approach to study and understand living organisms is called -

(1) Physiochemical biology

(2) Reductionist biology

(3) Fundamental biology

(4) Biochemical biology

39. Which of the following scientist explained that cells divided and new cells are formed from pre-existing cells?

(1) Schwann (2) Schleiden

(3) Rudolf Virchow (4) Robert Hooke

40. Which of the following scientist give the cell theory a final shape ?

(1) Leewenhoek

(2) Schleidin & Schwann

(3) Robert Hooke

(4) Rudolf Virchow

41. Which among the following is not a function of mesosome ?

(1) Synthesis of food

(2) Help in cell wall formation

(3) Help in DNA replication

(4) Distribution of DNA in daughter cells

42. In prokaryotes like cyanobacteria, besides mesosome other membranous extensions into cytoplasm is/are-

(1) GERL

(2) Chromatophores

(3) Ribosomes

(4) Mitochondria

43. Regarding to inclusion bodies - find out the incorrect statement

(1) It is site of food storage

(2) It is single membrane bounded

(3) They lie freely in cytoplasm

(4) May found in prokaryotic and eukaryotic cells

44. In plasma membrane of human erythrocyte which of the following is ratio of proteins and lipids respectively-

(1) 50 & 50 (2) 60 & 40

(3) 52 & 40 (4) 40 & 52

45. Fluidity of plasma membrane is due to -

(1) Lipids (2) Proteins

(3) Carbohydrates (4) Cholesterol

46. Regarding to cell membrane find out the odd one -

(1) Fluid mosaic model is widely accepted model

(2) Quasi fluid nature of lipids enables the lateral movement of proteins

(3) All types of molecules can easily pass through membrane

(4) Fluid nature of membrane is also important for cell growth & formation of intercellular junctions

47. Which type of solutes may move across plasma membrane from higher to lower concentration along concentration gradient without of help of transmembrane proteins?

(1) Positively charged solutes

(2) Negatively charged solutes

(3) Neutral solutes

(4) Any of the above

48. Select out the wrong statement -

(1) Neutral solute can move according to concentration gradient across the nonpolar lipid bilayer

(2) Water can also move according to concentration gradient across the nonpolar lipid bilayer.

(3) Non polar molecules can not pass through non polar lipid bilayer

(4) Na^+ & K^+ can move across membrane through active transport

49. Which of the following is not a function of cell wall ?

(1) Protection from mechanical damage and infection

(2) Cell to cell interaction

(3) Barrier to undesirable macromolecules

(4) Secretion

50. Which of the following component is not a constituent of algal cell wall ?

(1) Cellulose (2) Galactans

(3) Mannans (4) Hemicellulose

51. Which of the following constituent is right for endomembrane system ?

(1) ER, Golgi complex, lysosome & nucleus

(2) ER, Golgi complex, lysosome & vacuole

(3) ER, Golgi complex, lysosome & microbodies

(4) ER, Golgi complex, plastids & vacuole

52. Regarding to endoplasmic reticulum which of the following statement is wrong -

(1) ER divides the intra cellular space into two distinct compartments

(2) RER frequently observed in cells actively involved in secretion

(3) In animals steroidal hormones are synthesized in RER

(4) SER is the major site of lipid synthesis

53. Golgi complex receives proteins for modification from RER at which face -

(1) Cis face

(2) Trans face

(3) Concave face

(4) Maturing face

54. Which of the following reasons explains best, the close association of Golgi complex with ER ?

(1) Its enzymes works close to ER

(2) It receives material from ER for packaging

(3) It becomes active close to ER

(4) All of the above

55. In plant cells how much volume of cell can be occupied by vacuole ?

(1) 10% (2) 50%

(3) 90% (4) 80%

56. Classification of plastids into chloroplast, chromoplast and leucoplast is based on -

(1) Stored food (2) Pigments

(3) Structure (4) Size

57. Chloroplast of higher plants contains -

(1) Only chlorophyll

(2) Only carotenoids

(3) Both chlorophyll and carotenoids

(4) Phycobillins

58. Regarding to cilia and flagella which of the following statement is incorrect -

(1) Cilia is small and flagella is long

(2) Cilia can move either cell or surrounding fluid

(3) Flagella is responsible for movement of surrounding fluid

(4) Cilia work like oars

59. Plasma membrane covering of flagella and cilia surrounds the central core, that is known as -

(1) Shaft (2) Axonema

(3) Radial spoke (4) Arms

60. Radial spokes of flagella helps in connection between-

(1) Peripheral doublets

(2) Central singlet microtubules

(3) One of the peripheral doublet and central sheath

(4) Two successive peripheral doublets

61. What is the orientation of centrioles in centrosome?

(1) Parallel (2) Perpendicular

(3) Oblique (4) None of the above

62. Match the following -

(A) Robert Brown	(I) Ribonucleoproteins
(B) Flemming	(II) Nucleus as cell organelle
(C) Palade	(III) Packaging of materials
(D) Camillo Golgi	(IV) Staining of nucleus material

(1) A - (II) B - (IV) C - (I) D - (III)

(2) A - (II) B - (IV) C - (III) D - (I)

(3) A - (I) B - (II) C - (III) D - (IV)

(4) A - (IV) B - (III) C - (II) D - (I)

63. Nucleolus is the site of -

(1) Synthesis of r - RNA

(2) Synthesis of m - RNA

(3) Synthesis of t- RNA

(4) Synthesis of n- RNA

64. Classification of chromosomes with respect to shape based on -

(1) Structure

(2) Number of telomere

(3) Position of centromere

(4) Position of kinetochore

65. Chromosome with centromere slightly away from center is known as -

(1) Metacentric (2) Submetacentric

(3) Acrocentric (4) Telocentric

66. Match the following -

(A) Metacentric	(I) Terminal Centromere
(B) Submetacentric	(II) Centromere very close to its end
(C) Acrocentric	(III) Centromere sligthly away from the center
(D) Telocentric	(IV) Middle centromere

(1) A-(IV) B-(II) C-(III) D-(I)

(2) A-(IV) B-(III) C-(II) D-(I)

(3) A-(I) B-(II) C-(III) D-(IV)

(4) A-(I) B-(IV) C-(III) D-(II)

67. Find out the incorrect statement about secondary constriction -

(1) Non staining

(2) Constant position

(3) Known as satellite

(4) Present in some chromosomes

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	2	2	3	3	4	1	4	2	2	3	3	3	4	3	1	2	3	4
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	2	4	3	3	4	4	1	2	2	1	2	2	4	1	1	4	2	3	4
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	2	2	3	1	3	3	3	4	4	2	3	1	2	3	2	3	3	2	3
Que.	61	62	63	64	65	66	67													
Ans.	2	1	1	3	2	2	3													

BIOMOLECULES

1. A nitrogenous base is linked to the pentose sugar through :
(1) Phosphodiester linkage
(2) N-glycosidic linkage
(3) Ester linkage
(4) Phosphoester linkage

2. Which of the following is a nucleoside of DNA ?
(1) Adenosine
(2) Guanine
(3) Deoxyguanosine
(4) Deoxyguanylic acid

3. Which of the following is not the feature of double helix structure of DNA ?
(1) It is made of two polynucleotide chains
(2) The two chains have anti-parallel polarity
(3) The bases in two strands are paired through N-glycosidic bond.
(4) The two chains are coiled in a right handed fashion.

4. Which of the following compound is present in acid soluble pool when we analyse chemical composition?
(1) Protein (2) Lipid
(3) Glucose (4) Carotenoid

5. Which of the following elements present most abundantly on earth crust?
(1) Carbon (2) Hydrogen
(3) Oxygen (4) Silicon

6. If $-NH_2$ group and –COOH group are attached on same carbon in any amino acid, then these types of amino acids are known as :
(1) α-AA (2) β-AA
(3) γ-AA (4) All

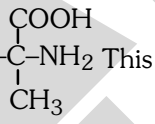
7. Variations in amino acids depend on :
(1) Side group (2) Ester group
(3) Complexity of cell (4) None of them

8. How many carbon atoms are found in arachidonic acid?
(1) 16 (2) 18 (3) 20 (4) 22

9. Which of the following AA is basic ?
(1) Valine (2) Lysine
(3) Glutamic acid (4) Glycine

10. How many total carbons are found in palmitic acid?
(1) 15 (2) 16
(3) 17 (4) 18

11. Lipid may be :
(1) Monoglyceride (2) Diglyceride
(3) Triglyceride (4) All the above

12.  This amino acid is :
(1) Serine (2) Alanine
(3) Glycine (4) Arginine

13. Which functional group is common in fatty acid & amino acid ?
(1) –COOH (2) $-NH_2$
(3) –OH (4) All

14. Which of the following is micromolecule ?
(1) Lipid (2) DNA
(3) Protein (4) All

15. Antibiotics are :
(1) Primary metabolites
(2) Secondary metabolites
(3) The product obtained from virus
(4) None of them

16. In proteins, amino acids are attached together by :
(1) Peptide bond (2) Amide bond
(3) Ester bond (4) 1 & 2 both

17. Proteins can act as :
(1) transporter of nutrients across cell membrane
(2) Hormones
(3) Enzymes
(4) All

18. Which of the following is homopolysaccharide?
(1) Cellulose (2) Starch
(3) Glycogen (4) All

19. Which of the following statements is correct ?

(1) 3' end of polynucleotide chain will be present where –OH group of 3' carbon of pentose sugar will be free.

(2) Both the strands of DNA are antiparallel due to opposite directing phosphodiester bond.

(3) DNA is more stable than RNA

(4) All

20. Which N-base is odd in the case of DNA?

(1) Cytosine (2) Guanine

(3) Uracil (4) 5-Methyl uracil

21. How many H-bonds are present bewteen cytosine and guanine in double stranded DNA formation?

(1) 2 (2) 3 (3) 4 (4) 1

22. $DNA \xrightarrow{A} RNA \xrightarrow{B}$ Protein, Name the process 'B'

(1) Replication (2) Trancription

(3) Translation (4) Taminism

23. There is a wide diversity in living organism in our biosphere and all living organism made of the same chemical. This statement can be justified by all of the following statement except :

(1) Plant tissue, animal tissue and a microbial paste having same elements

(2) Organisms having similar mode of genetic transfer mechanism.

(3) Mechanism of energy transfer process are almost similar in all organism

(4) Mechanism of energy production is similar in all organism.

24. All the elements present in a sample of earth's crust are also present in a sample of living tissue, but which of the following element is higher in any living organism than in earth's crust?

(1) Hydrogen, Oxygen, Carbon.

(2) Hydrogen, Oxygen, Carbon and Nitrogen

(3) Hydrogen, Oxygen, Carbon, Nitrogen and Sulphur.

(4) Hydrogen, Oxygen, Carbon, Nitrogen, Sulphur and Sodium

25. Which of the following compounds is used in the chemical analysis of living tissue?

(1) CH_3COOH (2) Cl_3CCOOH

(3) HCHO (4) $C_6H_{12}O_6$

26. Which of the following can be included alongwith biomolecules?

(a) Carbohydrate (b) Protein

(c) Lipids (d) Nucleic acid

(e) Vitamins (f) Minerals

(g) Water

(1) a, b, c, d, e, f, g (2) a, b, c, d, e, f

(3) a, b, c, d, e (4) a, b, c, d

27. Which of the following is maximum in human body

(1) Hydrogen (2) Carbon

(3) Oxygen (4) Nitrogen

28. Inulin is a polymer of

(1) Glucose (2) Amino acids

(3) Fructose (4) Nucleotides

29. When a dry piece of tissue is fully burnt, all the carbon compounds are oxidised to gaseous form and the remaining is called 'ash'. The ash contains all of the following, except.

(1) Calcium (2) Magnesium

(3) Sulphure (4) Nucleic acid

30. Pigments are considered as the secondary metabolites, having some particular functions. Which of the following is an example of pigments?

(1) Carotenoids (2) Codeine

(3) Concanavalin-A (4) Curcumin

31. Which of the following is/are good source of different type of secondary metabolites?

(1) Plants (2) Fungi

(3) Animals (4) Both (1) and (2)

32. Which of the following can not be considered as the example of polymeric substances?

(1) Rubber (2) Gums

(3) Cellulose (4) Vinblastin

33. Match the following with their suitable groups.

Column-A		Column-B	
(a)	Drugs	(i)	Morphine
(b)	Toxins	(ii)	Lemon grass oil
(c)	Terpenoides	(iii)	Abrin
(d)	Alkaloides	(iv)	Vinblastin
		(v)	Diterpens

(1) a-iv, b-iii, c-v, d-i (2) a-v, b-iii, c-ii, d-i

(3) a-iii, b-iv, c-i, d-ii (4) a-iv, b-i, c-v, d-iii

34. Select the correctly matched.

(1) Anthocyanins - Alkaloids

(2) Carotenoids - Toxins

(3) Ricin - Drugs

(4) Lemon grass oil - Essential oils.

35. Which of the following amino acid having H(Hydrogen) as R group?

(1) Glycine (2) Alanine

(3) Serine (4) Leucine

36. Which of the following statements is correct with reference to amino acids?

(1) These are substituted methane

(2) They contains α-carbon hance called α-amino acids

(3) Variable group of amino acid is designated as R-group

(4) All of the above

37. Amino acids are basically classified into different groups; mainly bassed on which of the following?

(1) Nature of R group

(2) Number of amino group

(3) Number of caboxylic group

(4) All of the above

38. Physical and chemical properties of amino acids depend on

(1) Amino group

(2) Carboxylic group

(3) R-group

(4) All of the above

39. Which of the following is acidic amino acid.

(1) Glutamic acid

(2) Aspartic acid

(3) Ascorbic acid

(4) Both (1) and (2)

40. Which of the following amino acid is/are basic in nature?

(1) Lysine (2) Arginine

(3) Histidine (4) All of the above

41. Which of the following is not the example of aromatic amino acid?

(1) Tyrosin (2) Tryptophan

(3) Threonin (4) Phenylalanine

42. Which of the following statements is not correct with reference to amino acid?

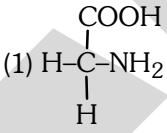
(1) NH_2 group of amino acids having ionizable nature.

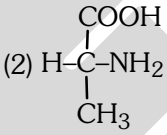
(2) COOH group of amino acids having ionizable nature.

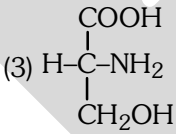
(3) The structure of amino acids changes in solutions of different pHs

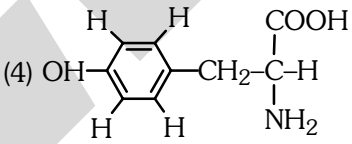
(4) Amino acids found in protein belong to D-forms mostly

43. Which of the following structures represents serine?

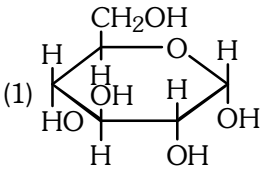
(1) 

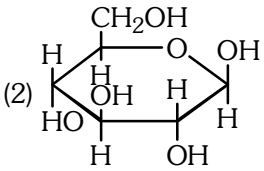
(2) 

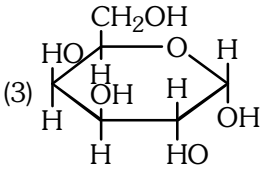
(3) 

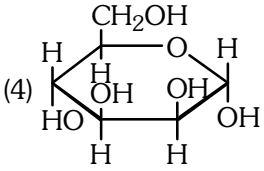
(4) 

44. Which of the following is the structure of α-D-glucose?

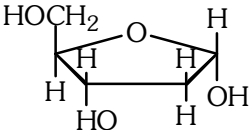
(1) 

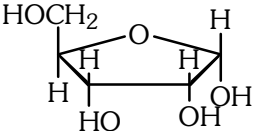
(2) 

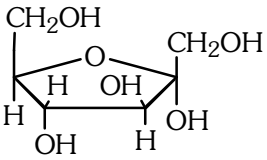
(3) 

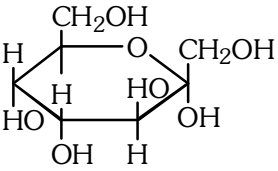
(4) 

45. Which of the following represents the structure of Ribose ?

(1) 

(2) 

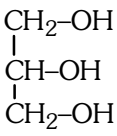
(3) 

(4) 

46. Which of the following is the molecular formula of Palmitic acid ?

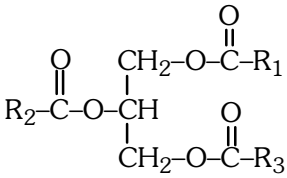
(1) $CH_3(CH_2)_2COOH$ (2) $CH_3(CH_2)_{14}COOH$

(3) $CH_3(CH_2)_{16}COOH$ (4) $CH_3(CH_2)_{18}COOH$

47.  is the structure of which of the following compounds?

(1) Glyceraldehyde (2) Glycerol

(3) Glyceric acid (4) Triglycerides

48. 

The given structure represents the structure of tri-aster derivative while R_1, R_2 and R_3 is/are :

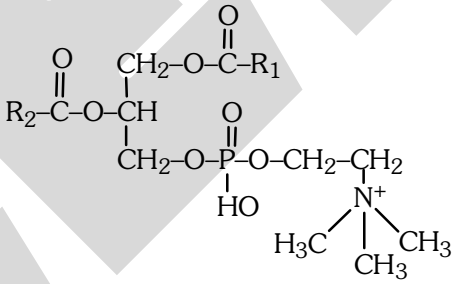
(1) Fatty acid, Amino acid & Adenylic acid respectively.

(2) Amino acid, Fatty acid and Phosphoric acid respectively.

(3) Fatty acids only.

(4) Amino acid, Glucose & Lactic acid respectively.

49. The structure given below is the structure of which of the following compounds.



(1) Lecithin (Phosphatidyl choline)

(2) Cephaline (Phosphatidyl serine)

(3) Kephaline (Phosphatidyl ethanol amine)

(4) Phosphosphingomyelins.

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	3	3	3	1	1	3	2	2	4	2	1	1	2	4	4	4	4	3
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	2	3	4	3	2	3	3	3	4	1	4	4	1	4	1	4	1	4	4	4
Que.	41	42	43	44	45	46	47	48	49											
Ans.	3	4	3	1	2	2	2	3	1											

CELL CYCLE & CELL DIVISION

1. Prophase–I of meiotic division is typically longer and more complex, it is subdivided into five phases, on the basis of :-

(1) Staining

(2) Behaviour of chromosomes

(3) Duration

(4) Number of chromosomes

2. Match the columns :-

Column–I		Column–II	
A.	Leptotene	(i)	Compaction of chromosomes
B.	Zygotene		
C.	Pachytene	(ii)	Recombination nodule
D.	Diplotene		
E.	Diakinesis	(iii)	Synapsis
		(iv)	Terminalisation of chiasmata
		(v)	Dissolution of synaptonemal complex

(1) A–i, B–iii, C–ii, D–v, E–iv

(2) A–i, B–ii, C–iii, D–v, E–iv

(3) A–v, B–iii, C–ii, D–i, E–iv

(4) A–iii, B–ii, C–v, D–iv, E–i

3. Leptotene, zygotene, pachytene, diplotene and diakinesis are 5 phases of prophase–I. Which one is the longest in human oogenesis?

(1) Zygotene (2) Leptotene

(3) Diplotene (4) Diakinesis

4. Interkinesis is stage between :-

(1) Two mitotic divisions

(2) Two phases of meiotic divisions

(3) Anaphase and telophase

(4) Leptotene and zygotene

5. In which phase of mitosis, chromosomes loose their individuality ?

(1) Prophase (2) Metaphase

(3) Anaphase (4) Telophase

6. Mark incorrect statements :-

(A) Meiosis involves only a single cycle of DNA replication

(B) Four haploid cells are formed at the end of meiosis–I

(C) Mitosis may occurs in haploid and diploid cells

(D) In yeast, cell cycle takes about 90 minutes.

(1) A and B (2) A and C

(3) Only B (4) All are correct

7. It is significant to note that in the 24 hour average duration of cell cycle of human cell, cell division proper lasts for only about :-

(1) Four hours (2) 90 minutes

(3) An hour (4) 10 hours

8. In which stage of mitotic division, cells do not show Golgicomplex, ER, nucleolus and nuclear envelope ?

(1) Metaphase (2) Late prophase

(3) Anaphase (4) All of these

9. Karyotype of chromosomes is prepared at :-

(1) Prophase (2) Interphase

(3) Metaphase (4) Anaphase

10. In which phase of mitosis, cell does not have nucleolus ?

(1) Interphase (2) Telophase

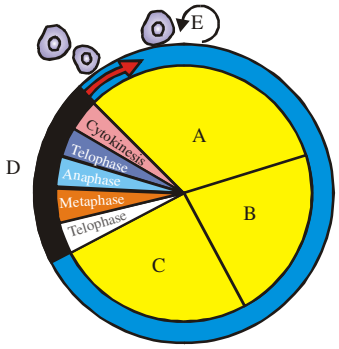
(3) Late prophase (4) All of these

11. "X-shaped structures" occurs during which phase of meiotic division ?

(1) Prophase I (2) Metaphase I

(3) Anaphase II (4) Telophase I

Q. No. 12 to 17 are based on given figure :



12. DNA replication occurs in ..... phase :-

(1) A (2) B (3) C (4) E

13. Which phase shows structured chromosomes ?

(1) B (2) D (3) C (4) E

14. Heart cells are found in ..... phase :-
(1) E (2) D (3) C (4) B

15. Quiescent stage is :-
(1) A (2) B (3) D (4) E

16. Centriole duplicates in ..... phase :-
(1) B (2) C (3) A (4) D

17. Cell differentiates in ..... phase :-
(1) C (2) E (3) B (4) D

18. In which stage of mitosis, Golgi complexes, ER, nucleolus and nuclear envelope begins to disappear?
(1) Early prophase (2) Late prophase
(3) Prometa phase (4) Metaphase

19. Chiasmata appear in which stage?
(1) Leptotene (2) Zygotene
(3) Pachytene (4) Diplotene

20. Which phase is marked by terminalization of chiasmata?
(1) Diakinesis (2) Pachytene
(3) Diplotene (4) Zygotene

21. Dissolution of synaptonemal complex is started and chiasmata are first seen during?
(1) Pachytene (2) Diplotene
(3) Diakinesis (4) Zygotene

22. Crossing over occurs during :-
(1) Pachytene (2) Diplotene
(3) Diakinesis (4) Zygotene

23. 'Dyad of cell' form after :
(1) Anaphase-I (2) Telophase-I
(3) Telophase-II (4) Anaphase-II

24. The movement of homologous chromosomes towards opposite poles occur by shortening of spindle fibre during :-
(1) Anaphase-II (2) Anaphase-I
(3) Telophase (4) Metaphase-I

25. In human being which cell(s) do/does not show division?
(a) Heart cell
(b) Muscle cell
(c) Nerve cell
(1) only a (2) only a and b
(3) only a and c (4) a, b and c

26. Cell cycle involves -
(1) Duplication of genome
(2) Synthesis of cell constituents
(3) Division of cell
(4) All the above

27. Regarding to cell cycle which of the following statement is wrong ?
(1) Cytoplasm increase is a continuous process
(2) DNA synthesis occurs only during one specific stage
(3) replicated chromosomes distributed to daughter nuclei by complex series of events
(4) events for replicated chromosomes distribution are not under genetic control

28. Which of the following phase corresponds to interval between mitosis and initiation of DNA replication ?
(1) G_1 phase (2) G_2 phase
(3) S - phase (4) M - phase

29. If there are 16 chromosomes in each root cell of onion, then what will be the number of chromosome in G_1 phase and G_2 phase respectively -
(1) 32 & 16 (2) 16 & 32
(3) 16 & 16 (4) 32 & 32

30. About cell - cycle, which of the following statement is correct ?
(1) In G_o phase cells are metabolically inactive
(2) In G_o phase cells are metabolically active
(3) Diploid somatic cells of animals divide by only meiotic division
(4) In plants only haploid cells can show mitotic divisions

31. The most dramatic period of cycle, involving a major reorganisation of virtually all components of cell is -
(1) G_1 (2) S
(3) G_2 (4) M

32. Chromatin condensation and movement of duplicated centriole towards opposite pole can be observed during-
(1) Prophase (2) Metaphase
(3) Anaphase (4) Telophase

33. Which of the following organelles or components can be observed in cell even after completion of prophase?
(1) Golgi complex
(2) Endoplasmic reticulum
(3) Nucleolus
(4) Mitochondria

34. Regarding arrangement of chromosome on equator during metaphase, which of the following statements is incorrect ?

(1) Each chromatid remains connected by one spindle fiber from both poles

(2) Each chromosome remains connected by spindle fibres from both poles

(3) Spindle fibre remains attached on kinetochore of both chromatids

(4) Each chromosome remains connected at both poles by spindle fibres

35. During poleward movement of chromosomes in anaphase centromere (kinetochore) of each daughter chromosome facing towards -

(1) Pole

(2) Equatorial plate

(3) Lateral

(4) It is random , sometimes towards pole and sometimes towards equatorial plate

36. Match the following -

(a) Prophase	(I) Decondensation of chromosome
(b) Metaphase	(II) Division of centromere
(c) Anaphase	(III) Attachment of spindle fibres on kinetochores of chromosomes
(d) Telophase	(IV) Initiation of assembly of mitotic spindles

(1) a (IV) b (III) c (I) d (II)

(2) a (IV) b (III) c (II) d (I)

(3) a (III) b (IV) c (II) d (I)

(4) a (III) b (IV) c (I) d (II)

37. Precursor of cell wall is -

(1) Cell membrane (2) Cell fragments

(3) Cell Plate (4) Nuclear membrane

38. Which of the following is not a significance of mitosis

(1) Maintenance of identical genetic complement

(2) Cell repair

(3) Restore nucleo cytoplasmic ratio

(4) Genetic variability

39. Meiosis ensures the production of ..... phase in life cycle of sexually reproducing organism, where as fertilisation restores ..... phase.

(1) diploid, haploid (2) haploid, triploid

(3) diploid, triploid (4) haploid, diploid

40. Meiosis involves two sequential cycles of nuclear and cell division called meiosis - I & meiosis - II, but how many cycles of DNA replication can be seen during this type of division ?

(1) One (2) Two (3) Three (4) Four

41. Regarding key features of meiosis select out the wrong one -

(1) Meiosis involves two sequential cycles of nuclear and cell division called meiosis- I & meiosis- II

(2) Meiosis is initiated after the parental chromosomes have replicated to produce identical sister chromatids at the S - Phase

(3) Meiosis involves pairing of homologous chromosomes and recombination between non homologous chromosome

(4) Four haploid cells are formed at the end of meiosis-II

42. Select the odd one -

(1) Zygotene - Synaptonemal complex appearance

(2) Pachytene - Appearance of recombination nodule

(3) Diplotene - Terminalisation of chiasmata

(4) Diakinesis - Assembly of meiotic spindle

43. Match the following -

(a) Metaphase- I	(I) Splitting of centromere of each chromosome
(b) Anaphase - I	(II) Separation of homologous chromosomes
(c) Telophase - I	(III) Alignment of bivalents on equatorial plate
(d) Anaphase -II	(IV) Appearance of diad of cells

	a	b	c	d
(1)	III	II	IV	I
(2)	II	III	IV	I
(3)	IV	III	II	I
(4)	I	II	III	IV

44. Match the following -

(a) Prophase- II	(I) Enclosure of chromosomes in nuclear envelope
(b) Metaphase - II	(II) Separation of sister chromatids
(c) Anaphase- II	(III) Chromosome alignment on equator
(d) Telophase -II	(IV) Disappearance of nuclear membrane

(1) a (IV) b (III) c (I) d (II)
(2) a (IV) b (III) c (II) d (I)
(3) a (IV) b (II) c (III) d (I)
(4) a (IV) b (I) c (II) d (III)

45. Which of the following is not a significance of meiosis ?
(1) Helps in conservation of specific chromosome number in each species
(2) Increase in genetic variability
(3) Helps in evolution and adaptation
(4) Helps in growth of organism

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	3	2	4	3	3	4	3	3	1	2	2	1	4	1	2	2	4	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	2	1	2	2	4	4	4	1	3	2	4	1	4	1	1	2	3	4	4	1
Que.	41	42	43	44	45															
Ans.	3	3	1	2	4															

PLANT PHYSIOLOGY

TRANSPORT IN PLANTS

1. Over small distance, substances can move by :
(1) Diffusion
(2) Cytoplasmic streaming
(3) Active transport
(4) All of the above

2. Substances that have a..... moiety, find it difficult to pass through the membrane.
(1) Hydrophilic (2) Hydrophobic
(3) Neutral (4) Lipophilic

3. Transport methods those require special membrane proteins also show :
(1) Always uphill movement
(2) Always movement according to concentration gradient
(3) Always transport saturation
(4) Always ATP expenditure

4. Which of the following statements are correct?
(A) If two systems containing water are in contact, random movement of water molecules will result in net movement of water down a gradient of free energy is called diffusion.
(B) The less the solute molecules in a solution, the lower is the solute potential
(C) If a pressure greater than atmospheric pressure is applied to a solution, its water potential increases.
(D) By convention, the water potential of pure water at standard temperature which is not under any pressure, is taken to be zero i.e. minimum value of water potential.
(1) A and B (2) A and C
(3) B and D (4) C and D

5. Imbibition :
(1) is a special type of osmosis
(2) involve adsorbtion
(3) is the characteristic feature of lipophilic coloids
(4) occurs against the water potential gradient

6. All the following statements are correct except that :
(1) the symplastic movement of absorbed water may be aided by cytoplasmic streaming
(2) the xylem vessels and tracheids are non living conduits so are parts of the apoplast
(3) the movement through the apoplast does not involve crossing the cell membrane
(4) the apoplastic system is the system of interconnected protoplasts that is continuous through the plant, except at the casparian strips of the endodermis in the roots.

7. As various ions from the soil are actively transported into the vascular tissues of the roots, water follows and increases the pressure inside the xylem. This pressure :
(1) is responsible for water loss from leaves in liquid phase
(2) may re-establish the continuity of water column in xylem
(3) is considered as positive pressure
(4) All of the above

8. The cause of the opening or closing of the stomata is:
(1) a change in the turgidity of the guard cells
(2) the crescent shape of thick and nonelastic outer wall of the guard cells
(3) the longitudinal orientation of cellulose microfibrils in the inner walls of guard cells
(4) All of the above

9. Most of the nitrogen in plants is transported in :
(1) Organic form via phloem
(2) Organic form via xylem
(3) Inorganic form via phloem
(4) Inorganic form via xylem

10. In plants the accepted mechanism for the translocation of sugars from source to sink :
(1) involves the modest push by root pressure
(2) involves the transport according to pressure potential gradient
(3) is completely based upon transpiration pull
(4) Does not requires metabolic energy

11. Mineral translocation in plants is carried out by :
(1) Xylem exclusively
(2) Phloem exclusively
(3) Mainly xylem & little bit by phloem
(4) Mainly phloem & little bit by xylem

12. Diffusion is very important to plants since it is the only means for :
(1) Water translocation in root
(2) Gaseous movement within plant
(3) Mineral translocation in root
(4) Sugar transport from source to sink

13. Which of the following is not a similarity between facilitated diffusion and active transport ?
(1) Transport saturation
(2) Sensitivity towards protein inhibitors
(3) Selectivity
(4) Uphill transport

14. Water will move from it's region of :
(1) lower ψ_p to higher ψ_p
(2) lower ψ_s to higher ψ_s
(3) lower ψ_w to higher ψ_w
(4) higher ψ_w to lower ψ_w

15. Which of the following is ultimately responsible for enlargement of plant cells ?
(1) Osmotic pressure
(2) Turgor pressure
(3) Wall pressure
(4) Osmotic potential

16. Beside water potential gradient, which of the following is also prerequisite for imbibition ?
(1) permeable membrane
(2) impermeable membrane
(3) affinity between adsorbant & liquid
(4) selectively permeable membrane

17. Regarding mycorrhiza select out the incorrect statement :
(1) they have large surface area
(2) the fungus provides minerals & water
(3) roots provide nitrogenous compounds
(4) it can never be of obligate nature

18. Which of the following is not observed during stomatal opening ?
(1) High turgidity of guard cells
(2) Radially oriented microfibrils
(3) Outer wall bulge out
(4) Low turgor of guard cells

19. Which of the following is not a significance of transpiration ?
(1) Absorption of water
(2) Absorption of minerals
(3) Cooling of leaf surface
(4) Maintain the shape and structure of plant

MINERAL NUTRITION

20. Which of the following is the method by which essential elements were identified in plants ?
(1) Plant ash analysis
(2) Hydroponics
(3) Plant tissue culture
(4) Nitrogen fixation

21. Which of the following essential elements is required by plants in excess of 10 m mole kg^{-1} of dry matter?
(1) Magnesium (2) Manganese
(3) Molybdenum (4) Selenium

22. Choose the pair from the following in which one element is essential to plant while other is beneficial but not essential.
(1) Copper and Molybdenum
(2) Sodium and Silicon
(3) Chlorine and Cobalt
(4) Selenium and Cobalt

23. Which of the following element is an activator for both ribulose bisphosphate carboxylase oxygenase enzyme and phosphoenol pyruvate carboxylase enzyme?
(1) Zinc (2) Copper
(3) Magnesium (4) Chlorine

24. Choose the pair from the following in which both the elements share common function during photosynthesis in plants.
(1) Chlorine and Magnesium
(2) Potassium and Phosphorus
(3) Boron and Molybdenum
(4) Manganese and Chlorine

25. If deficiency symptoms of any element appear first in the senescent leaves, this element should not be :

(1) Calcium (2) Nitrogen

(3) Potassium (4) Magnesium

26. Which of the following bacteria oxidise the ammonia into nitrite?

(1) *Nitrococcus*

(2) *Nitrobacter*

(3) Both (1) and (2)

(4) *Thiobacillus*

27. Which of the following is correct regarding non leguminous plant *Alnus*?

(1) Free living nitrogen fixation by *Beijernickia*

(2) Free living nitrogen fixation by *Frankia*

(3) Symbiotic nitrogen fixation by filamentous microbe

(4) Symbiotic nitrogen fixation by *Rhizobium*

28. During biological nitrogen fixation the energy input is :

(1) 16 ATP for each NH_3

(2) 8 ATP for two NH_3

(3) 32 ATP for two NH_3

(4) 8 ATP for each NH_3

29. During nitrogen metabolism in plants, transaminase enzyme is used in conversion of :

(1) Glutamic acid into other amino acids

(2) α-Ketoglutaric acid into glutamic acid

(3) Glutamic acid into glutamine

(4) NH_4^+ into glutamic acid

30. Proper aeration is required in hydroponics.

(1) to avoid the toxicity of minerals

(2) for translocation of mineral from root to shoot

(3) for absorption of minerals

(4) to decrease the osmotic pressure in root cells

31. Which of the following is not a beneficial element for plant life ?

(1) Na (2) Sr

(3) Si (4) Co

32. Water potential of a cell is mainly determined by which of the following element ?

(1) Mg^{++} (2) Ca^{++}

(3) K^+ (4) Fe^{2+}

33. The element is said to be deficient, when present:

(1) below critical concentration

(2) above critical concentration

(3) at critical concentration

(4) both below and above critical concentration

34. Deficiency symptoms of element can be visualised by what kind of changes ?

(1) Physiological changes

(2) Morphological changes

(3) Chemical changes

(4) Anatomical changes

35. Deficiency symptoms for which of the following element tend to appear first in young tissues?

(1) N & P (2) N & Ca

(3) Ca (4) S & K

36. Mn toxicity leads to Ca deficiency by :

(1) competing with Ca uptake

(2) inhibiting translocation to shoot apex

(3) competetive inhibition for enzymes

(4) All of the above

37. What is the major fate of NH_3 produced by ammonification ?

(1) Volatilise to re-enter in the atmosphere

(2) Absorbed by plants

(3) Converted into nitrates

(4) Denitrification

38. In which of the following root tissues nodule formation is initiated after successful infection ?

(1) Epidermis (2) Cortex

(3) Endodermis (4) Root hairs

39. First stable product of biological nitrogen fixation is:

(1) HN = NH

(2) $H_2N - NH_2$

(3) NH_3

(4) NO_3^- or NO_2-

PHOTOSYNTHESIS

40. During photosynthesis, plants mainly utilise the red and blue regions of visible spectrum, for the first time it was concluded by :

(1) Jan Ingenhousz (2) Joseph Priestley

(3) T.W. Engelmann (4) Cornelius Van Niel

41. Which of the following conclusions regarding photosynthesis was proved by using radioisotopic techniques ?

(1) Light is essential

(2) O_2 comes from H_2O and not from CO_2

(3) Glucose is stored as starch

(4) Exchange of gases with environment

42. The dark reactions of the photosynthesis :

(1) occur in darkness

(2) are not light dependent

(3) are not directly light driven

(4) occur in membrane system of chloroplast

43. Electrons from which of follwing reduces $NADP^+$ to $NADPH+H^+$ during Z-scheme of photosynthesis?

(1) Photosystem-I (2) Water

(3) Carbon dioxide (4) Photosystem-II

44. During photosynthesis the stroma lamellae of chloroplast could perform :

(1) the process of dark reaction in which ATP utilised

(2) the process of light reaction which produce $NADPH+H^+$

(3) the process of dark reaction which utilise $NADPH+H^+$

(4) the process of light reaction which produce ATP

45. Which of the following statements are correct regarding synthesis of ATP in chloroplast during photosynthesis ?

(A) Splitting of water in stroma helps in creation of proton gradient

(B) Cytochrome complex helps in the release of protons in the lumen of thylakoid by accepting electrons from hydrogen carrier.

(C) Movement of protons across the membrane to the stroma through the F_0 of the ATPase is coupled with ATP synthesis.

(D) Reduction of $NADP^+$ to $NADPH+H^+$ is also a cause for creation of proton gradient.

(1) All statements are correct

(2) C and D

(3) A and B

(4) B, C and D

46. What is the correct ratio of ATP utilisation in steps of Calvin cycle?

(1) Reduction : Regeneration :: 1 : 1

(2) Reduction : Regeneration :: 2 : 1

(3) Reduction : Regeneration :: 2 : 2

(4) Reduction : Regeneration :: 1 : 2

47. The cells of C_4 plants those are rich in RuBisCO enzyme, also have which of the following characteristic (s)?

(1) Intercellular spaces absent

(2) Thick walls impervious to gaseous exchange

(3) Large number of chloroplast

(4) All of the above

48. The productivity is better in C_4 plants because :

(1) they increase the intracellular concentration of CO_2 in mesophyll cells

(2) in these plants RuBisCO has much greater affinity for O_2 than for CO_2

(3) these plants can prevent competitive binding phenomena related to RuBisCO

(4) these plants minimise the carboxylase activity of RuBisCO

49. C_3 plants respond to higher CO_2 concentration by showing increased rates of photosynthesis because:

(1) Current availability of CO_2 levels is limiting to the C_3 plants

(2) C_3 plants show saturation at about 360 $\mu\ell L^{-1}$ concentration of CO_2

(3) these plants responds to high CO_2 concentration even in low light conditions

(4) in these plants RuBisCO shows only carboxylation

50. $2H_2A + CO_2 \xrightarrow{light} 2A + CH_2O + H_2$

in this given equation H_2A represents to :

(1) Suitable reducible compounds

(2) Suitable oxidisable compound

(3) Suitable buffer

(4) Both (1) and (2)

51. The membrane system of chloroplast is responsible for :

(1) Trapping the light energy

(2) Synthesis of ATP & NADPH

(3) Enzymatic reactions for CO_2 incorporation

(4) Both (1) and (2)

52. How does PS-II supply electrons continuously ?

(1) by removing electrons from photon

(2) by removing electrons from H_2O

(3) by removing electrons from CO_2

(4) by removing electrons from constituent carotenoids

53. Which of the following is not always required for chemiosmosis ?

(1) Membrane (2) Proton pump

(3) OEC (4) ATPase

54. Classification of biosynthetic phase of dark reaction as C_3 & C_4 is primarily based on.

(1) Initial CO_2 fixation

(2) Final CO_2 assimilation

(3) First CO_2 receptor

(4) Number of ATP get consumed

55. Which of the following is not special about C_4 plants?

(1) Responsiveness to high light intensities

(2) Lack of photorespiration

(3) Greater productivity

(4) Scotoactive stomata

56. In C_4 plants there is no photorespiration, because :

(1) The have large number of chloroplast

(2) Increased CO_2 concentration at RuBisCO site

(3) Concentric arrangement of mesophyll cells

(4) Greater affinity of RuBisCO for CO_2

57. Which of the following is not a plant factor regulating photosynthesis ?

(1) Age of leaf

(2) Number of mesophyll cells

(3) Atmospheric CO_2 concentration

(4) Amount of chlorophyll

58. Increase in CO_2 concentration upto ..... percent can cause an increase in CO_2 fixation rate, beyond this the level can become damaging over long periods.

(1) 0.03 percent (2) 0.04 percent

(3) 0.045 percent (4) 0.05 percent

RESPIRATION IN PLANTS

59. The energy released by oxidation of respiratory substrates :

(A) Comes out in a single step to increase the possibility of maximum ATP production

(B) is not used directly

(C) is used directly in the energy requiring processes of the organisms

(D) is trapped as chemical energy in the energy currency of the cell

(1) C and D are incorrect

(2) B and D are correct

(3) A and B are correct

(4) A and D are incorrect

60. How many ATP molecules and during which steps, are directly synthesised in EMP pathway from one glucose molecule?

(1) 4 ATP, 2 in each PEP to pyruvic acid and BiPGA to PGA

(2) 8 ATP, 4 in each PEP to pyruvic acid and BiPGA to PGA

(3) 2 ATP, 1 in each Glucose to Glucose-6-P and Fructose-6-P to Fructose 1, 6 BiP

(4) 4 ATP, 2 in each Glucose to Glucose-6-P and Fructose-6-P to Fructose 1, 6 BiP

61. Which of the following enzyme(s) is/are involved in the conversion of pyruvic acid into CO_2 and ethanol?

(1) Pyruvic acid dehydrogenase

(2) Alcohol decarboxylase

(3) Both (1) and (2)

(4) Pyruvic acid decarboxylase

62. The complete oxidation of one molecule of pyruvate by the stepwise removal of all the hydrogen atoms:

(1) leaving six molecules of CO_2

(2) leaving two molecules of CO_2

(3) leaving four molecules of CO_2

(4) leaving three molecules of CO_2

63. In aerobic respiration, the ultimate or final electron acceptor is :

(1) Atomic oxygen

(2) Molecular oxygen

(3) Cytochrome a_3

(4) Water

64. Fermentation differs from aerobic respiration :

(1) in having partial breakdown of glucose

(2) in producing less ATP per glucose

(3) in having slow oxidation of $NADH_2$ to NAD^+

(4) All of the above

65. Complete oxidation of which of the following respiratory substrate evolve less volume of CO_2 as compare to volume of O_2 consumed ?

(1) Fats

(2) Proteins

(3) Carbohyrates

(4) Both (1) and (2)

66. Enzymes differ from inorganic catalysts because enzymes get damaged at high temperatures. This difference :

(1) is applicable to all enzymes

(2) is not applicable to thermolabile enzymes

(3) is not applicable to the enzymes of thermophilic organisms

(4) is applicable to thermostable enzymes

67. An enzyme catalysing a transfer of a group, G between a pair of substrate S and S' as follows :

$$S - G + S' \longrightarrow S + S' - G$$

G = phosphate or hydrogen or any other group, the enzyme is related with which of the following class?

(1) Transferases (2) Dehydrogenases

(3) Both (1) and (2) (4) Either (1) or (2)

68. Enzyme, which catalyzes the breakdown of hydrogen peroxide to water and oxygen, has which type of cofactor?

(1) Tightly bound inorganic compound

(2) Tightly bound organic compound

(3) Permanently bound inorganic compound

(4) Loosely bound organic compound

69. What is the significance of respiration ?

(1) Production of cellular energy currency

(2) Provides carbon skeleton as precursor for synthesis of various chemicals

(3) loss of weight

(4) Both (1) and (2)

70. Plants donot present great demands for gaseous exchange because :

(1) They are autotrophic

(2) Photosynthesis and respiration work mutually

(3) In plants there is less need of energy

(4) Plants are regulators

71. Select out the correct sequence of glycolytic steps:

(1) PGAL $\rightarrow$ 3-PGA $\rightarrow$ 1,3-BiPGA $\rightarrow$ PEP

(2) PGAL $\rightarrow$ 1,3-BiPGA $\rightarrow$ PEP $\rightarrow$ 3-PGA

(3) PGAL $\rightarrow$ 1,3-BiPGA $\rightarrow$ 3-PGA $\rightarrow$ PEP

(4) PGAL $\rightarrow$ PEP $\rightarrow$ 1,3-BiPGA $\rightarrow$ 2-PGA

72. During respiration of *Yeast* which of the following enzyme is not used in oxygen stressed conditions ?

(1) Enolase

(2) Pyruvic acid decarboxylase

(3) Alcohol dehydrogenase

(4) Aconitase

73. How much amount of energy present in glucose, get released during lactic acid and alcohol fermentation?

(1) 7 percent

(2) less than seven percent

(3) more than seven percent

(4) always 2 percent

74. Pyruvic acid $\xrightarrow[\text{dehydrogenase}]{\text{Pyruvate}}$ Acetyl CoA + $CO_2 + NADH_2$

Inthis given reaction which of the following coenzyme is not used ?

(1) Mg^{++} (2) NAD^+

(3) Co-A (4) TPP

75. TCA cycle starts with condensation of acetyl group with :

(1) OAA (2) Water

(3) NAD (4) both (1) and (2)

76. During TCA which of the following intermediate is a result of two successive decarboxylations ?

(1) Oxalosuccinic acid (2) α-ketoglutaric acid

(3) Succinyl Co-A (4) Cis aconitic acid

77. Which of the following ETC complex is directly involved in reduction of oxygen ?

(1) complex-I (2) complex-II

(3) comlex-III (4) comlex-IV

78. When proteins are respiratory substrates the ratio of CO_2/O_2 would be about :

(1) 1.0 (2) 0.7

(3) 0.9 (4) 1.3

GROWTH & DEVELOPMENT

79. Which of the following statements are correct regarding growth?

(A) In plants, the form of growth is open and localised

(B) Swelling of piece of wood in water is considered as growth since it involve the increase in size

(C) Growth is accompanied by metabolic processes

(D) Growth, at a cellular level, is a result of increase in the amount of protoplasm

(1) All the statements are correct

(2) A and B

(3) B, C and D

(4) A, C and D

80. Meristematic phase of growth is characterised by :

(1) Increased vacuolation

(2) Maximal size in terms of protoplasmic modifications

(3) Cells those are rich in protoplasm and having thin cell walls with abundant plasmodesmata

(4) Cell enlargement

81. Which of the following is/are related to the type of growth in which both the progeny cells, arise from mother cell, retain the ability to divide?

(A) Sigmoid curve

(B) expressed as $W_1 = W_0 + rt$

(C) Linear curve

(D) Three phases - Lag, exponential and stationary

(1) A and D (2) A, B and D

(3) Only C (4) B and C

82. In plants, cells/tissues arising out of the same meristem have different structures at maturity, this statement shows that plants have :

(1) Open indeterminate growth

(2) Open determinate growth

(3) Open differentiation

(4) Capacity of dedifferentiation

83. Match the following :

(A) Auxin	(i) Derivatives of carotenoids
(B) Gibberellin	(ii) Gas
(C) Cytokinin	(iii) Adenine derivatives
(D) Ethylene	(iv) Terpenes
(E) Abscisic acid	(v) Indole compounds

(1) A - i, B - ii, C - iii, D - iv, E - v

(2) A - ii, B - i, C - v, D - iii, E - iv

(3) A - v, B - iv, C - iii, D - ii, E - i

(4) A - iv, B - iii, C - i, D - ii, E - v

84. Math the following :

(A) Human urine	(i) Ethylene
(B) Coconut milk	(ii) GA_3
(C) Ripened oranges	(iii) Auxin
(D) *Gibberella fujikuroi*	(iv) Cytokinin

(1) A - iii, B - iv, C - i, D - ii
(2) A - i, B - ii, C - iii, D - iv
(3) A - iv, B - iii, C - ii, D - i
(4) A - ii, B - i, C - iv, D - iii

85. Match the following :

(A) Cytokinin	(i) Weed free lawns
(B) Auxin	(ii) Brewing industry
(C) Abscissic acid	(iii) Root hair formation
(D) Ethylene	(iv) Overcome apical dominance
(E) Gibberellin	(v) Stress hormone

(1) A - iv, B - i, C - v, D - ii, E - iii
(2) A - i, B - ii, C - v, D - iii, E - iv
(3) A - iii, B - iv, C - v, D - i, E - ii
(4) A - iv, B - i, C - v, D - iii, E - ii

86. Which of the following occur naturally in plants?
(1) 2, 4-dichlorophenoxyacetic acid
(2) Indole butyric acid
(3) Naphthalene acetic acid
(4) Kinetin

87. Plants, in which there is no correlation between exposure to light duration and induction of flowering response, are called :
(1) Day - neutral plants
(2) Long day plants
(3) Short day plants
(4) Monocarpic plants

88. Which of the following is not a biennial plant?
(1) Barley (2) Sugarbeet
(3) Cabbages (4) Carrots

89. Swelling of piece of wood when placed in water is not considered as growth because :
(1) It does not occur at expense of energy
(2) It is not a metabolic change
(3) It is reversible process
(4) It is extrinsic process

90. Plant growth is unique because :
(1) It is intrinsic
(2) It occurs at the expense of energy
(3) Plant retains the capacity for unlimited growth throughout their life
(4) Its accompanied by metabolic processes

91. Growth at a cellular level, is principally a consequence of increase in amount of :
(1) Cell wall material (2) Water
(3) Protoplasm (4) Cell sap

92. Cells with increased vacuolation, cell enlargement and new cell wall deposition are the characteristic features of which phase of growth ?
(1) Meristematic phase
(2) Elongation phase
(3) Maturation phase
(4) Differentiation phase

93. Trees showing seasonal activities, represent what kind of growth curve ?
(1) Sigmoid (2) Linear
(3) J-shaped (4) double sigmoid

94. Quantitative comparisions between the growth of living systems can be made by :
(1) Absolute growth rate
(2) Relative growth rate
(3) Exponential growth rate
(4) Both (1) and (2)

95. Nutrients both macro and micro essential elements are required by plant during growth for :
(1) Synthesis of protoplasm
(2) As source of energy
(3) Enzyme of activation
(4) All of the above

96. Parenchyma cells that are made to divide under controlled laboratory conditions during plant tissue culture, represents :
(1) Differentiation
(2) Dedifferentiation
(3) Redifferentiation
(4) Undifferentiated mass of cells

97. Which of the following is an intercellular intrinsic factor regulating development ?

(1) genetic constitution

(2) PGR

(3) Water

(4) Oxygen

98. Select out the incorrect match :

(1) GA - speed up malting process

(2) Auxin - Xylem differentiation

(3) Cytokinin - Adventitious shoot formation

(4) Ethylene - Lateral shoot growth

ANSWERS KEY

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

REPRODUCTION IN ORGANISMS

1. Find out incorrect statement :

(1) Period from birth to natural death called life span

(2) Life span of organisms are necessarily correlated with their size

(3) Except single celled organisms, all others are mortal

(4) Reproduction enables the continuity of species, generation after generation

2. Match the following (with respect to life span) :

A. Dog	(I) 200-300 years
B. Butterfly	(II) 20 years
C. Rice plant	(III) 1-2 week
D. Banyan Tree	(IV) 3-4 month

(1) A(II), B(III), C(IV), D(I)

(2) A(III), B(II), C(IV), D(I)

(3) A(II), B(III), C(I), D(IV)

(4) A(III), B(IV), C(II), D(I)

3. Regarding to reproduction which of the following statement is correct :

(1) Asexual reproduction is common among multicellular plants and animals

(2) In monerans cell division itself is a mode of reproduction

(3) During bud formation in yeasts meiotic division occurs

(4) In fungi, fission is most common method of asexual reproduction

4. "Water hyacinth" or *Eichhornia* is one of the important problematic weed of static water in India. Which of the following statement is incorrect about it :

(1) It is also known as "Terror of Bengal"

(2) It is native plant of India

(3) It increases biological oxygen demand of waterbody

(4) It spreads rapidly through vegetative reproduction

5. What is the duration of juvenile phase in bamboo and interflowering period of *Strobilanthus kunthiana* respectively :

(1) 50-100 years and 21 years

(2) 50-100 years and 12 years

(3) 25-300 years and 12 years

(4) 25-30 years and 21 years

6. Interaction of which of the following factors regulate the reproductive processes and the associated behavioral expression of organisms :

(1) Only hormones

(2) Only environmental factors

(3) Both (1) and (2)

(4) Photosynthetic efficiency

7. Which of the following is not a distinct stage of sexual reproduction :

(1) Pre gametogenesis stage

(2) Pre fertilisation stage

(3) Fertilisation stage

(4) Post fertilisation stage

8. Match the following regarding to number of chromosomes in meiocyte :

(A) *Ophioglossum*	(i) 20
(B) Apple	(ii) 24
(C) Rice	(iii) 34
(D) Maize	(iv) 1260

(1) A(iv), B(iii), C(i), D(ii)

(2) A(iv), B(i), C(ii), D(iii)

(3) A(iv), B(ii), C(iii), D(i)

(4) A(iv), B(iii), C(ii), D(i)

9. Where does syngamy occur in algae?

(1) In archegonium (2) In water or oogonium

(3) In Ovary (4) In the soil

10. From the formation of embryo point of view, which of the following plant group is the odd one :

(1) Algae (2) Bryophytes

(3) Pteridophytes (4) Gymnosperms

11. Which of the following plant possess non motile male gametes :

(1) *Marchantia* (2) *Pteridium*

(3) *Ginkgo* (4) *Pisum*

12. Which of the following structure is the vital link that ensures continuity of species between organisms of one generation and the next :

(1) Endosperm (2) Zygote

(3) Embryo (4) Sex organs

13. First cell of sporophytic generation is :
(1) Gamete (2) Spore
(3) Zygote (4) Embryo

14. During embryogenesis zygote go through which of the following process/processes :
(1) Cell division
(2) Cell differentiation
(3) Both 1 and 2
(4) Either cell division or cell differentiation

15. Sexual reproduction is of isogamous type in :-
(1) *Riccia* (2) *Selaginella*
(3) *Cladophora* (4) *Cycas*

16. Find out the incorrect statement :
(1) Cucurbits are monoecious plants
(2) Papaya is a dioecious plant
(3) Meiocytes are haploid
(4) Male gametes are transfered through pollen tube in spermatophytes

17. Which of the following is a dioecious plant :
(1) Datepalm (2) Cucumber
(3) Maize (4) *Chara*

18. Cultivation of floral plants is known as
(1) Horticulture (2) Floriculture
(3) Sericulture (4) Vermiculture

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Ans.	2	1	2	2	2	3	1	4	2	1	4	2	3	3	3	3	1	2	

SEXUAL REPRODUCTION IN FLOWERING PLANTS

1. What would be the ploidy of cells of tetrad ?
(1) n (2) 2n (3) 3n (4) 4n

2. Which of the following statements are correct ?
(1) Pollen grains are rich in nutrients.
(2) In some cereals like rice and wheat pollen grains lose viability within 30 minutes of their release
(3) In some members of rosaceae, leguminosae and solanaceae, pollen grains maintain viability for months
(4) All of the above

3. The number of ovules in an ovary may be
(1) One (2) Many
(3) Two (4) One to many

4. Each ovule has one or two protective envelopes called
(1) Micropyle (2) Integuments
(3) Hilum (4) Chalaza

5. Chalaza represents the
(1) Tip of the ovule (2) Base of the ovule
(3) Both (1) & (2) (4) Stalk of the ovule

6. Ovules generally differentiate a single megaspore mother cell in the
(1) Micropylar region (2) Chalazal region
(3) Both 1 & 2 (4) Integument region

7. Polar nuclei are situated in the central cell
(1) Below the egg apparatus
(2) Above the egg apparatus
(3) Below the antipodals
(4) All of the above

8. In embryosac, three cells are grouped together at the micropylar end to constitute
(1) Antipodals (2) Synergids
(3) Egg apparatus (4) Polar nuclei

9. The synergids have special cellular thickening at the micropylar tip, called
(1) Antipodals (2) Filiform apparatus
(3) Obturators (4) Vascular tissue

10. An example of insect pollinated flower, in which flower provides safe place to lay eggs for insect is
(1) *Vallisneria* (2) *Salvia*
(3) *Amorphophallus* (4) Maize

11. Endosperm development precedes embryo development, because
(1) Embryo provides nutrition to developing endosperm
(2) Endosperm provides nutrition to developing embryo
(3) Endosperm development starts after embryo development
(4) All of the above

12. The portion of embryonal axis above the level of cotyledons is called
(1) Hypocotyl (2) Epicotyl
(3) Tigellum (4) Scutellum

13. The portion of embryonal axis below the level of cotyledons is called
(1) Hypocotyl (2) Epicotyl
(3) Tigellum (4) Scutellum

14. Genetically geitonogamy is
(1) Allogamy (2) Xenogamy
(3) Autogamy (4) Cleistogamy

15. Endosperm is completely consumed by developing embryo in
(1) Castor (2) Coconut
(3) Wheat (4) Pea

16. Endosperm may persist in mature seed in
(1) Pea (2) Castor
(3) Groundnut (4) Beans

17. Usually, How many embryosacs are present in an ovule?
(1) 1 (2) 2
(3) 3 (4) Many

18. What would be the genetic nature of apomictic embryo?
(1) n
(2) 3n
(3) 2n
(4) n or 2n like mother plants

19. What will be the ploidy of the cells of functional megaspore and female gametophyte respectively:
(1) n, n (2) 2n, 2n (3) n, 2n (4) 2n, n

20. In Castor plant :
(1) Autogamy is possible
(2) Geitonogamy is possible
(3) Both are possible
(4) Both are not possible

21. Each lobe of a typical anther in angiosperm having two theca it is called :
(1) Monothecous (2) Dithecous
(3) Monosporangiate (4) Tetrasporangiate

22. Which of the following part of the flower serves as a landing platform for pollen grain ?
(1) Stigma (2) Ovary
(3) Style (4) Ovule

23. Enclosed within the integuments is a mass of cells called
(1) Micropyle (2) Nucellus
(3) Chalaza (4) Embryosac

24. Example of plants, which contains cleistogamous flowers :
(1) *Oxalis*
(2) *Commelina*
(3) *Viola* (Common pansy)
(4) All of the above

25. Cleistogamous flowers are invariably :
(1) Autogamous (2) Xenogamous
(3) Geitonogamous (4) All are possible

26. Wind pollinated flowers often have.....ovule in each ovary.
(1) Many (2) Two (3) One (4) Three

27. Pollen tube enters into the embryosac through :
(1) Chalaza (2) Integument
(3) Filiform apparatus (4) Funiculus

28. Syngamy results in the formation of :
(1) Zygote
(2) Primary endosperm nucleus
(3) Endosperm
(4) Fruit

29. Embryo develops at which end of embryosac?
(1) Micropylar end
(2) Chalazal end
(3) Funiculus
(4) Outside the ovary

30. The microsporangia develop further and become pollen sacs. In anther these pollen sacs extends
(1) Transverslly
(2) Longitudinally
(3) Obliquely
(4) Sometimes transversaly and some times longitudinally

31. From outer to inner what is the sequence of wall layers in anther lobes?
(1) Epidermis, middle layers, tapetum, endothecium
(2) Epidermis, endothecium, tapetum, middle layers
(3) Epidermis, endothecium, middle layer, tapetum
(4) Tapetum, middle layers, endothecium, epidermis

32. Due to which of the following chemical deposition pollen grains are well preserved as fossils
(1) Pollenkitt (2) Callose
(3) Sporopollenin (4) Pectocellulose

33. Which of the following pollen structure exhibits a fascinating array of patterns and designs (Sculpturing pattern)?
(1) Germpores (2) Exine
(3) Intine (4) Tapetum

34. Regarding to formation of pollen grain from microspore which of the following statement is incorrect
(1) Generative cell is bigger
(2) Vegetative cell possess irregularly shaped nucleus
(3) Generative cell floats in cytoplasm of vegetative cell
(4) Vacuole is present in vegetative cell

35. Which of the following is not a pollen grain caused disease?
(1) Asthma (2) Bronchitis
(3) Hayfever (4) Malaria

36. Regarding to number of ovules in ovary select out the odd one
(1) Wheat (2) Orchids
(3) Paddy (4) Mango

37. Nucellus, the mass of cells enclosed within the integuments, provide nutrition to
(1) Embryosac (2) Embryo
(3) Seed (4) Ovule

38. During embryo sac formation how many nuclei out of eight nucleus go through cytokinesis or wall formation?
(1) All eight (2) Two
(3) Six (4) Four

39. Geitonogamy is the transfer of pollen grains from anther to stigma of another flower of the same plant is :-
(1) Functionally cross pollination
(2) Genetically self pollination
(3) Ecologically cross pollination
(4) All the above

40. Regarding to cross pollination which of the following statement is incorrect?

(1) Plants use two abiotic and one biotic agent

(2) Majority of plants use abiotic agents for pollination

(3) Production of enormous amount of pollen grains is concerned to compensate uncertainity and loss of pollens

(4) Pollination by wind is more common among abiotic pollinations

41. About wind pollination which of the following is incorrect?

(1) Light and non sticky pollengrains

(2) Well exposed stamens

(3) Feathery stigma

(4) Highly scented flowers

42. Which of the following is probable reason of limited distribution of bryophytes and pteridophytes?

(1) Jacketed multicellular sex organs

(2) Absence of roots

(3) Absence of seeds

(4) Need of water for transfer of male gametes

43. Regarding to type of pollination which of the following is odd one

(1) *Vallisneria* (2) *Hydrilla*

(3) Water lily (4) *Zostera*

44. The genetic mechanism which inhibit pollen germination or pollentube growth in pistil so that self pollination can be prevented is known as

(1) Inbreeding depression

(2) Self incompatibility

(3) Inter specific incompatibility

(4) Heterosis

45. In which of the following plants both autogamy and geitonogamy is absent

(1) Maize (2) Mango

(3) Papaya (4) Castor

46. Perisperm is present in

(1) Mango (2) Guava

(3) Black pepper (4) Pea

47. Which of the following is not involved in post fertilisation events

(1) Endosperm and embryo development

(2) Maturation of ovules into seed

(3) Maturation of ovary into fruit

(4) Degeneration of nucellus

48. The structure in which few leaf primordia and shoot apex of monocot embryo remain enclosed is

(1) Coleoptile (2) Coleorhiza

(3) Epiblast (4) Epicotyl

49. In mature seed how much amount of moisture is present

(1) 5-10 percent

(2) 10-15 percent

(3) 15-20 percent

(4) 20-25 percent

50. Seed is the basis of our agriculture. Which of the following is/are crucial for storage of seeds, so that they can be used as food through out the year and also to raise crop in the next season

(1) Dehydration (2) Dormancy

(3) Vermiculture (4) Both 1 and 2

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	4	4	2	2	1	1	3	2	3	2	2	1	3	4	2	1	4	1	2
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	2	1	2	4	1	3	3	1	1	2	3	3	2	1	4	2	1	3	4	2
Que.	41	42	43	44	45	46	47	48	49	50										
Ans.	4	4	3	2	3	3	4	1	2	4										

GENETICS : PRINCIPLES OF INHERITANCE & VARIATIONS

1. Variations are :
(1) Degree by which progeny differs from their parents
(2) Degree by which progeny similar to their parents
(3) Process by which characters are passed on from parent to progeny
(4) True breeding lines

2. Mendel found that the F_1 always resembled either one of the parents and that the trait of the other parent was not seen in them. This is due to :
(1) Segregation (2) Dominance
(3) Partial dominance (4) Unit factor

3. In monohybrid cross the allele do not show any blending and that both the characters are recovered as such in F_2 generation. This statement is explained on the basis of :
(1) Dominance
(2) Segregation
(3) Independent assortmant
(4) All the above

4. In monohybrid cross proportion of 3 : 1 explains:
(1) Dominance (2) Segregation
(3) Both (1) and (2) (4) Unit factor

5. It was found that sometimes the F_1 - had a phenotype that did not resemble either of the two parents and was in between the two. This is the case of :
(1) Dominance (2) Incomplete dominance
(3) Codominance (4) Pleiotropism

6. Theoratically, the modified allele could be responsible for the production of :
(1) less efficient enzyme
(2) A non functional enzyme
(3) Non enzyme at all
(4) All the above

7. The modified allele is equivalent to the unmodified allele when it produces :
(1) Normal enzyme
(2) A non functional enzyme
(3) No enzyme at all
(4) Inactive enzyme

8. Recessive traits are seen due to :
(1) Formation of non functional enzyme
(2) Enzyme is not produced
(3) 1 and 2 both
(4) Formation of functional enzyme

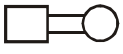
9. Multiple alleles can be found only when :
(1) Population studies are made
(2) Individual study is made
(3) Mutation is absent
(4) Dominance is present

10. Which of the following is correct ?
(1) When genes are grouped on the same chromosome, some genes are very tightly linked and showed very low recombination
(2) When genes are loosely linked show very low recombination
(3) When genes are tightly linked show higher recombination
(4) When genes are loosely linked show no recombination

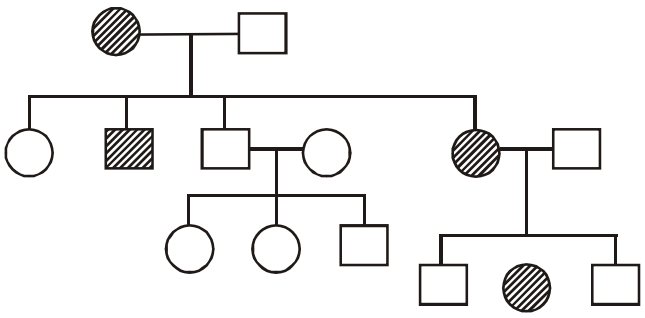
11. In Morgan's experiment, what will be percentage of recombination in case of body colour and eye colour in *Drosophila* ?
(1) 37.2% (2) 1.3% (3) 98.7% (4) 37.2%

12. In a large number of insects the mechanism of sex determination is of :
(1) XO type (2) XY type
(3) ZW type (4) All the above

13. Male heterogamety found in :
(1) Human (2) Grasshopper
(3) Many birds (4) 1 and 2 both

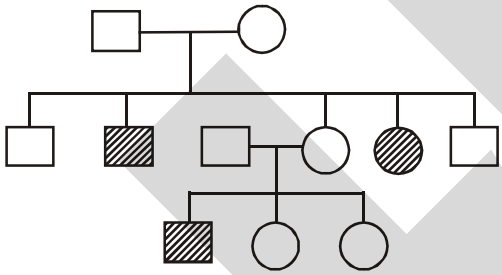
14. Which symbol of pedigree is correctly matched ?
(1)  – Female
(2)  – affected offspring
(3)  – Affected male of autosomal recessive disease
(4)  – Marriage between relatives

15. Given pedigree represents inheritance of myotonic dystrophy which is an autosomal dominant disorder. What will be genotype of parents ?



(1) Mother - aa Father - AA
(2) Mother - AA Father - aa
(3) Mother - Aa Father - aa
(4) Mother - aa Father - aa

16. Given pedigree chart shows inheritance of autosomal recessive trait (for eg - sickle cell anaemia) then what will be genotype of parent ?



(1) Father - (Aa) Mother - (aa)
(2) Father - (aa) Mother - (aa)
(3) Father - (Aa) Mother - (Aa)
(4) Father - (AA) Mother - (AA)

17. A diploid organism is heterozygous for 4 loci, how many types of gametes can be produced?
(1) 8 (2) 16 (3) 2 (4) 32

18. When a cross is made between tall plant with yellow seed (TtYy) and tall plant with green seed (Ttyy), what proportion of phenotype in the offspring could be expected to be tall and green.
(1) 25% (2) 12.5%
(3) 37.5% (4) 50%

19. In case of codominance :
(1) F_1 - generation resembles both parents
(2) F_1 - generation is in between both parents
(3) F_1- generation resembles either of the two parents
(4) All the above

20. Mendelian disorder are mainly determined by :
(1) Alternation or mutation in single gene
(2) Absence of one chromosome
(3) Excess of one of more chromosome
(4) All the above

21. Which of the following characters of *Drosophila* is not suitable for genetical studies ?
(a) They could be grown on simple synthetic medium in laboratory
(b) They complete their life cycle in about 2-weeks
(c) Single mating produces few number of progeny flies.
(d) They have many types of heredilaty variations that can be seen with low power microscope.
(e) Male & Female flies are not easily distinguishable
(1) a, b, c (2) a, b, c, d, e
(3) d and e (4) c and e

22. Incomplete dominance can be seen in :
(1) Flower colour in *Mirabilis jalapa*
(2) Flower colour in *Pisum sativum*
(3) Size of starch grains in pea
(4) 1 and 3 both

23. Which of the following cow breed comes in existance through artifical selection and domestication from ancestral wild cows
(1) Brown swiss (2) Jamanapari
(3) Murrah (4) Sahiwal

24. Which of the following was/were applied first time to problems in biology during Mendel's investigations into inheritance
(1) Statistical analysis
(2) Mathematical logic
(3) Computational devices
(4) Both 1 and 2

25. A true breeding line is that
(1) Having undergone continuous cross pollination
(2) Having undergone continuous self pollination
(3) Having undergone continuous vegetative propagation
(4) Obtain through tissue culture (Meristem)

26. How many true breeding pea plant varieties were selected by Mendel
(1) 7 (2) 14
(3) 21 (4) 28

27. Regarding to pair of dominant and recessive trait which of the following combination is wrong
(1) Flower colour – Violet / white
(2) Flower position – Axial / terminal
(3) Pod shape – Inflated / constricted
(4) Seed colour – Green / yellow

28. Segregation of alleles is a random process so what would be the chances of a gamete containing either alleles
(1) 25 % (2) 50 %
(3) 75 % (4) 100 %

29. Graphical representation to calculate the probability of all possible genotypes of offspring in a genetic cross, is known as
(1) Mendel square (2) Punnett square
(3) Crossboard method (4) Emasculation method

30. If F_1 individual of genotype (Tt) go through sexual reproduction, then it's gamete (pollengrain) with genotype (T) have what chances to pollinate eggs of the genotype (T)
(1) 25 % (2) 50 %
(3) 75 % (4) 100 %

31. Mendel proposed how many conclusions to consolidate his understanding of inheritance in monohybrid cross
(1) One (2) Two
(3) Three
(4) None of the rules, he proposed laws / principles

32. The law of dominance is used to explain the expession of only one of the parental characters in a monohybrid cross in ..... and the expression of both in .....
(1) F_1 and F_2 (2) F_2 and F_3
(3) F_1 and F_3 (4) F_2 and F_1

33. The fact that the alleles donot show any blending and that both the characters are recovered as such in F_2 generation, become the basis of
(1) Law of Dominance
(2) Law of paired factors
(3) Law of segregation
(4) Law of independent assortment

34. In the theoritical explanation of allelic interaction for dominant and recessive forms, the recessive trait is seen due to production of
(1) Normal enzyme
(2) A non functional enzyme
(3) No enzyme production
(4) Either 2 or 3

35. Genes responsible for ABO blood group determines which of the following biomolecules of RBC plasma membrane
(1) Phospholipid (2) Proteins
(3) Sugars (4) Cholesteroles

36. If there are four allelic forms for the gene controlling ABO blood group then what will be the number of possible genotypes
(1) 6 (2) 10
(3) 12 (4) 14

37. Multiple alleles can be found during study of
(1) Gametes (2) Individual
(3) Population (4) All above

38. Shape of seed depends on starch granules size, so inheritance of seed shape show ..... relationship while inheritance of starch grains show .....
(1) Dominant recessive, codominance
(2) Incomplete dominance, codominance
(3) Dominant - recessive, incomplete dominance
(4) Codominance, incomplete dominance

39. Inheritance of starch grains size shows
(1) Dominant recessive relationship
(2) Codominance
(3) Incomplete dominance
(4) Multiple allelism

40. Dominance of any character generally depends on
(1) Gene or product related informations of any gene
(2) Character choosen by ourself in study
(3) Environmental factors
(4) Both 1 and 2

41. In any dihybrid cross segregation of one pair of characters is independent of other pair of characters, is known as

(1) Law of segregation

(2) Law of purity of gametes

(3) Law of independent assortment

(4) Law of dominance

42. In dihybrid mendelian cross how many types of genotype and phenotype will be obtain

(1) 4 and 9 respectively

(2) 9 and 4 respectively

(3) 9 & 16 respectively

(4) 4 & 16 respectively

43. Mandel published his work in 1865 but it remained unrecognised till 1900. Which of the following reason was not responsible for it

(1) Communication was not easy

(2) His concept of genes (factors) as stable and discrete unit was not accepted by his contemporaries as an explanation for apparently continuous variations

(3) Use of mathematics to explain biological phenomenon

(4) Use of emasculation technique

44. Parallelism between charomosome and behaviour of gene was established by

(1) de Vries, Correns and Tschermark

(2) Sutton and Boveri

(3) Bateson and Punnet

(4) Landsteiner and de Castello

45. Who among the following united the knowledge of chromosomal segregation with Mendelian principles and called it chromosomal theory of inheritance

(1) Bateson (2) Boveri

(3) Sutton (4) Correns

46. Experimental verification of chromosomal theory of inheitance was proposed by

(1) Tschermark (2) de Vries

(3) Sutton (4) Morgan

47. Drosophila melanogaster is best material for study of inheritance. Which of the following reason is not appropriate for selection of Drosophila

(1) They can grow on simple synthetic medium

(2) They complete their life cycle in about two weeks

(3) Single mating could produce small number of progeny

(4) Clear differentiation of the sexes

48. Who among the following used the frequency of recombination between gene pairs on the same chromosome as a measure of distance between genes and mapped their position

(1) Davenport (2) Sturtevant

(3) Morgan (4) Nillson

49. If yellow body, white eyed drosophila is crossed with wild brown body red eyes drosophila. Then what would be frequency of recombinants in F_1 generation

(1) 100 % (2) 1.3 %

(3) 98.7 % (4) 0 %

50. Which of the following structure was discovered by Henking

(1) y-body (2) Bar body

(3) x-body (4) Nu-body

51. In some insects half of the sperms possess X chromosome along with autosomes while half of the sperms carries

(1) Only autosomes

(2) y chromosome along with autosome

(3) x chromosome only

(4) x chromosome along with autosomes

52. Female heterogamety can be seen is

(1) Human beings (2) Drosophilla

(3) Hen (4) Honey bees

53. Chromosomal aberrations are commonly observed in :-

(1) Germinal cells (2) Cancer cells

(3) Nail base cells (4) Gametes

54. Study of family history about inheritance of a particular trait in several generations of a family called

(1) Phylogeny (2) Ontogeny

(3) Pedigree analysis (4) Cladistics

55. Symbols ◈ used in pedigree analysis, represents

(1) Five offspring with unspecified sex

(2) Five diseased offspring

(3) Five unaffected offspring

(4) Five affected offsprings

56. Genetic disorders determined by alteration or mutation in single gene are known as

(1) Chromosomal disorders

(2) Mendelian disorders

(3) Non inheritable disorders

(4) All above

57. Which of the following is not a Mendelian disorder

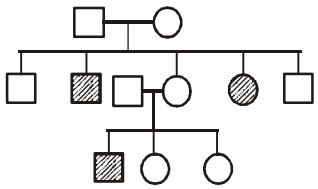
(1) Haemophilia

(2) Cystic fibrosis

(3) Cryduchat syndrome

(4) Sickle cell anaemia

58.



In this given pedigree what is the mode of inheritance

(1) Autosomal dominant

(2) Autosomal recessive

(3) X-linked dominant

(4) X-linked recessive

59. In sickle cell anaemia which of the following genotype will show disease phenotype

(1) Hb^A Hb^A

(2) Hb^S Hb^S

(3) Hb^S Hb^A

(4) Both 1 and 2

60. Which of the following is not concerned with sickle cell anaemia

(1) Sixth position of β-chain

(2) α chain of Hb

(3) Valine

(4) Haemoglobin

61. Polymerisation of mutant haemoglobin molecule in sickle cell anaemia is due to

(1) Sulphadrugs

(2) High oxygen

(3) Low oxygen concentration

(4) Plasmodium falciperum

62. Regarding to phenylketonuria which of the following statement is wrong

(1) Phenylalanine can not convert into tyrosine

(2) Phenylalanine convert into phenylpyruvate and derivatives

(3) Phenylpyruvate deposited in heart, liver and kidney

(4) This is inborn error of metabolism

63. Chromosomal disorders arise due to

(1) Absence of one or more chromosomes

(2) Excess of one or more chromosomes

(3) Abnormal arrangement of one or more chromosomes

(4) All the above

64. Which of the following symptom is not assocoated with Down's syndrome

(1) Flat back of head

(2) Many loops on finger tips

(3) Big and wrinked tongue

(4) Congenital liver diseases

65. Match the folloiwng

(A)	Down's Syndrome	(i)	44 + XY
(B)	Klinefelter's Syndrome	(ii)	45 + XY
(C)	Turner's Syndrome	(iii)	44 + XO
(D)	Phenylketonuria	(iv)	44 + XXY

	A	B	C	D
(1)	I	IV	III	I
(2)	II	IV	III	I
(3)	I	II	III	IV
(4)	I	II	IV	III

66. Retarted physical, psychomotor and mental development are consequences observed during

(1) Down's syndrome

(2) Klinefelter's syndrome

(3) Turner's syndrome

(4) Lesch nyhan syndrome

67. Gynaecomastia state can be seen in

(1) Down's syndrome

(2) Klinefelter's syndrome

(3) Turner syndrome

(4) Edward's syndrome

68. Match the folloiwng

(A)	Haemophilia	(i)	Board plam with characteristic palm creased
(B)	Down's Syndrome	(ii)	Delayed clotting of blood
(C)	Klinefelter's syndrome	(iii)	Some feminine character
(D)	Turner's Syndrome	(iv)	Rudimentary ovaries

	A	B	C	D
(1)	I	II	III	IV
(2)	III	II	I	IV
(3)	II	I	IV	III
(4)	II	I	III	IV

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	2	2	3	2	4	1	3	1	1	2	1	4	4	3	3	2	3	1	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	4	4	4	2	2	4	2	2	2	3	1	3	4	3	2	3	3	3	4
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	3	2	4	2	3	4	3	2	4	3	1	3	2	3	3	2	3	2	2	2
Que.	61	62	63	64	65	66	67	68												
Ans.	3	3	4	4	2	1	2	4												

GENETICS : MOLECULAR BASIS OF INHERITANCE

1. Which of the following is not the feature of human genome ?
(1) Less than 2 percent of the genome code for protein
(2) Chromosome 1 has fewest gene (231)
(3) Repetitive sequences make up very large portion of human genome
(4) The functions are unknown for over 50% of the discovered genes

2. The sequence of which chromosome number was completed in May 2006 ?
(1) Chromosome number 1
(2) Chromosome number 2
(3) Chromosome number 5
(4) Chromosome number 10

3. The repressor of the operon is synthesized :
(1) All the time (2) Certain time
(3) Non constitutively (4) None of these

4. Match the following

(A) ϕ x 174	(i) 48502 bp
(B) Lambda phage	(ii) 5386 Nucleotides
(C) E.Coli	(iii) 6.6×10^9 bp
(D) Human somatic cell	(iv) 4.6×10^6 bp

(1) A(i), B(ii), C(iv), D(iii)
(2) A(ii), B(i), C(iv), D(iii)
(3) A(i), B(ii), C(iii), D(iv)
(4) A(iv), B(iii), C(ii), D(i)

5. Which of the following pyrimidine base is common in both DNA and RNA
(1) Adenine (2) Guanine
(3) Cytosine (4) Thymine

6. In nucleoside which of the following bond exists between sugar and nitrogenaous base
(1) Phosphodiester bond
(2) Hydrogen bond
(3) Phosphoester bond
(4) N-glycosidic bond

7. By which of the following bond phosphoric acid remain linked with 5' carbon of sugar in one nucleotide
(1) Phosphoester bond
(2) Phosphodiester bond
(3) N-Glycosidic bodn
(4) Hydrogen bond

8. The backbone in a polynucleotide chain is formed due to
(1) Sugars and nitrogenous bases
(2) Phosphates and nitrogenous base
(3) Nitrogenous bases and histones
(4) Sugar and phosphates

9. In RNA, every nucleotide residue has an additional – OH group at which of the following position
(1) 2' position of deoxyribose
(2) 1' possition of ribose sugar
(3) 3' position of ribose sugar
(4) 2' position of ribose sugar

10. DNA as an acidic substance present in nucleus was first identified by
(1) Wilkins and Franklin
(2) Watson and Crick
(3) Friedich meischer
(4) Altmann

11. Double helix model of DNA proposed by watson and crick was based on
(1) X-ray diffraction data of Meischer
(2) X-ray crystallography data of Wilkins and Franklin
(3) X-ray diffraction data of Watson and Crick
(4) X-ray diffraction data of Chargaff

12. Regarding to features of double helix struture of DNA which of the following is wrong
(1) Two polynucleotide chains have antiparallel polarity
(2) The bases in two strands are paired through phosphodiester bonds
(3) Adenine form two hydrogen bonds with thymine
(4) The pitch of the helix is 3.4 nm

13. In addition to hydrogen bonding which of the following feature confers stability to helical structure
(1) Phosphodiester bond
(2) Pairing between one purine and one pyrimidine
(3) Glycosidic linkage between sugar and nitrogenous base
(4) The plane of one base pair stacks over the other

14. Which of the following is responsible for constant distance between two polynuclestide chains in DNA
(1) Antiparallel polarity of two polynucleotide strands
(2) Hydrogen bonding
(3) Pairing between one purine and one pyrimidine
(4) All the above

15. Phosphoric acid remain associated with which of the following carbon of sugar in a nucleotide :-
(1) Ist (2) 3rd
(3) 4th (4) 5th

16. In there are 3.3×10^9 bp present in genome, then what would be the length of the DNA of any somatic cell
(1) 1.1 meter (2) 2.2 meter
(3) 3.3 meter (4) 6.6 meter

17. Positive charge and basic nature of histone is due to abundance of
(1) Lysines and tryptophanes
(2) Arginines & threonines
(3) Lysines and arginines
(4) Tryptophanes and threonines

18. Negative charge of DNA is due to which of the following constituent
(1) Sugar (2) Nitrogenous base
(3) Phosphoric acid
(4) Hydroxyl group (–OH) present on sugar

19. A typical nucleosome contains how much amount of DNA
(1) 100 bp (2) 146 bp
(3) 200 bp (4) 346 bp

20. In a mammalian somatic cell how many nucleosomes are present
(1) 6.6×10^9 (2) 3.3×10^9
(3) 3.3×10^7 (4) 3.3×10^5

21. Which of the following is actual sequence of packaging of DNA in eukaryotic cells
(1) DNA $\rightarrow$ Chromatin $\rightarrow$ Nucleosome $\rightarrow$ Chromosome
(2) DNA $\rightarrow$ Nucleosome $\rightarrow$ Chromosome $\rightarrow$ Chromatin
(3) DNA $\rightarrow$ Nucleosome $\rightarrow$ Chromatin $\rightarrow$ Chromosome
(4) DNA $\rightarrow$ Chromosome $\rightarrow$ Chromatin $\rightarrow$ Nucleosome

22. The packaging of chromatin at higher level requires additional set of proteins that is known as
(1) Histone proteins
(2) NHC proteins
(3) Homeotic proteins
(4) Domain proteins

23. The unequivocal proof that DNA is the genetic material came from the experiments of
(1) Griffith
(2) Avery, Macleod & Mccarty
(3) Hershey and Chase
(4) Watson and Crick

24. Radioactive (^{35}S) was detected in
(1) Supernatant (2) Sediment
(3) Both (4) Either 1 or 2

25. Which of the folloiwng is not a criteria for determination of genetic material
(1) Ability of replication
(2) Chemically and structurally stable
(3) It should be non mutable
(4) Ability to expres itself in from of Mendelian characters

26. Which of the folloiwng feature of RNA make it labile and easily degradable
(1) Single stranded nature
(2) 2'–OH group on sugar
(3) Phosphodiester bond
(4) Absence of Hydrogen bond

27. Regarding to RNA which of the following feature is wrong
(1) Catalytic property
(2) Labile and easily degradable
(3) Absence of thymine
(4) Presence of methylated uracil

28. Which fo the folloiwng reason is suitable to expalin that RNA is best for expression of characters
(1) It shows catalytic properties
(2) Presence of 2'–OH group on ribose sugar
(3) It can directly code for the synthesis of protein
(4) Presence of uracil

29. Which of the following is responsible for short life span and fast rate of mutation and evolution
(1) Presence of DNA
(2) Presence of highly reactive RNA
(3) Double stranded genetic material
(4) Single stranded genetic material

30. Which of the following evidence suggests that essential life processes evolved around RNA

(1) RNA used to act as genetic material

(2) RNA can act as catalyst

(3) RNA is highly reactive

(4) Both 1 and 2

31. Regarding to Meselson and Stahl experiment for semi conservative nature of DNA replication select out the wrong statement

(1) ^{15}N of $^{15}NH_4Cl$ was incorporated in DNA and other compounds

(2) ^{15}N & ^{14}N can be differentiate on the basis of radioactive activity

(3) Heavy and normal DNA molecules could be distinguished by CsCl density gradient centrifugation

(4) ^{15}N used in $^{15}NH_4Cl$ was not a radioactive isotope

32. If E.Coli is allow to grow for 80 minutes in $^{15}NH_4Cl$ medium then what would be the proportion of hybrid and heavy density DNA molecules

(1) 1 : 7 (2) 7 : 1

(3) 14 : 2 (4) 1 : 4

33. Semiconservative replication of DNA in chromosomes was proved by

(1) Meselson & Stahl by using $^{15}NH_4Cl$

(2) Taylor by using $^{15}NH_4Cl$

(3) Meselson & Stahl by using tritiated thymidine

(4) Taylor by using tritiated thymidine

34. How much duration of time required for replication of 4.6 x 10^6pb in E.coli

(1) 83 minutes

(2) 20 minutes

(3) 2 minutes

(4) 3 hrs

35. What is the rate of polymerisation in *E.coli*

(1) 20,000 bp per second

(2) 2000 nucleotides per second

(3) 2000 bp per minute

(4) 2000 bp per second

36. During replication large amount of energy get exhausted. The source of this energy is

(1) Deoxy ribonucleotide triphosphophate

(2) Deoxyribonucleoside monoplosphate

(3) Deoxyribonucleoside triphosphate

(4) Both 1 and 2

37. Regarding to direction of DNA replication select out the correct one

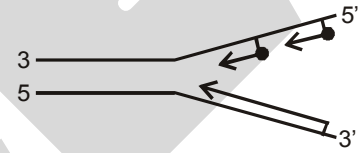
(1) 5' $\rightarrow$ 3' Template – continuous synthesis

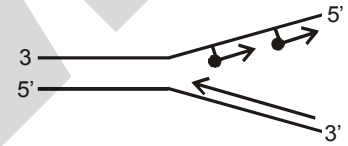
(2) 3' $\rightarrow$ 5' Template – discontinuous synthesis

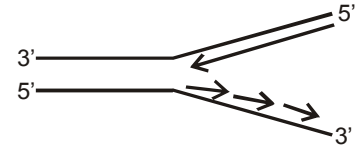
(3) 3' $\rightarrow$ 5' Template – continuous synthesis

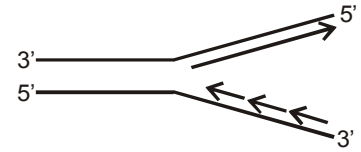
(4) 5' $\rightarrow$ 3' Template – synthesis leadingstrand

38. Which of the following scheme of replication fork is true

(1) 

(2) 

(3) 

(4) 

39. During transcription only one of the strand of DNA get transcribed. Which of the following reason explain it

(1) Otherwise one segment of DNA would be coding for two different proteins

(2) Otherwise dsRNA comes in existance

(3) Otherwise antisense RNA arise which donot participate in Translation

(4) All the above

40. A transcription unit in DNA is defined primarily by three regions in DNA. These regions are

(1) Promoter, regulator and structural gene

(2) Promoter, structural gene and terminator

(3) Promoter, regulator and terminator

(4) Promoter, regulator and operator gene

41. In transcription unit promoter and terminator are determined on the basis of

(1) Coding strand (2) Template strand

(3) Noncoding strand (4) Antisense strand

42. In eukaryotes as well as prokaryotes those DNA sequences that appear in mature or processed RNA are known as

(1) Introts (2) Exons

(3) Recons (4) Mutons

43. Regarding to role of RNA in protein synthesis find out the odd one

(1) m-RNA - provides the template

(2) t-RNA - brings aminoacids

(3) r-RNA - read genetic code

(4) sn-RNA splicing

44. Which of the following exclusive property of trancription found in RNA-polymerase

(1) Initiation (2) Elongation

(3) Termination (4) Processing

45. What is the length and constituent base of tail in functional m-RNA

(1) Poly U – 200-300 bp

(2) Poly A – 200-300 bp

(3) Poly C – 200-300 nucleotides

(4) Poly A – 200-300 nucleotides

46. DNA dependent RNA polymerases mediated synthesis of RNA over DNA called transcription. About it which of the following statement is wrong

(1) In bacteria m-RNA doesnot required any processing to become active

(2) In eukaryotes there is clearcut division of labour in RNA polymerases

(3) Absence of introns in RNA of eukaryotes is reminiscent of antiquity

(4) RNA polymerase - III is responsible for synthesis of sn-RNA

47. Which of the following was not involved in deciphering of genetic code

(1) Physicist george Gamow's permutation combination of 4^3 bases

(2) H.G. Khorana's based synthesis of RNA molecules with defined combination of bases

(3) Severo ochoa enzyme for polymerising DNA with defined sequences

(4) Marshall Nirenberg's cell free system for protein synthesis

48. Which of the following mutation forms the genetic basis of proof that codon is a triplet and it is read in a continuous manner

(1) Chromosomal structural mutations

(2) Chromosomal numerical mutations

(3) Substitutional mutation

(4) Frame shift insertion or deletion mutation

49. An adapter molecule that would on one hand read the code and on the other hand would bind to specific amino acids is

(1) m-RNA (2) r-RNA

(3) t-RNA (4) hm-RNA

50. Which of the following r-RNA show structural as well as functional role in bacteria :-

(1) 16s rRNA (2) 23s rRNA

(3) 5s rRNA (4) 28s rRNA

51. A m-RNA also has some additional sequences that are not translated called UTR. The function of UTR is

(1) Charging of t-RNA

(2) Formation of peptide bond

(3) Helps in efficient translation

(4) Helps in translocation

52. The t-RNA move away from ribosomes after translocation of ribosome in relation to m-RNA, is known as

(1) Acylated t-RNA (2) Peptidyle t-RNA

(3) Deacylated t-RNA (4) Charged t-RNA

53. At which of the following levels, regulation of gene expression in eukaryotes donot occur

(1) Transcription level

(2) Processing level

(3) Transport of ribosomal subunits from nucleus to cytoplasm level

(4) Translation level

54. In prokaryotes predominant site for control of gene expression is the

(1) Control of rate of processing of primary transcript

(2) Control of rate of transcription initiation

(3) Control of transport of m-RNA from nucleus to cytoplasm

(4) Control of Translation

55. HGP was closely associated with the rapid development of a new area in biology called as

(1) Biofortification

(2) Bioinformatics

(3) Biomining

(4) Biotransformation

56. Which of the following is not a goal of HGP

(1) Identify all the approximately 20,000–25,000 genes

(2) Store this information in database

(3) Restrict the related technologies so that other sector donot benefited with it

(4) Address the ethical, legal and social issues

57. The human genome project was coordinated by

(1) U.S. department of energy

(2) National institute of health

(3) Sanger centre

(4) Both 1 and 2

58. Which of the following organism was not used as model organism is human genome project

(1) Arabidopsis

(2) Caenorhabdities elegans

(3) Rice

(4) Hyacinthus orientalis

59. Approach of HGP focused on identifying all the genes that expressed as RNA is known as

(1) Expressed sequence tags

(2) Sequence annotation

(3) Polymerase chain reaction

(4) Dermatoglyphics

60. Automated DNA sequencers worked on the principle of a method developed by

(1) Watson

(2) Chargaff

(3) Frederick sanger

(4) Singer and Nicolson

61. Regarding to salient features of human genome select out the incorrect one

(1) Human genome contains 3164.7 million nucleotide bases

(2) Human genome contain 30,000 genes

(3) y-chromosome has largest number of genes

(4) 1.4 million locations are associated with SNPs

62. Match the following

A.	SNPs	i	3164.7 million
B.	Genes of chromosome No. 1	ii	1.4 Million
C.	Total No. of Human genes	iii	30000
D.	Total nucleotides of human genome	iv	2968

	A	B	C	D
(1)	ii	iii	iv	i
(2)	ii	iv	iii	i
(3)	ii	iv	i	iii
(4)	iv	ii	iii	i

63. If an inheritable mutation is observed in a population at high frequency, it is referred as

(1) DNA polyploidy

(2) DNA polymorphism

(3) DNA redundancy

(4) Sequence annotation

64. Due to high degree of polymorphism, size of VNTR varies in size from

(1) 0.1 – 2 kb

(2) 0.1 – 2000 kb

(3) 0.1 – 20 kb

(4) 0.1 – 200 kb

65. What is the basis of heredity

(1) Variations

(2) Inheritance

(3) Genetics

(4) Recombination

66. Change in a single base pair of DNA can be termed as

(1) Chromosomal aberrations

(2) Point mutation

(3) Genomatric mutation

(4) Frame shift mutation

67. Which of the following cell cycle event is responsible for aneuploidy based chromosomal disorders

(1) Failure of G_1 phase

(2) Failure ofDNA replication in s-phase

(3) Failure of segregation/Disjunction

(4) Failure of movement of chromosomes

68. Which of the folloiwng cell cycle event is responsible for polyploidy phenomenon

(1) Failure of karyokinesis

(2) Failure of cytokinesis

(3) Failure of segregation

(4) Failure of non-disjunction

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	1	2	3	4	1	4	4	3	2	2	4	3	4	2	3	3	3	3
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	2	3	1	3	2	4	3	2	4	2	1	4	2	4	3	3	2	4	2
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	2	3	2	4	3	3	4	3	2	3	3	3	2	2	3	4	4	1	3
Que.	61	62	63	64	65	66	67	68												
Ans.	3	2	2	3	2	2	3	2												

STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION

1. Root of any plant breeding programme is :
(1) Mutation (2) Genetic variability
(3) Hybridisation (4) Selection

2. The contribution of agriculture in indian GDP is approximately :
(1) 62% (2) 90%
(3) 33% (4) 5%

3. 'P-1542' is a hybrid variety of which plant ?
(1) Wheat (2) Rice
(3) Maize (4) Pea

4. "Jaya" and "Ratna" are better yielding semi dwart varieties of rice. These varieties are doveloped in which country ?
(1) Japan (2) India
(3) Phillipins (4) Mexico

5. *Saccharum* barberry had poor sugar content and yield. This veriety of sugar cane mainly grown in which part of india ?
(1) South India (2) East India
(3) North India (4) West India

6. Himgiri variety of wheat, which developed by hybridisation and selection is mainly resistance for
(1) Leaf and stripe rust
(2) White rust
(3) Bacterial blight
(4) Chilly mosaic virus

7. The conventional method of breeding for disease resistance in plants is :
(1) Hybridisation (2) Selection
(3) Mutation (4) Both (1) and (2)

8. In mung bean, resistance to yellow mosaic virus and powdery mildew were induced by :
(1) Plant introduction (2) Plant tissue culture
(3) Hybridisation (4) Mutation

9. Parbhani Kranti, which has resistance to yellow mosaic virus is a variety of :
(1) Wheat (2) Cow pea
(3) Bhindi (4) Chilli

10. Which character of maize leads to resistance to maize stem borers naturally ?
(1) High aspartic acid
(2) Low nitrogen content
(3) Low sugar content
(4) All of the above

11. "Atlas 66" is high protein contained variety of :
(1) Wheat (2) Maize
(3) Rice (4) Bhindi

12. Production of thousands of plants through tissue culture method is called :
(1) Macropropagation (2) Micropropagation
(3) Somatic embryo (4) Totipotency

13. Which variety of Bhindi is resistance to shoot and fruit borer ?
(1) Pusa Gaurav (2) Pusa sem-2
(3) Pusa komal (4) Pusa sawani

14. Plants produced by tissue culture method are called:
(1) Explant
(2) Somaclones
(3) Micropropagation
(4) SCP (Single cell protein)

15. India has maximum genetic diversity of :
(1) Wheat (2) Rice
(3) Mango (4) Apple

16. In India, how many varieties of rice are present ?
(1) 200000 (2) 50000
(3) 10000 (4) 1000

17. Pomato is an example of :
(1) Somatic hybrid (2) Somatic embryo
(3) Androgenic haploid (4) SCP

18. Which chemical is used in somatic hybridisation ?
(1) Polyethyline glycole (2) Acredine
(3) HNO_2 (4) Ethenol

19. Sonalika is variety of :
(1) Wheat (2) Rice
(3) Maize (4) Pea

20. "International center for wheat and maize" improvement" is situated at :

(1) Phillipins (2) India

(3) Mexico (4) Brazil

21. Biological principles as applied to animal husbandry and food production. Which of the following technique is not going to play a pivotal role in further enhancing food production

(1) Embryo transfer technique

(2) Tissue culture technique

(3) Mutations

(4) Biomining

22. Green revolution was dependent to a large extent on plant breeding techniques for development of

(1) High yielding varieties

(2) Disease resistant varieties

(3) Wild varieties

(4) Both 1 and 2

23. Purposeful manipulation of plant species in order to create desired plant type that are better suited for cultivation, give better yields and disease resistant is

(1) Plant systematics (2) Plant breeding

(3) Plant monitoring (4) Biofortification

24. Classical plant breeding involves

(1) Hybridisation of pure lines exclusively

(2) Hybridisation of pure lines followed by artificial selection

(3) Artificial selection exclusively

(4) Mutation breeding

25. Which of the following is not a step of plant breeding

(1) Collection of variability

(2) Evalution and selection of parents

(3) Cross hybridisation within a pure line

(4) Selection and testing of superior recombinants

26. Which of the following is root of any plant breeding programme

(1) Genetic variability

(2) Evaluation and selection of parents

(3) Cross hybridisation among selectied parents

(4) Selection of superior recombinants

27. The entire collection of plants / seeds having all the diverse alleles for all genes in a given crop is known as

(1) Genetic erosion

(2) Germplasm collection

(3) Gene pool

(4) Genetic drift

28. For how many growing seasons, new selected lines is tested in farmer's field

(1) Two growing seasons

(2) Three growing seasons

(3) Four growing seasons

(4) Five growing seasons

29. Which of the following rice variety were developed in India

(1) IR - 8 (2) IR - 36

(3) TN - 1 (4) Jaya

30. Which of the following sugarcane species were crossed to combine desirable qualities of high yield, thick stem, high sugar content and ability to grow in sugarcane areas of North India

(1) Saccharum officinale x Saccharum barberi

(2) S. officinarum x S. baberi

(3) S. barberi x S.indica

(4) S. officinarum x S. officinale

31. Match the following

A.	Himgiri variety	i.	White rust
B.	Pusa swarnim	ii.	Hill bunt
C.	Pusa shubhra	iii.	Leaf curl
D.	Pusa sadabahar	iv.	Black rot

	A	B	C	D
(1)	ii	i	iii	iv
(2)	i	ii	iv	iii
(3)	ii	i	iv	iii
(4)	i	ii	iii	iv

32. About disease resistant varieties of plant select out the incorrect match

(1) Wheat – Himgiri

(2) Brassica – Pusa swarnim

(3) Cauliflower – Pusa shubhra

(4) Cowpea – Pusa snowball K1

33. In mung bean, resistance to yellow mosic virus and powdery mildew were induced by

(1) Conventional breeding

(2) Mutation breeding

(3) Germplasm collection

(4) Polyploidy breeding

34. Parbhani kranti variety of *Ablemoschus esculentus* was created for resistance against which of the following disease

(1) Yellow mosaic virus

(2) Curl blight black rot

(3) White rust

(4) Powdery mildew

35. Resistance to jassids in cotton and cereal leaf beetles in wheat is due to which of the following morphological / physiological / Biochemical characteristic

(1) Solid stem (2) Nectorlessness

(3) High aspartic acid (4) Hairy leaves

36. In maize resistance to maize **stem borer** is due to

(1) High aspartic acid

(2) Low nitrogen and sugar content

(3) High nitrogen and suger content

(4) Both 1 and 2

37. Select the incorrect match

(1) Pusa gaurav – Aphids

(2) Pusa sem 2 – Shoot borers

(3) Pusa sem 3 – Jassids & Aphids

(4) Pusa sawani – Fruit borers

38. Hidden hunger is associated with deficiency of

(1) Proteins (2) Vitamins

(3) Micronutrients (4) All the above

39. Which of the following is not a consiquence of hidden hunger

(1) Increased the risk of disease

(2) Reduced life span

(3) Reduced mental abilities

(4) Reduced skin pigmentation

40. Breeding crops with higher levels of vitamins and minerals, higher proteins and healthier fats is known as

(1) Bioremediation (2) Biomagnification

(3) Biofortification (4) Biotransformation

41. Which of the following is not an objective of plant breeding for improved nutritional quality

(1) Protein content and quality

(2) Oil content and quality

(3) Vitamin content

(4) Carbohydrate content

42. Which of the following nutrient was enhanced in hybrid maize developed in the year 2000

(1) Lysine (2) Tryptophane

(3) Threonine (4) Both 1 and 2

43. Which of the following wheat variety have high protein content

(1) Kalyansona (2) Sharbati sonaro

(3) Atlas 66 (4) IR - 8

44. Biofortified rice are enriched in which of the following nutrient

(1) Iron (2) Amino acids

(3) Fatty acids (4) Essential amino acids

45. Match the following

A.	Vitamin A rich	i	Lablab
B.	Vitamin C rich	ii	Spinach
C.	Fe and Ca Rich	iii	Bitter gaurd
D.	Protein Rich	iv	Carrot

	A	B	C	D
(1)	iv	iii	ii	i
(2)	iv	iii	i	ii
(3)	iii	iv	ii	i
(4)	iii	iv	i	ii

46. Which of the following can be used for cultivation of SCP

(1) Waste water from potato processing plants

(2) Straw

(3) Sewage

(4) All above

47. 250 gm *Methylophilus methylotrophus* can produce how much amount of proteins in a day :-

(1) 2.5 tonnes (2) 25 tonnes

(3) 250 tonnes (4) 25 Kg

48. Which of the following cell property is the basis of plant tissue culture

(1) Homeostasis (2) Thermoperiodicity

(3) Meristematic (4) Totipotency

49. Each of the plant obtained through tissue culture are genetically identical to the original plant from which they were grown are known as

(1) Genocopies

(2) Somaclonal variants

(3) Somaclones

(4) Phenocopies

50. Fusion between two naked protoplasts is known as

(1) Somatic hybridisation

(2) Germinal hybridisation

(3) Parasexual hybridisation

(4) Both 1 and 3

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	4	2	3	1	4	4	3	4	1	2	4	2	2	1	1	1	1	3
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	4	2	2	3	1	2	2	4	2	3	4	2	1	4	4	2	4	4	3
Que.	41	42	43	44	45	46	47	48	49	50										
Ans.	4	4	3	1	1	4	2	4	3	4										

MICROBES IN HUMAN WELFARE

1. Nutritionally curd is more suitable then milk. Which of the following reason not supporting to this view

(1) It increasing vitamin B_{12}

(2) It checks disease causing microbes

(3) LAB convert lactose into lactic curd

(4) It provide additional proteins

2. Large holes in "Swiss cheese" are due to production of large amount of CO_2 by ..... bacterium

(1) *Leuconostoc mesenteroides*

(2) *Propionibacterium sharmanii*

(3) *Thermococcus proteus*

(4) *Staphylococcus thermophilus*

3. Which of the following is not a product of distillation

(1) Whisky (2) Brandy

(3) Wine (4) Rum

4. Find out odd one with refrence to distillation

(1) Beer (2) Wine

(3) Both 1 and 2 (4) Vodka

5. Which of the following bacteria was associated with discovery of penicillin

(1) *Streptococus*

(2) *Staphylococcus*

(3) *Saccharomyces cerveisiae*

(4) *Propionobacterium*

6. Full potential of penicillin as an effective antibiotic was established by

(1) Alexander Flemming (2) Ernest chain

(3) Howard florey (4) Both 2 and 3

7. Which of the following is "Clot buster"

(1) Citric acid (2) Streptokinase

(3) Cyclosporin (4) Statins

8. Which of the following chemicals, used as an immunosuppressive agent in organ transplantation

(1) Streptokinase (2) Cyclosporin - A

(3) Statins (4) Citric acid

9. Match the following

A.	Pectinases	i. Blood cholesterol lowering agents
B.	Streptokinases	ii. Immunosuppressive agents
C.	Cyclosporin - A	iii. Clot-busters
D.	Statin	iv. Clearifying agents

	A	B	C	D
(1)	iv	iii	ii	i
(2)	iv	iii	i	ii
(3)	iii	iv	ii	i
(4)	i	ii	iii	iv

10. Match the following

A.	Citric acid	i. *Haemolytic streptococcus*
B.	Streptokinase	ii. *Aspergillus niger*
C.	Cyclosporin - A	iii. *Monascus purpureus*
D.	Statins	iv. *Trichoderma polysporum*

	A	B	C	D
(1)	i	ii	iii	iv
(2)	ii	i	iii	iv
(3)	ii	i	iv	iii
(4)	iv	ii	iii	i

11. Functioning of statin is based on

(1) Competitive inhibition

(2) Endproduct inhibition

(3) Allosteric inhibition

(4) Negative feed back inhibition

12. The technology of biogas production was developed in India mainly due to efforts of

(1) IARI (2) KVIC

(3) IPM (4) Both 1 and 2

13. *Bacillus thuringiensis* show their inhibitory effect on which part of the insect body

(1) Gut

(2) Respiratory tract

(3) Nervous system

(4) Circulatory system

14. Which of the following biological agents are used for species specific, narrow spectrum insecticidal applications
(1) Adenoviruses
(2) Nucleopolyhedrosis viruses
(3) Retroviruses
(4) Trichoderma

15. Which of the following is one of the advantage of application of viruses as bioinsecticides
(1) They are less effective
(2) They are host specific
(3) They are costly
(4) They can not obtain easily

16. In which of the following conditions use of baculoviruses is desirable
(1) When they are used as part of IPM
(2) When an ecologically sensitive area is being treated
(3) When beneficial insects are being conserved
(4) All of the above

17. Use of biofertilizer is the part of
(1) Inorganic farming
(2) Organic farming
(3) Energy cropping
(4) Energy plantation

18. Members of which of the following fungal genus mainly participate in the mycorrhiza formation
(1) *Azotobacter* (2) *Fusarium*
(3) *Rhizopus* (4) *Glomus*

19. Which of the following is not an advantage of mycorrhiza
(1) Phosphorus absorption
(2) Resistance to root borne pathogens
(3) Nitrogen fixation
(4) Tolerance to salinity and draught

20. Cultivation of which of the following crop plant specially get benifitted by application of cyanobacteria
(1) Maize (2) legumes
(3) Wheat (4) Rice

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	4	2	3	4	2	4	2	2	1	3	1	4	1	2	2	4	2	4	3	4

BIOTECHNOLOGY : PRINCIPLES AND PROCESSES

1. The science, which deals with techniques of using live organisms or enzymes from organism to produce products and processes useful to human is :
(1) Genetics (2) Biotechnology
(3) Bioinformatics (4) None of these

2. A restriction endonucleases which always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs is :
(1) Hind-II (2) Psu I
(3) Hae-III (4) All of these

3. The first letter of the name of Restriction endonuclease came from the
(1) Genus of organism
(2) Species of organism
(3) Family of organism
(4) Class of organism

4. Autonomously replicating circular extra chromosomal DNA of bacteria is :
(1) Plastid (2) Nucleus
(3) Plasmid (4) None of these

5. The specific DNA sequence in a chromosome which is responsible for initiation of replication is :
(1) Cloning region
(2) Termination region
(3) Initiation region
(4) Origin of replication

6. Which of the following reproduction preserves the genetic informations ?
(1) Asexual reproduction
(2) Sexual reproduction
(3) Both (1) and (2)
(4) None of these

7. Taq polymerase is used in, polymerase chain reaction, because :
(1) It becomes inactive at high temperature
(2) it makes other enzyme active at high temperature
(3) It remains active during high temperature
(4) It is obtained from thermostable virus.

8. The vessels, where large volumes of culture can be processed are :
(1) Bioreactors (2) Biovessels
(3) Biocontainers (4) All of above

9. Which of the following enzymes is known as 'genetic glue'?
(1) DNA polymerase
(2) Alkaline phosphatase
(3) DNA ligase
(4) All of the above

10. Small chemically synthesised oligonucleotides that are complementary to the regions of DNA at 3' end used in PCR are :
(1) Primers (2) Dimers
(3) Small strands (4) Large fragments

11. Bombardment of high velocity micro-particles of gold or tungsten coated with DNA on target cells is :
(1) Biolistics
(2) Micro-injection
(3) Electroporation
(4) Bombing

12. In micro injection :
(1) DNA is bombarded on target cells
(2) DNA is placed through a vector
(3) DNA is directly injected into the nucleus of animal cell
(4) None of the above

13. pBR322 has two antibiotic resistance genes, they are :
(1) Streptomycin and Ampicillin resistant gene
(2) Chloromycetin and tetracycline resistant gene
(3) Tetracycline and neomycin resistant genes
(4) Ampicillin and tetracyclin resistant genes

14. Most common matrix is agarose a natural polymer used in gel electrophoresis is extracted from :
(1) an animal
(2) a fungus
(3) Sea weeds
(4) None of these

15. To isolate DNA from the plant cells we have to break the wall this is done by :

(1) Lysozyme (2) Cellulase

(3) Chitinase (4) Invertase

16. *Agrobacterium tumifaciens* a pathogen transform normal plant cells into a tumor, similarly in animals the normal cells transformed into cancerous cells by:

(1) Retro viruses (2) DNA viruses

(3) Ribo viruses (4) None of these

17. Insertional inactivation results into inactivation of which enzyme ?

(1) Transacetylase

(2) Permease

(3) Taq polymerase

(4) β-galactosidase

18. If the bacterium does not have any insert, then the presence of chromogenic substrate, it gives :

(1) Red coloured colonies

(2) Colourless colonies

(3) Blue colonies

(4) Green colonies

19. To make cell competent to take up DNA, heat shock is given to cells, the temperature of shock is :

(1) 30°C (2) 42°C

(3) 60°C (4) 90°C

20. In gel electrophoresis technique the DNA fragments are forced to move through a medium towards :

(1) Anode (2) Cathode

(3) Both (1) and (2) (4) None of the above

21. Restriction enzymes belong to a larger class of enzymes called :

(1) Cellulases (2) Hydrolases

(3) Polymerases (4) Nucleases

22. Which one is not a basic step in genetically modifying an organism

(1) Identification of DNA with desirable genes

(2) Introduction of the identified DNA into the host

(3) Introduction of unidentified DNA into the host

(4) Maintenance of introduced DNA in the host and transfer of the DNA to its progeny.

23. The construction of the first recombinant DNA was done by ?

(1) Stanley cohen and Herbert Boyer

(2) Nathan's and Smith

(3) Maeselson and Stahl

(4) Allec Jeffreys

24. The most commonly used bioreactors are of

(1) Simple stirring type

(2) Sparged stirring type

(3) Both (1) and (2)

(4) None of the above

25. Downstream processing is :

(1) Process of separation of DNA fragments

(2) Process of joining the vector and the host DNA

(3) Process including separation and purification of the product

(4) Process of transferring DNA.

26. EcoRI recognises palindromic sequence

(1) $^{5'}$GGGCCC$^{3'}$ $^{3'}$CCCGGG (2) $^{5'}$-GAATTC-$^{3'}$ ^{3}-CTTAAG-$^{5'}$

(3) ^{5}-AAGCTT$^{3'}$ ^{3}-TTCGAA-^{5} (4) None of the above

27. The enzymes responsible for restricting the growth of bacteriophage in *E-coli* were isolated in 1963, these enzyme are :

(1) DNA ligases

(2) Alkaline phosphatases

(3) DNA polymerases

(4) Restriction endonuclease

28. Vector which is commonly used to transfer foreign gene in a crop plant is :

(1) Plasmids of *Salmonella*

(2) λ bacterio phage vector

(3) Ti plasmid of *Agrobacterium tumifaciens*

(4) None of the above

29. Father of genetic engineering is :

(1) Paul Berg

(2) Nathans

(3) Herbert Boyer

(4) Stanley Cohen

30. A definition of biotechnology that encompasses both traditional view and modern view are given by :
(1) European forum on Biotechnology
(2) European focus on Biotechnology
(3) European Federation of Biotechnology
(4) European Centre of Biotechnology

31. Which one of the following is must in Biotechnology?
(1) Restriction endonuclease + DNA ligase
(2) Restriction exonuclease + DNA polymerase
(3) Alkaline phosphate + DNA Ligase
(4) RNA polymerase + DNA polymerase

32. Taq. polymerase is obtaned from :
(1) *Bacillus thuriengiensis*
(2) *Thermus aquaticus*
(3) *Salmonella typhimurium*
(4) *Eischerichia coli*

33. To denature the DNA template in PCR it is heated to
(1) 70℃ (2) 54℃
(3) 80℃ (4) 94℃

34. Roman numbers following the names of restriction endonuclease indicate :
(1) The order in which the enzymes were isolated from that strain of bacteria
(2) strain of bacteria
(3) the order in which genus is taken to isolate the enzyme
(4) none of the above

35. Exonuclease removes nucleotides from
(1) Specific positions
(2) the ends of the DNA
(3) any where in DNA
(4) All the above

36. Alternative selectable markers developed to differentiate non-recombinants from recombinants on the basis of :
(1) Ability of separate them according to size
(2) Ability to produce colour in the presence of a chromogenic substrate
(3) Ability to not produce colour
(4) None of the above

37. In a chromosome there is a specific DNA sequence which is responsible for initiating replication is :
(1) Ori
(2) Palindromic sequence
(2) Initiation sequence
(4) Promoter sequence

38. First recombinant DNA was made by Stanley Cohen and Herbert Boyer in :
(1) 1968 (2) 1970
(3) 1972 (4) 1974

39. The first restriction endonuclease discovered, was
(1) Eco RI (2) Sam I
(3) Bam HI (4) Hind II

40. In the vector pBR322 there is
(1) One selectable marker
(2) Two selectable markers
(3) Three selectable markers
(4) None of the above

41. When the isolation of genetic material is done the RNA can be removed by treatment with :
(1) Protease
(2) Chitinase
(3) Ribonuclease
(4) Deoxyribonuclease

42. If DNA is inserted within the coding sequence of β-galactosidase enzyme then
(1) Non-recombinants will give blue coloured colonies in presence of chromogenic substrate
(2) Recombinant will give blue coloured colonies in presence of chromogenic substrate
(3) Both recombinants and non-recombinants give blue colour
(4) Non-recombinants do not produce colour due to insertional inactivation.

43. Knife of DNA :
(1) DNA - ligase
(2) Restriction endonuclease
(3) Exonuclease
(4) Peptidase

44. Large vessel in which raw materials are biologically converted into specific products, individual enzymes etc using microbial plant, animal or human cell is:

(1) Biotank

(2) Biovessel

(3) Bioreactor

(4) None of the above

45. Which one of the following is not required in PCR?

(1) Oligonucleotide primer

(2) DNA template

(3) Taq polymerase

(4) Helicase enzyme

46. Select incorrect statement :

(a) Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as *Lepidopterans, Coleopterans* and *Dipterans*

(b) RNA interference takes place in all eukaryotic organisms as a method of cellular defence

(c) Genetically modified crops are more sensitive to abiotic stresses

(d) Golden rice is protein enriched rice

(e) *Agrobacterium* is used to deliver desirable genes into animal cell

(1) only a (2) a, b and c

(3) a, c and d (4) c, d and e

47. The enzymes, which remove nucleotides from the ends of the DNA are :

(1) Exonuclease (2) Endonuclease

(3) Cellulase (4) Hydrolase

48. When a recombinant DNA is inserted within the coding sequence of an enzyme β-galatosidase, it results into inactivation of the enzyme gene this is called :

(1) Insert inactivation

(2) Insertional inactivation

(3) Insertional activation

(4) None of the above

49. Group of letters that form the same words when read both forward and backward is called :

(1) Palindrome (2) Same words

(3) Opposite words (4) None of the above

50. Which type of ends are produced by EcoRI ?

(1) Blunt ends (2) Sticky ends

(3) Both (1) and (2) (4) None of the above

51. The sequence which is responsible for controlling the copy number of the linked DNA is :

(1) Coding sequence

(2) Promoter sequence

(3) Terminator sequence

(4) Ori

52. In gel electrophoresis the DNA fragments separate according to size (smaller the fragment size, the faster it moves) this effect is called :

(1) Sieving effect (2) Movement effect

(3) Size effect (4) Spooling

53. Extraction, purification and packaging of products is collectively known as :

(1) Upstream processing

(2) Distillation

(3) Downstream processing

(4) Genetic engineering

54. You have three copies of a particular DNA molecule what technique would you use to make more copies of the molecule?

(1) Gel electrophoresis

(2) Sequencing

(3) PCR

(4) Restriction fragment analysis

55. Which of the following is best way to determine paternity ?

(1) Gene counting (2) Chromosome counting

(3) DNA finger printing (4) Protein analysis

56. Ti plasmid is present in :

(1) *E.coli*

(2) *Agrobacterium tumefaciens*

(3) *Agrobacterium orifaciens*

(4) *Vibrio cholerae*

57. Apart from DNA in the bacterial nucleoid, there is a circular extrachromosomal DNA in a bacterial cell called :

(1) Plasmid (2) Mesosomes

(3) Chromosome (4) None of these

58. DNA cannot pass through cell membrane as it is :

(1) hydrophilic (2) hydrophobic

(3) lipophilic (4) All the above

59. Which type of bioreactor is usually cylindrical or with a curved base to facilitate the mixing of the contents?

(1) Sparged tank bioreactor

(2) Stirred tank bioreactor

(3) Both (1) and (2)

(4) None of the above

60. The stickiness of the ends, facilitates the action of enzyme :

(1) DNA ligase

(2) DNA polymerase

(3) Alkaline phosphatase

(4) All of the above

61. Two enzymes responsible for restricting the growth of bacteriophage in *E.coli* were isolated in 1963, one of these cut DNA, while other :

(1) Add propyl group to DNA

(2) Add ethyl group to DNA

(3) Add methyl group to DNA

(4) None of the above

62. In PCR-technology primer is a :

(1) Small chemically synthesized oligonucleotide that are complementary to region of DNA

(2) Large chemically synthesized oligonucleotide that are identical to region of DNA

(3) Small segment of RNA

(4) None of these

63. In gel electrophoresis the DNA fragment separate according to their size through sieving effect, which is provided by :

(1) Agarose gel

(2) Nylone membrane

(3) Polyethylene glycol

(4) Ethidium Bromide

64. Which of the following method of vectorless gene transfer is suitable for plants ?

(1) Biolistics method

(2) Micro injection

(3) Liposome mediated

(4) Electroporation

65. The linking of antibiotic resistant gene in the plasmid vector become possible with the enzyme :

(1) Restriction endonuclease

(2) DNA ligase

(3) DNA polymerase

(4) RNA polymerase

66. In gel electrophoresis, separated bands of DNA are cut out from the agarose gel and extracted from the gel pieces, This step is known as :

(1) Blotting (2) Elution

(3) Cloning (4) Tagging

67. If any protein encoding gene is expressed in a hetero logous host then protein is known as :

(1) Recombinant gene

(2) Recombinant protein

(3) Selectable marker

(4) Homogenous protein

68. Which enzyme is used in PCR technique ?

(1) Thermostable DNA polymerase

(2) Thermostable RNA polymerase

(3) Thermostable ligase

(4) Thermostable vector

69. If the plasmid in the bacteria dose not have any insert then the colonies produce :

(1) Blue colour in the presence of X-gal

(2) No colour in the presence of X-gal

(3) Blue colour in the absence of X-gal

(4) None of the above

70. Which of the following is used to deliver desirable gene in to animal cell :

(1) Disarmed retrovirus

(2) Disarmed agrobacterium

(3) Disarmed *E.coli*

(4) Disarmed plant pathogen

71. *Agrobacterium tumifaciencs*, a pathogen of several dicot plants is able to deliver a piece of DNA and it is known as :

(1) R-DNA

(2) S-DNA

(3) M-DNA

(4) T-DNA

72. The normal *E-coli* cell carries resistance gene against:

(1) Ampicillin

(2) Chloramphenicol

(3) Tetracycline

(4) None of the above

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	1	3	4	1	3	1	3	1	1	3	4	3	2	1	4	3	2	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	3	1	3	3	2	4	3	1	3	1	2	4	1	2	2	1	3	4	2
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	3	1	2	3	4	4	1	2	1	2	4	1	3	3	3	2	1	1	2	1
Que.	61	62	63	64	65	66	67	68	69	70	71	72								
Ans.	3	1	1	1	2	2	2	1	1	1	4	4								

BIOTECHNOLOGY AND ITS APPLICATION

1. A transgenic food crop, which may help in solving the problem of night blindness in developing countries is :

(1) Bt soyabean

(2) Golden rice

(3) Flavr savr tomatoes

(4) Starlink maize

2. Bacterium *Bacillus thuringiensis* is widely used in contemporary biology as

(1) Source of industrial enzyme

(2) Indicator of water pollution

(3) Insecticide

(4) Agent for production of dairy products.

3. Bt toxin is produced by *Bacillus thuringiensis* which is :

(1) Bacterium (2) Protozoa

(3) Fungus (4) Virus

4. GEAC stands for :

(1) Gene evaluation approval committee

(2) Genetic engineering approval committee

(3) Genetic engineering applied committee

(4) Gene enhancement approval committe

5. Conventional methods to diagnose a disease are :

(1) Serum and urine analysis

(2) PCR

(3) ELISA

(4) All of the above

6. The first transgenic cow, which produced human protein enriched milk was named :

(1) Andy (2) Dolly

(3) Rosie (4) Dumpy

7. Milk of transgenic cow 'Rosie' contains a substance that was nutritionally more balanced product for human babies is :

(1) α-lactalbumin (2) β-lactalbumin

(3) γ-lactalbumin (4) δ-lactalbumin

8. Which peptide is not present in the mature insulin and is removed during maturation into insulin?

(1) A-peptide (2) B-peptide

(3) C-peptide (4) Both (1) and (2)

9. Two polypeptide chains of insulin are linked together by :

(1) disulphide bonds

(2) hydrogen bonds

(3) Phosphodiester bonds

(4) Glycosidic bonds

10. 'Flavr Savr' is a transgenic variety of :

(1) Potato (2) Tomato

(3) Soyabean (4) Rice

11. Golden rice is enriched in :

(1) Vitamin C (2) Vitamin D

(3) Vitamin A (4) Vitamin E

12. For the control of the cotton bollworms, which one of the genes is useful ?

(1) Cry 1 Ac (2) Cry 1 Ab

(3) Cry 1 Ad (4) All of these

13. Process involving silencing of a specific mRNA due to a complementary dsRNA molecule is called :

(1) Transcription (2) RNA interference

(3) DNA interference (4) None of these

14. *Meloidegyne incognitia* which infects the roots of tobacco plants causing a great reduction in yield is a :

(1) Nematode (2) Bacterium

(3) Virus (4) Alga

15. Toxin present in *Bacillus thuringiensis* does not kill the bacterium because it is inactive form what makes it active inside the insect ?

(1) the alkaline pH of the gut, which solubilises the crystals

(2) the acid pH of the gut

(3) the neutral pH of the gut

(4) All of the above

16. Crystals of Bt toxin produced by some bacteria do not kill the bacteria themselves because :

(1) bacteria are resistant to the toxin

(2) toxin is immature

(3) toxin is inactive

(4) bacteria enclose toxin in a special sac

17. Which one of the following statements about genetically engineered insulin is incorrect.

(1) *E.coli* is used for producing humulin

(2) Chains A, B were produced separately

(3) Eli lily company prepared it for first time

(4) Genetically engineered insulin has C-peptide

18. Infection by pathogen can be detected by the presence of antigens or by detecting the antibodies synthesised against the pathogen, on this principle a test is based which is ?

(1) PCR

(2) ELISA

(3) Both (1) and (2)

(4) None of the above

19. Indian parliament recently cleared, which amendment of the Indian patents bill,

(1) First amendment (2) Second amendment

(3) Third amendment (4) Fourth amendment

20. How many documented varities of basmati rice distinct for its unique aroma and flavour are grown in India?

(1) 27 varities (2) 25 varities

(3) 28 varities (4) 26 varities

21. Over 95 percent of all existing transgenic animals are :

(1) Pigs (2) Cows

(3) Fish (4) Mice

22. The organisation set up for making decisions regarding the validity of GM research and the safety of introducing GM organism for public services is :

(1) Genetic engineering approval committee

(2) Genetic engineering advanced company

(3) Genetic engineering applied committee

(4) None of these

23. Use of bio-resources by multinational companies and other organisations without proper autorisation from the countries and people concerned without compensatory payment is called :

(1) Biotheft

(2) Biopatent

(3) Biopiracy

(4) None of the above

24. Which of the following plants is genetically modified for improved nutritional value of food?

(1) Potato (2) Wheat

(3) Rice (4) Maize

25. Which animal is being used to test the safety of polio vaccine?

(1) Transgenic mice

(2) Transgenic pig

(3) Transgenic cow

(4) Transgenic cat

26. Cry1 Ab gene produces proteins which control?

(1) Bollworms

(2) Corn borer

(3) Both (1) and (2)

(4) None of the above

27. Nematode-specific genes were introduced into the host plant (tabacco plant) by using which vector?

(1) Plasmid vector

(2) Cosmid vector

(3) Bacteriophage vector

(4) BAC

28. Which one of the following statements are true regarding genetic modifications ?

(1) Genetic modifications reduced reliance on chemical pesticides

(2) Genetic modifications has enhanced nutritional value of food.

(3) Genetic modifications made crops more tolerant to abiotic stresses.

(4) All are correct

29. Critical research areas of biotechnology are :

(1) providing the best catalyst in the form of improved organism usually a microbe or pure enzyme.

(2) Creating optimal conditions through engineering for a catalyst to act.

(3) Down stream processing technologies to purify the protein/organic compound.

(4) All the above

30. Bacterium genetically engineered for cleaning oil spills is :

(1) *Eischerichia coli*

(2) *Pseudomonas putida*

(3) *Salmonella typhimurium*

(4) *Agrobacterium tumifaciens*

31. Bacterium which is known as 'Super bug' is :

(1) *Pseudomonas putida*

(2) *Salmonella*

(3) *Eischerichia*

(4) *Agrobacterium*

32. Animals those have had their DNA manipulated to possess and express an extra (foreign) gene are known as :

(1) Transgenic animals

(2) Genetically modified animals

(3) Both (1) and (2)

(4) None of the above

33. When cut by the restriction enzyme, the DNA fragments can be joined together using :

(1) DNA polymerase (2) DNA ligase

(3) Alkaline phosphatase (4) DNA gyrase

34. Genetically engineered human insulin is made in

(1) Fungus (2) Protista

(3) Plants (4) Bacterium

35. Genetically engineered bacteria are being used in commercial production of :

(1) melatonin (2) testosterone

(3) thyroxine (4) human insulin

36. Insulin consists of two short polypeptide chains, which are linked together by?

(1) Sulphide bridges (2) Peptide bridges

(3) Chloride bridges (4) Disulphide bridges

37. *Meloidegyne incognitia* infects the root of which plant ?

(1) Potato (2) Soyabean

(3) Tobacco (4) Tomato

38. Genetics modified crops (GMC) are useful in agriculture because :

(1) They are more tolerant to abiotic stresses

(2) They increase reliance on chemical pesticide

(3) They have reduced nutritional value

(4) All the above

39. The protien encoded by the gene cryIAc and cryIIAb, controls :

(1) Cotton bollworm (2) Corn borer

(3) Cotton borer (4) All the above

40. A nematode *Meloidegyne incognitia* infects the root of tobacco plant and causes a great reduction in yield. A novel strategy was adopted to prevent this infection which was based on the process of :

(1) DNA interference

(2) RNA interference

(3) PCR technique

(4) DNA test

41. In RNA interference (RNAi) :

(1) The silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevent translation of the mRNA :

(2) The silencing of a specific mRNA due to dsDNA

(3) The silencing of a specific mRNA due to tRNA

(4) All the above

42. Transgenic animals produces biological product such as α-1-antitrypsin, which is used to treat :

(1) Emphysema

(2) Cystic fibrosis

(3) Phenyl ketonuria

(4) Sickle cell anaemia

43. The first transgenic cow was 'Rosie', produces :

(1) Human protein-enriched milk (α-lactabumin)

(2) Human protein α-1 antitrypsin riched milk

(3) Human protein enriched milk (insulin)

(4) All the above

44. Transgenic mice are being developed for use in :

(1) Testing the safety of polio vaccines before they are used on human

(2) Molecular diagnosis of diseases

(3) Production of human protein enriched milk

(4) Production of human insulin

45. The technique that serves the purpose of early diagnosis of disease or pathogen :

(1) Recombinant DNA technology

(2) Polymerase chain reaction (PCR)

(3) Enzyme linked immuno sorbent assay (ELISA)

(4) All the above

46. Transgenic tobacco which is developed through RNA interference, prevents the infection of :

(1) A nematode - *Meloidegyne incognitia*

(2) A bacterium - *Pseudonomonas putida*

(3) A fungi - *Tricoderma*

(4) An insect

47. The first clinical gene therapy was given to a 4-year old girl with ADA deficiency in :

(1) 1984 (2) 1986

(3) 1992 (4) 1990

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	3	1	2	1	3	1	3	1	2	3	1	2	1	1	3	4	2	2	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	1	3	3	1	2	4	4	4	2	1	3	2	4	4	4	3	1	1	2
Que.	41	42	43	44	45	46	47													
Ans.	1	1	1	1	4	1	4													

ORGANISMS AND POPULATIONS

1. At organismic level which type of ecology exists
(1) Synecology
(2) Physiological ecology
(3) Behavioural ecology
(4) Systematic ecology

2. Formation of different kind of biomes depends on
(1) Light (2) Temperature
(3) Precipitation (4) Both 2 and 3

3. Regional and local variation within each biome lead to formation of –
(1) Climate (2) Weather
(3) Habitat (4) Niche

4. What is / are key elements that leads to so much variation in the physical and chemical conditions of different habitats?
(1) Temperature (2) Water and light
(3) Soil (4) All above

5. Temperature is the most ecologically relevant environmental factor. In which of the following habitats temperature can exceed 100° C ?
(1) Tropical desert
(2) Thermal springs
(3) Deep sea hydrothermal vents
(4) Both 2 and 3

6. Find out the correct match with reference to their habitat –
(1) Mango tree – Canada
(2) Snow leopards – Kerela forest
(3) Tuna fish – Temperate latitudes in oceans
(4) Lion – Gujarat

7. Temperature is one of the important abiotic factor. Significance of temperature on living beings can be realised through –
(1) Kinetics of enzymes
(2) Basal metabolism
(3) Physiological functions
(4) All the above

8. Next to temperature, water is the most important factor influencing the life of organism. Which among the following water characteristics is not an influencing character?
(1) pH (2) Turbidity
(3) Colour (4) Salinity

9. What is the salinity of hypersaline lagoons?
(1) 5 ppt
(2) 30–35 ppt
(3) More than 100 ppt
(4) Less than 50 ppt

10. Among the following algae that inhabit the sea, which is likely to be found in the deepest water?
(1) Red algae (2) Brown algae
(3) Green algae (4) Golden brown algae

11. Percolation and water holding capacity of soil does not depend on –
(1) Soil composition (2) Biota
(3) Size of grains (4) Aggregation

12. Which of the following is main reason for non occurence of small size conformers ?
(1) Karyoplasmic index
(2) Area : volume ratio
(3) Basal metabolism
(4) All the above

13. Which of the following alternative used by zooplanktons to overcome partial stressful conditions ?
(1) Migration (2) Diapause
(3) Hibernation (4) Aestivation

14. Majority of plants belongs to which of the following category
(1) Regulators
(2) Conformers
(3) Partial regulators
(4) Eurytherms

15. Shortening of ears, limbs and other extremeties of mammals so that heat loss can be minimise, is associated with –

(1) Allen's rule (2) Bergeman's rule

(3) Jordan's rule (4) Rensch's rule

16. Altitude sickness can be seen at which specific height ?

(1) < 3500 m (2) > 3500 m

(3) 5300 m (4) < 530 m

17. Which of the following is not an adaptation for altitude sickness ?

(1) Increase in red blood cell production

(2) Decrease in binding capacity of oxygen with haemoglobin

(3) Increased breathing rate

(4) Increased heart palpitations

18. Behavioural response to cope with variations in the environment can be seen in

(1) CAM plants

(2) Opuntia plant

(3) Desert lizards

(4) C_4 - plants

19. Population ecology is an important area of ecology because it links ecology with

(1) Population genetics (2) Evolution

(3) Physiognomy (4) Both 1 and 2

20. The tiger counting in our national parks and tiger reserves is often based on

(1) Pug marks (2) Manual counting

(3) Fecal pellets (4) Both 1 and 3

21. Match the following

(a)	Breeding once in life	(i)	Mammals
(b)	Breeding several times in life	(ii)	Oysters
(c)	Large number of small sized offsprings	(iii)	Most of birds
(d)	Small number of large sized offsprings	(iv)	Pacific salmon fish

(1) a(iv), b(ii), c(iii), d(i) (2) a(iv), b(iii), c(ii), d(i)

(3) a(iii), b(iv), c(ii), d(i) (4) a(ii), b(iii), c(iv), d(i)

22. Match the following given population interactions

(a)	+ / +	(i)	Predation
(b)	– / –	(ii)	Ammensalism
(c)	+ / –	(iii)	Competition
(d)	– / 0	(iv)	Mutualism

(1) a(i), b(ii), c(iii), d(iv) (2) a(i), b(iii), c(ii), d(iv)

(3) a(iv), b(iii), c(i), d(ii) (4) a(iv), b(iii), c(ii), d(i)

23. The famous 'Australian havoc' is associated with which of the following invasive species :-

(1) Nile pearch (2) Princkly pear cactus

(3) Red fox (4) Rabbit

24. In rocky intertidal communities removal of which of the following predator became the cause of destruction of 10 species of invertebrates?

(1) Monarch butterfly

(2) Starfish pisater

(3) *Paramecium aurelia*

(4) Abingdon tortoise

25. Phytophagous insects show which of the following interaction :-

(1) Predation

(2) Competetion

(3) Mutualism

(4) Commensalism

26. Which of the following cannot be used by prey for defence against predator :-

(1) Cardiac glycosides (2) Strychnine

(3) Nectar (4) Quinine

27. Regarding competition find out the wrong statement.

(1) Unrelated species could compete for same resource

(2) Fitness of one species is lowered in presence of other species

(3) Abingdon tortoise become extinct due to competitor starfish

(4) *Balanus* leads to exclusion of Chathamalus from rock coasts of scotland

28. Which of the following mean was used by warblers to avoid competition and coexist

(1) Difference in foraging activities

(2) Habitat fragmentation

(3) Competitive release

(4) All of these

29. Which of the following is not an adaptation of parasites for assurance of parasite host interaction

(1) Loss of sensory organs

(2) Presence of adhesive organs

(3) Loss of digestive system

(4) Low reproductive potential

30. Which of the following match is incorrect for commensalism interaction?

(1) Epiphytes on trees

(2) Egrets with grazing cattles

(3) Hermit crab and sea anemone

(4) Sea anemone and clown fish

31. During interaction between sea anemone and clown fish, which get benefitted :-

(1) Sea anemone only (2) Clown fish only

(3) Both (4) Neither 1 nor 2

32. Which of the following is not an example of coevolution?

(1) Orchid and Bee

(2) Opuntia and Cactophagous moth

(3) Yucca and Pronuba

(4) Wasp and Fig

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	4	3	4	4	4	4	3	3	1	2	2	2	2	1	2	4	3	4	4
Que.	21	22	23	24	25	26	27	28	29	30	31	32								
Ans.	2	3	2	2	1	3	3	1	4	3	2	2								

ECOSYSTEM

1. The components of ecosystem are seen to function as an unit, when we consider which of the folloiwng aspect

(1) Productivity and decomposition

(2) Decomposition and energy flow

(3) Productivity and energy flow

(4) Productivity, decomposition, energy flow and nutrient cycling

2. Amount of biomass or organic matter produced per unit area over a time period by plants is represented or expressed in terms of :-

(1) Weight $(g^{-2}) - g^{-2}\ yr^{-1}$

(2) Energy (Kcal m^{-2}) – Kcal m^{-2} / yr^{-1}

(3) Fresh weight

(4) Dry weight

3. The rate of biomass production is called productivity. It may be primary or secondary productivity. Primary productivity does not depends on

(1) Plants species inhabitating a particular area

(2) Predation

(3) Environmental factors

(4) Photosynthetic capacity

4. The annual net primary productivity of the whole biosphere is approximately

(1) 170 billion tons

(2) 50 billion tons

(3) 55 billion tons

(4) 710 billion tons

5. In net primary productivity of whole biosphere what is the contribution of oceans in billion ton ?

(1) 50 (2) 70

(3) 42 (4) 55

6. By digestion and pulverisation detritus get fragmented. This fragmentation step of decomposition helps in

(1) Increasing porocity of detritus

(2) Increasing surface area of detritus

(3) Increasing rate of sedimentation

(4) All of these

7. Leaching is one of the important step of decomposition. During leaching, which of the following nutrient go down into the soil horizon ?

(1) Water soluble inorganic substance

(2) Water insoluble inorganic substances

(3) Water soluble organic substances

(4) Both water soluble organic substances and inorganic substances

8. During decomposition, humification leads to accumulation of a dark coloured amorphous substance called humus. Which of the following is correct regarding humus ?

(1) Susceptible to microbial action

(2) Undergoes decomposition at an extremely high rate

(3) Colloidal in nature

(4) It promote compaction of soil

9. Which of the following chemical will not reduce the rate of decomposition of detritus

(1) Lignin (2) Chitin

(3) Cutin (4) Sugars

10. Which among the following factors are most important climatic factors that regulate decomposition through their effects on the activities of soil microbes

(1) Temp & soil moisture

(2) Temp and pH of soil

(3) Temp and oxygen

(4) pH of soil and oxygen

11. Decomposition is one of the important functional aspect of ecosystem. Which of the following statement is not correct for decomposition ?

(1) Warm and moist environment favours decomposition

(2) Nitrogen and sugar component favours decomposition

(3) Low temperature and anaerobiosis favours decomposition

(4) Decomposition is largely an oxygen requiring process

12. How much amount of incident solar radiation and PAR is capture as GPP respectively :-

(1) 1–5% and 2–10%

(2) 2–10% and 1–5%

(3) 1–4% and 2–8%

(4) 0.4–4% and 0.8–8%

13. In an aquatic ecosystem which type of food chain is major conduit for energy flow is

(1) GFC (2) Parasitic food chain

(3) DFC (4) Both 1 and 3

14. About flow of food energy by the process of eating and being eaten, which of the following is incorrect

(1) In an aquatic ecosystem, GFC is major conduit for energy flow

(2) In terrestrial ecosystem, DFC major conduit for energy flow

(3) In predator food chain there is increase in size of organism with trophic level

(4) DFC can never be connected with GFC

15. Mass of the living material at a particular time called as the standing crop. Biomass of a species is expressed in terms of ..... is more accurate

(1) Fresh weight

(2) Dry weight

(3) Both (1) and (2)

(4) Kcal m^{-2}/yr^{-1}

16. In an ecosystem based on production of nearly 6 million plants, how many top consumers can be supported ?

(1) 708000 (2) 354000

(3) 3 (4) 30000

17. In an ecosystem if dry weight of producers is 809 kgm^{-2}. Then what will be the biomass of tertiary consumers

(1) 37 dry weight (Kg m^{-2})

(2) 11 (Kg m^{-2})

(3) 15 kg m^{-2}

(4) 1.5 kgm^{-2}

18. Ecological pyramids show diagramatic representation of ecological parameters like number, biomass and energy. Which is / are limitation of ecological pyramids ?

(1) It does not take into account the same species belonging to two or more trophic levels

(2) It does not accomodate a food web

(3) Saprophytes are not given any place in pyramids

(4) All the above

19. The gradual and fairly predictable changes in the species composition of a given area is called :-

(1) Bioprospecting

(2) Biofortification

(3) Ecological succession

(4) Ecological assessment

20. The gradual and fairy predictable changes in the species composition of a given area is not characterised by :-

(1) Increase in number of species

(2) Increase in number of individuals of species

(3) Increase in biomass

(4) Decrease in niche specialisation

21. About succession, which of the following statement is correct :-

(1) In xerosere, xeric conditions progress to hydric conditions

(2) In hydrosere, mesic environment progress to hydric conditions

(3) In hydrosere, hydric environment progress to mesic conditions

(4) Abandoned farm lands show primary succession

22. All successions whether taking place in water or on land proceeds to which climax community :-

(1) Hydric (2) Xeric

(3) Mesic (4) Halophytic

23. Which of the following regulate the rate of release of nutrients into atmosphere

(1) Soil (2) Moisture

(3) pH and Temperature (4) All the above

24. What percentage of carbon constitute the dry weight of organisms

(1) 49 %
(2) 71 %
(3) 30 %
(4) 20 %

25. How much amount of carbon is fixed in biosphere through photosynthesis annually

(1) 2×10^{13} kg
(2) 4×10^{13} kg
(3) 5×10^{13} kg
(4) 6×10^{13} kg

26. Which among the following is not considered as an ecological service?

(1) Generation of fertile soil
(2) Wild life habitat formation
(3) Products of antibiotics
(4) Crop pollination

27. Robert Constanza and his colleagues have put price tags on natures life support services with refrence to this which of the following is not true?

(1) Fundamental ecosystem services = $ 33 trillions
(2) Soil formation = $ 16.5 trillions
(3) Nutrient cycling = less than $ 3.3 trillions
(4) Climate regulation = $ 5 trillions

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	4	4	2	1	4	2	4	3	4	1	3	1	1	4	2	3	4	4	3	4
Que.	21	22	23	24	25	26	27													
Ans.	3	3	4	1	2	3	4													

BIODIVERSITY AND CONSERVATION

1. Match the following–

(a)	Ants	(i)	20,000 species
(b)	Beetles	(ii)	>28,000 species
(c)	Fishes	(iii)	>3,00,000 species
(d)	Orchids	(iv)	>20,000 species

(1) a (iv), b (ii), c (iii), d (i)

(2) a (ii), b (iii), c (iv), d (i)

(3) a (iv), b (iii), c (ii), d (i)

(4) a (iii), b (ii), c (i), d (iv)

2. In biosphere, diversity (heterogeneity) exist at –

(1) Species level

(2) Genetic level

(3) Ecosystem level

(4) All the above

3. Term **"biodiversity"** was popularised by–

(1) Edward Wilson (2) Humboldt

(3) Tilman (4) Paul Ehrlich

4. In India, how many genetically different strains of rice and mango varieties are present –

(1) <50,000 and 1,0000 respectively

(2) 1000 and 50000 respectively

(3) >50.000 and 1.000 respectively

(4) >50,000 and 5,000 respectively

5. Find out incorrect statement –

(1) Biodiversity exists at all levels of biological organisation

(2) A single species cannot show more diversity at genetic level

(3) Western ghats have a greater amphibian species diversity

(4) India has greater ecological diversity than Scandinavian country.

6. According to IUCN (2004), how many plant and animal species have been described so far –

(1) <1.5 billion (2) >1.5 million

(3) 7.1 million (4) 7.1 billion

7. Which method is thought to be best for estimation of mirobial biodiversity –

(1) Bio statistical method

(2) Bio chemical or molecular method

(3) Paleobotanical method

(4) Culture method

8. What is the contribution of India in global species diversity –

(1) 2.4 % (2) 12 %

(3) 8.1 % (4) 7.1 %

9. Find out the right one –

(1) India has 7.1% species diversity

(2) India is one of the 22 mega diversity countries of world

(3) According to Robert May's global estimate only 22% of the total species have been recorded so for

(4) According to Robert May's estimation, more than 3,00,000 plant species yet to be discovered in India

10. Pattern of Biodiversity depends upon –

(1) Latitudinal gradient

(2) Altitudinal gradient

(3) Species - area relationship

(4) All of these

11. Which of the following is not the reason of great biodiversity in tropics ?

(1) Undisturbed climate for millions of years

(2) Less seasonal variations

(3) More nutritive soil

(4) More solar energy

12. Which statement is incorrect –

(1) There is increase in biodiversity from pole to equator

(2) There is increase in biodiversity from low altitude to high altitude

(3) There is directly proportional relationship between area & biodiversity

(4) Tropics has less seasonal, relatively more constant and predictable environment.

13. In species area relationship, on a logarithmic scale. The relationship is –

(1) Rectangular hyperbola

(2) Rectangular parabola

(3) Straight line

(4) Sigmoid

14. In equation log S = log C + Z log A, what is Z –

(1) Species richness

(2) Area

(3) Regression coefficient

(4) Y-intercept

15. For frugivorous birds and mammals in tropical forest of different continents, the slope(Z) is found to be :-

(1) 0.1 - 0.2 (2) 0.6 - 1.2

(3) 1.15 (4) 11.5

16. More species in community, tends to more stability than communities with less species'. It was supported by–

(1) David Tilman (2) Paul Ehrlich

(3) Humboldt (4) Tansley

17. "Rivet popper hypothesis" was proposed by –

(1) Tilman (2) Hombolat

(3) Paul Ehrlich (4) Mayer

18. Select the wrong match for extinction of species as per the IUCN red list 2004 –

(1) Vertibrates – 338

(2) Invertebrates - 359

(3) Plants - 87

(4) Prokaryotes - 2001

19. Careful analysis of records shows that extinction across taxa are not random, some groups like _____ appear to be more vulnerable to extinction.

(1) Reptiles (2) Mammals

(3) Aves (4) Amphibians

20. According to ecologists warn that if the present trends continue. Nearly half of the species on earth might be wiped out within how many years –

(1) 100 (2) 1000

(3) 50 (4) 500

21. In general, the loss of biodiversity in a region may not lead to –

(1) Decline in plant production

(2) Lowered resistance to environmental perturbations

(3) Constant pest and disease cycles

(4) Increased variability in certain ecosystem processes such as plant productivity

22. From 'The Evil Quartet' which of the following is most important cause of biodiversity loss –

(1) Habitat loss and fragmentation

(2) Over - exploitation

(3) Alien species invasion

(4) Co-extinctions

23. The most dramatic examples of habitat loss come from tropical rain forests. Once covering more that 14 present of earths land surface and now cover no more than –

(1) 5% (2) 6%

(3) 10% (4) 13%

24. The Amazon rain forest 'lungs of Planet" harbouring probably millions of species is being cut & cleared for which purpose –

(1) For cultivation of soyabeans

(2) For conversion to grasslands for raising beef cattles

(3) For cuttivation of Medicinal plants

(4) Both (1) and (2)

25. When large habitats are broken up in to small fragments due to human activities, which of the following get badly affected –

(1) Mammals and birds requiring large territories

(2) Animals with migratory habitats

(3) Animals with large bodysize

(4) Both (1) and (2)

26. Alien species invasion is one of the cause of Biodiversity loss. Introduction of Nile perch in victoria lake lead to extinction of more than 200 species of –

(1) Cichlid fish (2) Gambusia

(3) Salmon fish (4) Cat fish

27. The recent illegal introduction of which African fish becomes severe cause of threatening of indigenous cat fishes –

(1) Gambusia (2) Labeo

(3) *Clarias gariepinus* (4) Dog fish

28. Find out the following w.r.t. economic importance of biodiversity –

(1) Production of oxygen (2) Pollination

(3) Medicinal utility (4) All

29. When we conserve and protect the whole ecosystem, its biodiversity at all levels is called –

(1) In situ conservation (2) Ex -situ conservation

(3) On site conservation (4) Both (1) and (3)

30. Which among the following is the criterion for determination of 'Biodiversity hot spot' –

(1) Very high level of species richriess

(2) High degree of habitat loss and fragmentation

(3) High degree of Endemism

(4) All of the above

31. Find out the odd one with respect to 'Biodiversity hot spots' –

(1) Western Ghats & Srilanka

(2) Indo - Burma

(3) Himalaya

(4) Gangatic plains

32. Find out the wrong match –

(1) Bioshpere reserves – 14

(2) National parks – 85

(3) Wild life sanctuaries – 448

(4) Indian Biodiversity hot spot – 3

33. 'Sacred groves is also one of the important mean of Biodiversity conservation. In respect of this find out the odd one –

(1) Khasi and Jaintia – Meghalaya

(2) Aravalli hills – Rajasthan

(3) Sarguja, Chanda and Bastar – Mizoram

(4) Western Ghat – Maharashtra

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	3	4	1	3	2	2	2	3	3	4	3	2	3	3	3	1	3	4	4	1
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33							
Ans.	3	1	2	4	4	1	3	3	4	4	4	2	3							

ENVIRONMENTAL ISSUES

1. Pollution is undesirable changes in physical, chemical and biological properties. Which among the following is not air pollution induced plant injury –

(1) Reduced growth and yield

(2) Premature death of plant

(3) Clogging of Stomata

(4) Oxygen binding ability

2. Harmful effects of air polluntants depends on –

(1) Concentration of pollutants

(2) Duration of exposure

(3) Organism

(4) All the above

3. Electrostatic precipitators can remove how much percentage of particutate matter present in exhaust from a thermal power plant –

(1) 90% (2) 95%

(3) 99% (4) 100%

4. Scrubber is one of the device used to remove air pollutants. Which of the following gaseous pollutant can be remove through it –

(1) NOx (2) SO_2

(3) CO (4) CO_2

5. According to CPCB particulate size ≤ 2.5 micrometer are responsible for cousing greatest harm to human health. They can cause various harms except –

(1) Breathing and Respiratory symptoms

(2) Respiratory Irritation

(3) Inflammation and damage to lungs

(4) Lack of sleep

6. Which of the following devices is best for reducing emission of poisonous gases –

(1) Scrubber

(2) Catalytic convertors

(3) Electrostatic precipitators

(4) Filters

7. Which of the following is not associated with catalytic convertors –

(1) Conversion of unburnt hydrocarbon to CO_2 & H_2O

(2) Conversion of CO to CO_2

(3) Conversion of NO_x to N_2

(4) Conversion of SO_2 to S

8. Motor vehicles equipped with catalytic convertor should use unleaded petrol because –

(1) Lead in petrol inactivates the catalyst

(2) Lead in petrol act as catalyst

(3) Lead in petrol start to burn along petrol

(4) Lead in petrol leads to checking burning of petrol

9. In 1990s what was the rank of Delhi among the 41 most polluted cities of the world –

(1) 1^{st} (2) 2^{nd}

(3) 3^{rd} (4) 4^{th}

10. What was the main step taken in Delhi to control air pollution after Public interest litigation (PIL) filed in Supreme court. –

(1) Reduction in vehicles

(2) Use of CNG in buses instead of Diesel

(3) Use of catalytie convertor

(4) Plantation

11. All the buses of Delhi were converted to run on CNG by The end of 2002. Why CNG is better than Diesel–

(1) CNG burns most efficiently

(2) Little of it is left unburnt

(3) Inactivate catalyst of catalytical convertor

(4) Both (1) and (2)

12. What is the main problem with switching over to CNG from petrol and diesel ?

(1) High cost

(2) Difficulty of lying down pipelines to deliver CNG for uninterrupted supply

(3) Lack of suitable engines

(4) All the above

13. Beside use of CNG, simultaneously parallel steps taken in Delhi for reducing vehicular pollution, except–

(1) Use of unleaded petrol

(2) Use of low sulphur petrol and diesel

(3) Use of catalytic convertors

(4) Use of Electrostatic precipitators

14. The Government of India through a new auto fuel policy has laid out a road map to cut down vehicular pollution in Indian cities. Most stringent norms for fuels means–

(1) Steadily reducing the sulphur content in petrol

(2) Steadily reducing the aromatics content in petrol

(3) Steadily reducing the sulphur and aromatics content in petrol and diesel

(4) Steadily reducing the particulated matter in petrol and Diesel

15. According Euro-III norms, what should be the level of sulphur in diesel and petrol respectively –

(1) 150 ppm & 350 ppm

(2) 350 ppm & 150 ppm

(3) 250 ppm & 350 ppm

(4) 350 ppm & 250 ppm

16. According to Euro-III norms, which among the following standard is not true –

(1) Sulphur should be controlled at 350 ppm in Diesel

(2) Sulphur should be controlled at 150 ppm in petrol

(3) Aromatic hydrocarbons should be contained at 42 percent

(4) Sulphur content should be controlled at 50 ppm in petrol and diesel

17. The goal of Euro-IV norms, according to roadmap is to reduce sulphur to –

(1) 50 ppm in petrol and diesel

(2) 150 ppm in petrol and diesel

(3) 350 ppm in petrol and diesel

(4) 250 ppm in petrol and diesel

18. According to Euro-III norms, In petrol or diesel aromatic hydrocarbons are to be contained at 42 percent and goal of it to bring down the level of sulphur –

(1) 30% (2) 40%

(3) 42% (4) 35%

19. The Bharat Stage-III, norms for reducing the level of vehicular pollutant, is equivalent to –

(1) Euro-I norms (2) Euro-II norms

(3) Euro-III norms (4) Euro-IV norms

20. The Bharat Stage-III norms of Automobiles are applicable throughout the country from –

(1) 1 October 2005 (2) 1 October 2010

(3) 1 October 2009 (4) 1 October 2012

21. All automobiles and fuel petrol and diesel - were to have met the Euro-IV emission specification in 13 highly polluted cities of India from –

(1) 1 April 2002

(2) 1 April 2005

(3) 1 April 2010

(4) 1 April 2012

22. In India, the **Air (prevention and control of pollution) act,** came in to force in –

(1) 1972 (2) 1981

(3) 1987 (4) 1992

23. Air (Prevention and control of pollution) act 1981 was amended in 1987 to include _____ as an air pollutant. –

(1) Particulated matter

(2) Hydrocarbons

(3) Noise

(4) Radioactive pollutants

24. The Specific intensity of noise, which may damage ear drums and causes permanently impairing hearing ability is –

(1) Equal and less than 150 dB

(2) Equal and more than 150 dB

(3) Less than 20 dB

(4) Less than 80 dB

25. Noise as one of the important air pollutant is not responsible for –

(1) Sleeplessness

(2) Increase heart beating

(3) Altered breathing pattern

(4) Decreased oxygen carrying capacity

26. To safe guard our water resources, water (prevention and control of pollution) act was came in force –

(1) 1971 (2) 1972

(3) 1974 (4) 1981

27. Regarding to composition of waste water which among the following is not true –

(1) Suspended solid – sand, silt & clay

(2) Colloidal matter – faecal matter, bacteria & cloth

(3) Dissolved material – nitrate, ammonia & phosphate

(4) Dissolved material – faecal matter, bacteria & nutrients

28. Domestic sewage primarily contains –

(1) Suspended solid

(2) Colloidal matter

(3) Biodegradable matter

(4) Dissolved matter

29. About highly sewage polluted water, what is true –

(1) High DO and BOD

(2) High DO and less BOD

(3) Low DO and low BOD

(4) Low DO and high BOD

30. Unlike domestic sewage, waste water from industries like petroleum, paper manufacturing, metal extractions and processing etc. are often important source of water pollution. Out of these heavy metals are –

(1) Elements with density < 5 g/cm^3

(2) Elements with density < 5 g/cm^2

(3) Elements with density > 5g $/cm^3$

(4) Elements with density > 5g/ cm^2

31. Biomagnification - an increase in concentration of toxic substances at successive trophic levels, is well known for –

(1) DDT

(2) Mercury

(3) CO

(4) Both (1) and (2)

32. Pollutants from man's activities like effluents from industries and homes can radically accelerate the aging of lake, that is known as –

(1) Cultural Eutrophication

(2) Accelerated Eutrophication

(3) Rising Eutrophication

(4) Both (1) & (2)

33. Integrated waste water treatment plant of town of Arcata is supported by biologists of Humboldt state university, involves –

(1) Conventional sedimentation

(2) Filteration

(3) Series of six marshes

(4) All the above

34. Series of six connected marshes over 60 hectares of marshland, with appropriate plants, algae, fungi and bacteria is responsible for –

(1) Neutrilisation of pollutants

(2) Absorbtion of pollutants

(3) Assimillation of pollutants

(4) All the above

35. Practical ,hygienic efficient and cost effective solution to human waste disposal is –

(1) Eco - San toilets (2) Natural toilets

(3) Ecofriendly toilets (4) Ecological sanitation

36. Open dumps often serve as breeding ground for rats and flies and not burnt to completion. Which among the following were adopted as the substitute for open burning dumps –

(1) Eco san

(2) Electronic Burners

(3) Sanitary Landfills

(4) Solar Burners

37. Which among the following was developed by company of Ahmed Khan by a fine powder of recycled modified plastic –

(1) Polysterene (2) Polyblend

(3) Polyethylene (4) Polyplastic

38. With which polyblend was mixed to lay roads. Which show increased water repellant properties –

(1) Polysterene (2) Bitumen

(3) Polyethylene (4) Plastic

39. e - wastes generated in developed countries, is used by developing countries for recovery of –

(1) Gold (2) Nickel

(3) Copper (4) All the above

40. Which among the following is a cyclical, zero waste procedure, where waste products from one process are cycled in as nutrients for other processes–

(1) Integrated organic farming

(2) Integrated remedy for plastic waste

(3) Integrated waste water treatment

(4) Sustainable waste treatment

41. The unique idea of integrated organic farming was executed by–

(1) Ramesh Chandra Dagar

(2) Ahmed Khan

(3) Amrita Devi

(4) Sunderlal Bahuguna

42. Green house effect leads to deleterious changes in the environment and resulting in odd climatic changes. Which among the following is not the control measure of it –

(1) Cutting down the use of fossil fuel

(2) Improving efficiency of energy usage

(3) Increasing deforestration

(4) Slowing down the human population

43. The thickness of the ozone in a column of air from ground to top of the atmosphere is measured in terms of –

(1) Decibel (2) Dobson

(3) Deby (4) Dalton

44. Cl atoms released from CFC show degradation of ozone in which layer of atmoshpere –

(1) Trophosphere

(2) Stratosphere

(3) Ionosphere

(4) Thermosphere

45. Which among the following is not the influence of UV-B on human health –

(1) Aging of skin

(2) Inflammation of cornea

(3) Cancer of skin

(4) Depigmentation

46. Montreal Protocol was come in action from –

(1) 1987 (2) 1988

(3) 1989 (4) 1992

47. The ozone hole over Antarctica develops each year between –

(1) Late August and early October

(2) Early August and late October

(3) Early October and early December

(4) Late October and late December

48. Which of the following is not a result of water logging–

(1) Deposition of salt crust on land

(2) Collection of salts around root

(3) Damage to agriculture

(4) Leaching of salts

49. According to National forest policy (1988) of India has recommended 33% forest cover for plains and_____% area for hills.–

(1) 30% (2) 19.4%

(3) 67% (4) 76%

50. Slash and Burn agriculture are associated with –

(1) Deforestration (2) Jhum cultivation

(3) Shifting cultivation (4) All the above

51. Which among the following is not a result of Deforestration –

(1) Enhanced carbondioxide concentration

(2) loss of biodiversity

(3) Ozone depletion

(4) Disturbed hydrological cycle

52. Realising the significance of participation by local communities, the goverment of India in 1980s has introduced the concept of –

(1) Integrated Forest Management [IFM]

(2) Joint forest management [JFM]

(3) National Forest Policy

(4) Chipko movement

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	4	4	3	2	4	2	4	1	4	2	4	2	4	3	2	4	1	4	3	2
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	3	2	3	2	4	3	4	3	4	3	4	4	4	4	4	3	2	2	4	1
Que.	41	42	43	44	45	46	47	48	49	50	51	52								
Ans.	1	3	2	2	4	3	1	4	3	4	3	2								

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Standing: **Naveen Maheshwari (Director), Brajesh Maheshwari (Director & H.O.D. Physics)**

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