

Total No. of Printed Pages : 21

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A

PG-EE-2021

SET-X

SUBJECT : Life Sciences

12497

Sr. No. ....

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Date of Birth \_\_\_\_\_

Father's Name \_\_\_\_\_ Mother's Name \_\_\_\_\_

Date of Examination \_\_\_\_\_

\_\_\_\_\_  
(Signature of the Candidate)

\_\_\_\_\_  
(Signature of the Invigilator)

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1. All the following may be methods for the inhibition of microbial growth by antibiotics except :
  - (1) Antibiotics disrupt cell wall synthesis.
  - (2) Antibiotics interfere with cell membrane function.
  - (3) Antibiotics prevent the release of energy from ATP.
  - (4) Antibiotics inhibit the synthesis of protein.
2. In which of the following would you place the plants having vascular tissue lacking seeds ?
  - (1) Pteridophytes
  - (2) Gymnosperms
  - (3) Bryophytes
  - (4) Algae
3. Apomixis is a type of reproduction in plants in which ?
  - (1) Fertilization does not take place.
  - (2) Male nucleus takes part in fertilization.
  - (3) Embryo formation does not take place.
  - (4) Generative nucleus takes part in fertilization.
4. From which of the following algae, agar is commercially extracted ?
  - (A) Gracillaria
  - (B) Fucus
  - (C) Sargassum
  - (D) Gelidium
  - (E) Turbinaria
  - (1) C and E
  - (2) B and C
  - (3) D and E
  - (4) A and D



5. In which one of the following pairs of diseases is viral as well as transmitted by mosquitoes ?
- (1) Elephantiasis and dengue                      (2) Yellow fever and sleeping sickness  
(3) Encephalitis and sleeping sickness      (4) Yellow fever and dengue
6. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern Azolla is :
- (1) Tolypothrix    (2) Nostoc  
(3) Chlorella    (4) Anabaena
7. Ionophores are :
- (1) the gating mechanisms associated with the transport of ions.  
(2) intrinsic proteins that passively transport ions.  
(3) chemicals that form pores in the plasma membrane and allow ions to cross.  
(4) intrinsic proteins that actively transport ions.
8. The trans Golgi network is :
- (1) the intermediate compartment between the ER and the Golgi.  
(2) the part of the Golgi where fusion of vesicles from the ER occurs.  
(3) where sorting of proteins to the lysosomes, plasma membrane and cell exterior occurs.  
(4) the network of vesicles that transport proteins between Golgi cisternae.
9. Most human cells are diploid with total DNA content of  $2C$ . The DNA content increases to  $4C$  before the onset of mitosis. At anaphase, the DNA content of each cluster will be :
- (1)  $4C$   
(2)  $2C$   
(3)  $1C$   
(4)  $3C$

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10. Malignant cancer cells have all of the following properties except :
- (1) unregulated cell division
  - (2) inhibition of angiogenesis
  - (3) resistance to apoptosis
  - (4) cellular immortality
11. Cytokines are produced by cells of the immune system in response to various physiological stimuli that :
- (1) modulate cell function through subsequent cell differentiation or cell proliferation.
  - (2) facilitate cell lysis.
  - (3) cause glycosylation of immunoglobulins.
  - (4) cause histamine release.
12. In what way, if any, does the chromosomal determination of sex differ in *Drosophila* and humans ?
- (1) In humans, the Y-chromosome determines maleness, with female development being a default process, but in *Drosophila*, the presence of two X-chromosomes determines femaleness, and male development is the default process.
  - (2) In humans, the Y-chromosome determines maleness, but in *Drosophila*, the ratio of X-chromosomes to autosomes determines maleness or femaleness.
  - (3) In humans, it is the presence of only one X-chromosome that triggers male development and two X-chromosomes trigger female development, just as occurs in *Drosophila*.
  - (4) In human males, a single Y-chromosome is present in the absence of an X-chromosome, while in *Drosophila*, a single X-chromosome is present in the absence of a Y-chromosome.
13. How many generations are present in the seed of gymnosperm ?
- |       |       |
|-------|-------|
| (1) 2 | (2) 3 |
| (3) 1 | (4) 4 |



14. Bryophytes are *not* characterised by :
- (1) Sporophyte parasitic over gametophyte
  - (2) Independent gametophyte
  - (3) Absence of vascular tissues
  - (4) Independent sporophyte
15. Stems and leaves of bryophytes are :
- (1) Analogous to vascular plants
  - (2) Homologous to vascular plants
  - (3) Analogous to algae & fungal thallus
  - (4) None of these
16. The dominant photosynthetic phase in the life-cycle of pteridophyta is equivalent to the :
- (1) Gametophytic phase of bryophyta
  - (2) Sporophytic phase of bryophyta
  - (3) Gametophytic phase of pteridophytes
  - (4) Gametophytic phase of gymnosperm
17. In Pteridophytes, reduction division occurs when :
- (1) Prothallus is formed
  - (2) Sex organs are formed
  - (3) Spores are formed
  - (4) Gametes are formed
18. In which of the following gametophyte is not independent free living ?
- (1) Pinus
  - (2) Funaria
  - (3) Marchantia
  - (4) Pteris

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19. Seasonal activity of vascular cambium is influenced by many factors, except :
- (1) Geographical location of plant
  - (2) Relative humidity and temperature
  - (3) Photoperiod and water supply
  - (4) Leaf orientation
20. When secondary growth is initiated in dicot stem, what will happen first ?
- (1) The cells of cambium divide periclinally to form xylem mother cells
  - (2) Interfascicular cambium join with intrafascicular cambium
  - (3) Parenchymatous cells present between vascular bundles become meristematic
  - (4) Pith get obliterated
21. Select one of the following of important features distinguishing Gnetum from Cycas and Pinus and showing affinities with angiosperms :
- (1) Embryo development and apical meristem
  - (2) Absence of resin duct and leaf venation
  - (3) Presence of vessel elements and absence of archegonia
  - (4) Perianth and two integuments
22. Which one of the following is heterosporous ?
- (1) Equisetum
  - (2) Dryopteris
  - (3) Salvinia
  - (4) Adiantum
23. A system of classification, in which a large number of traits are considered, is :
- (1) Natural system
  - (2) Phylogenetic system
  - (3) Artificial system
  - (4) Synthetic system



24. The book 'Genera plantarum' was written by :
- (1) Engler & Prantl (2) Bentham & Hooker  
(3) Bessey (4) Hutchinson
25. Phylogenetic classification is one which is based on :
- (1) Overall similarities (2) Utilitarian system  
(3) Habits of plants (4) Common evolutionary descent
26. Endosperm of gymnosperm is ontogenetically similar to angiospermic :
- (1) Endosperm (2) Embryo sac  
(3) Archegonium (4) Megasporangia
27. Flowering plants are more successful than other members of the plant world because :
- (1) They are large and have a good vascular tissue system  
(2) They carry out variety of pollination mechanism  
(3) The protected plant embryo can survive in the period of unfavourable conditions  
(4) All of these
28. A. Heterospory is found in all members of pteropsida :  
B. Selaginella is advance among pteridophytes as it produces seeds  
C. Pinus leaves are monomorphic, pinnate compound and have sunken stomata as adaptation against transpiration  
D. Sporic meiosis is characteristic of life cycle in many organisms like Volvox, Chlamydomonas and Ulothrix.
- (1) All are incorrect (2) Both B and C are correct  
(3) Only B is correct (4) Only D is incorrect
29. Which phytohormone is synthesised in ripened fruits ?
- (1) ABA (2) Auxin  
(3) Cytokinin (4) Ethylene

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30. Which of the following is incorrect about ethylene ?
- (1) Promotes root hair formation
  - (2) It is natural and derivative of carotenoids
  - (3) It increases the number of female flowers
  - (4) It causes synchronisation of flowering and fruit set in pineapples
31. Select a correct match :
- (1) GA, – Early seed production in conifers
  - (2) Cytokinin – Synchronise fruit set in pineapples
  - (3) Auxin – Overcomes senescence
  - (4) Ethylene – Seed maturation and development
32. Where is the respiratory electron transport system (ETS) located in plants ?
- (1) Intermembrane space
  - (2) Mitochondrial matrix
  - (3) Outer mitochondrial membrane
  - (4) Inner mitochondrial membrane
33. Respiratory Quotient (RQ) value of tripalmitin is :
- (1) 0.9
  - (2) 0.7
  - (3) 0.07
  - (4) 0.09
34. Conversion of glucose to glucose-6-phosphate, the first irreversible reaction of glycolysis, is catalyzed by :
- (1) Aldolase
  - (2) Hexokinase
  - (3) Enolase
  - (4) Phosphofructokinase



35. How many ATP molecules will be produced in muscles by aerobic oxidation of one molecule of glucose ?
- (1) 2 (2) 4  
(3) 36 (4) 34
36. Plants, but not animals, can convert fatty acids to sugars by a series of reactions called :
- (1) Photosynt  
(2) Krebs cycle  
(3) Glycolysis  
(4) Glyoxylate cycle
37. Pasteurization is a process, which means heating of drinks. It is carried out, at what temperature and for how much duration ?
- (1) 70°C and 60 minutes  
(2) 80°C and 30 minutes  
(3) 120°C and 60 minutes  
(4) 60-70°C and 30 minutes
38. Lenticels are involved in :
- (1) Gaseous exchange (2) Food Transport  
(3) Photosynthesis (4) Transpiration
39. Guttation is the result of :
- (1) Osmosis (2) Root pressure  
(3) Diffusion (4) Transpiration
40. Photosynthetic Active Radiation (PAR) has the following range of wavelengths :
- (1) 400-700 nm  
(2) 450-950 nm  
(3) 340-450 nm  
(4) 500-600 nm

PG-EE-2021/(Life Sciences)(SET-X)/(A)



A

41. The C 4 plants are photosynthetically more efficient than C 3 plants because :
- (1) They have more chloroplasts
  - (2) The  $\text{CO}_2$  compensation point is more
  - (3)  $\text{CO}_2$  generated during photorespiration is trapped and recycled through PEP carboxylase
  - (4) The  $\text{CO}_2$  efflux is not prevented
42. The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by :
- (1) T.H. Morgan
  - (2) Gregor J. Mendel
  - (3) Alfred Sturtevant
  - (4) Sutton Boveri
43. What is the genetic disorder in which an individual has an overall masculine development gynaecomastia, and is sterile ?
- (1) Turner's syndrome
  - (2) Klinefelter's syndrome
  - (3) Edward syndrome
  - (4) Down's syndrome
44. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by :
- (1) Only daughters
  - (2) Only sons
  - (3) Both sons and daughters
  - (4) Only grandchildren
45. Which one of the following discoveries resulted in a Nobel Prize ?
- (1) X-rays induce sex-linked recessive lethal mutations
  - (2) Cytoplasmic inheritance
  - (3) Recombination of linked genes
  - (4) Genetic engineering

PG-EE-2021/(Life Sciences)(SET-X)/(A)

P. T. O.



46. Normally DNA molecule has A-T, G-C pairing. However, these bases can exist in alternative valency status owing to rearrangements called :
- (1) Frame-shift mutation (2) Tautomerisational mutation  
(3) Analog substitution (4) Point mutation
47. The most striking example of point mutation is found in a disease called :
- (1) Down's syndrome (2) Sickle cell anaemia  
(3) Edward syndrome (4) Night blindness
48. When two genetic loci produce identical phenotypes in cis and trans position, they are considered to be :
- (1) Multiple alleles  
(2) The parts of same gene  
(3) Pseudoalleles  
(4) Different genes
49. What map unit (Centimorgan) is adopted in the construction of genetic maps ?
- (1) A unit of distance between two expressed genes representing 10% cross over  
(2) A unit of distance between two expressed genes representing 100% cross over  
(3) A unit of distance between genes on chromosomes, representing 1 % cross over  
(4) A unit of distance between genes on chromosomes, representing 50% cross over
50. Expressed Sequence Tags (ESTS) refers to :
- (1) Genes expressed as RNA (2) Polypeptide expression  
(3) DNA polymorphism (4) Novel DNA sequences
51. In history of biology, human genome project led to the development of :
- (1) Bioinformatics  
(2) Eugeneics  
(3) Biotechnology  
(4) Genetic engineering

PG-EE-2021/(Life Sciences)(SET-X)/(A)



A

52. If there are 999 bases in an RNA that codes for a protein with 333 amino acids and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered ?
- (1) 1 (2) 11  
(3) 33 (4) 333
53. The final proof for DNA as the genetic material came from the experiments of :
- (1) Griffith  
(2) Hershey and Chase  
(3) Avery, Mcleod and McCarty  
(4) Hargobind Khurana
54. Which one of the following is not a gaseous biogeochemical cycle in ecosystem ?
- (1) Nitrogen cycle (2) Carbon cycle  
(3) Sulphur cycle (4) Phosphorus cycle
55. Which of the following ecological pyramids is generally inverted ?
- (1) Pyramid of numbers in grassland  
(2) Pyramid of energy  
(3) Pyramid of biomass in a forest  
(4) Pyramid of biomass in a sea
56. What type of ecological pyramid would be obtained with the following data ?
- Secondary consumer : 120 g  
Primary consumer : 60g  
Primary producer : 10 g
- (1) Inverted pyramid of biomass  
(2) Pyramid of energy  
(3) Upright pyramid of biomass  
(4) Upright pyramid of numbers

PG-EE-2021/(Life Sciences)(SET-X)/(A)

P. T. O.



57. Which ecosystem has the maximum biomass ?
- (1) Forest ecosystem (2) Grassland ecosystem  
(3) Pond ecosystem (4) Lake ecosystem
58. Limit of BOD prescribed by Central Pollution Control Board for the discharge of industrial and municipal waste water into natural surface water, is :
- (1) < 3.0 ppm (2) < 10 ppm  
(3) < 100 ppm (4) < 30 ppm
59. More than 70% of world's freshwater is contained in :
- (1) Antarctica  
(2) Glaciers and Mountains  
(3) Greenland  
(4) Polar ice
60. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called :
- (1) Convergent evolution  
(2) Non-random evolution  
(3) Adaptive radiation  
(4) Natural selection
61. The tendency of population to remain in genetic equilibrium may be disturbed by :
- (1) Lack of migration (2) Lack of mutations  
(3) Lack of random mating (4) Random mating
62. The two antibiotic resistance genes on vector pBR322 are for :
- (1) Tetracycline and Kanamycin  
(2) Ampicillin and Tetracycline  
(3) Ampicillin and Chloramphenicol  
(4) Chloramphenicol and Tetracycline

PG-EE-2021/(Life Sciences)(SET-X)/(A)



A

63. Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes ?

- (1) BOD incubator (2) Sludge digester  
(3) Industrial oven (4) Bioreactor

64. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :

- (1) Isopropanol  
(2) Chilled ethanol  
(3) Methanol at room temperature  
(4) Chilled chloroform

65. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.

- (1) The enzyme cuts DNA molecule at identified position within the DNA.  
(2) The enzyme binds DNA at specific sites and cuts only one of the two strands.  
(3) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.  
(4) The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.

66. The correct order of steps in Polymerase Chain Reaction (PCR) is :

- (1) Extension, Denaturation, Annealing  
(2) Annealing, Extension, Denaturation  
(3) Denaturation, Annealing, Extension  
(4) Denaturation, Extension, Annealing

67. Enzyme used in ELISA test is :

- (1) Endonuclease  
(2) Ligase  
(3) Peroxidase  
(4) Polymerase

PG-EE-2021/(Life Sciences)(SET-X)/(A)

P. T. O.



68. What will be the  $p\text{CO}_2$  and  $p\text{O}_2$  in atmospheric air as compared to alveoli respectively ?
- (1) Low and high
  - (2) High and low
  - (3) High and high
  - (4) Low and low
69. In ureotelic animals, urea is formed by :
- (1) Krebs's cycle
  - (2) EM pathway
  - (3) Ornithine cycle
  - (4) Cori's cycle
70. Which one of the following mammalian cells is not capable of metabolising glucose to carbon-dioxide aerobically ?
- (1) Red blood cells
  - (2) White blood cells
  - (3) Unstriated muscle cells
  - (4) Liver cells
71. All enzymes are proteins except :
- (1) Trypsin
  - (2) Pepsin
  - (3) Steapsin
  - (4) Ribozyme and Ribonuclease-P
72. Which of the following is the best evidence for the lock and key theory of enzyme action ?
- (1) All isolated enzymes have been identified as protein
  - (2) Compounds similar in structure to the substrate inhibit the reaction
  - (3) Enzymes are found in living organisms and speed up certain reaction
  - (4) Enzymes determine the direction of a reaction

PG-EE-2021/(Life Sciences)(SET-X)/(A)



A

73. Co-enzyme is :
- (1) Always a protein
  - (2) Often a metal
  - (3) Always an inorganic compound
  - (4) Often a vitamin
74. A person is eating boiled potato. His food contains :
- (1) Cellulose, which can be digested by cellulase
  - (2) Starch, which cannot be digested
  - (3) Lactose, which cannot be digested
  - (4) DNA, which can be digested by pancreatic DNAase
75. Which of the following is a reducing sugar ?
- (1) Galactose
  - (2) Gluconic acid
  - (3) B-methyl galactoside
  - (4) Sucrose
76. Which of the following hormones is not secreted by duodenum to inhibit the gastric motility ?
- (1) GIP
  - (2) Enterogastrone
  - (3) Secretin
  - (4) Enterokinase
77. In case of vertebrates, lacteals are found in :
- (1) Oesophagus
  - (2) Ear
  - (3) Small intestine
  - (4) Ischium

PG-EE-2021/(Life Sciences)(SET-X)/(A)

P. T. O.





78. The movement of ions against the concentration gradient will be :
- (1) Active transport
  - (2) Osmosis
  - (3) Diffusion
  - (4) All of these
79. Vomiting centre is located in the :
- (1) Medulla oblongata
  - (2) Stomach and sometimes in duodenum
  - (3) GI tract
  - (4) Hypothalamus
80. Which one of the following vitamins can be synthesised by bacteria inside the gut ?
- |                    |       |
|--------------------|-------|
| (1) D              | (2) A |
| (3) B <sub>1</sub> | (4) C |
81. Which one of the following is a protein deficiency disease ?
- (1) Kwashiorkor
  - (2) Night blindness
  - (3) Eczema
  - (4) Cirrhosis
82. Which of the following statement is incorrect wrt inbreeding ?
- (1) Inbreeding increases homozygosity
  - (2) Inbreeding exposes harmful recessive gene that are eliminated by selection
  - (3) Inbreeding helps in accumulation of deleterious alleles and elimination of desirable alleles
  - (4) Inbreeding helps in developing a pure-line animal

PG-EE-2021/(Life Sciences)(SET-X)/(A)



A

17

83. What is correct to say about the hormone action in humans ?
- (1) In females, FSH first binds with specific receptors on ovarian cell membrane
  - (2) FSH stimulates the secretion of estrogen and progesterone
  - (3) Glucagon is secreted by B-cells of Islets of langerhans and stimulates glycogenolysis
  - (4) Secretion of thymosins is stimulated with aging
84. Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum :
- (1) Protozoa
  - (2) Coelenterata
  - (3) Porifera
  - (4) Mollusca
85. Which of the following characteristics is mainly responsible for diversification of insects on land ?
- (1) Eyes
  - (2) Segmentation
  - (3) Bilateral symmetry
  - (4) Exoskeleton
86. Which of the following endoparasites of humans does show viviparity ?
- |                                    |                                  |
|------------------------------------|----------------------------------|
| (1) <i>Ascaris lumbricoides</i>    | (2) <i>Ancylostoma duodenale</i> |
| (3) <i>Enterobius vermicularis</i> | (4) <i>Trichinella spiralis</i>  |
87. Select the Taxon mentioned which represents both marine and fresh water species.
- (1) Echinoderms
  - (2) Ctenophora
  - (3) Cephalochordata
  - (4) Cnidaria

PG-EE-2021/(Life Sciences)(SET-X)/(A)

P. T. O.



88. Which one of the following living organisms completely lacks a cell wall ?
- (1) Cyanobacteria
  - (2) Sea-fan(Gorgonia)
  - (3) Saccharomyces
  - (4) Blue-green algae
89. Biological organisation starts with :
- (1) Cellular level
  - (2) Organismic level
  - (3) Atomic level
  - (4) Submicroscopic molecular level
90. Peripatus is a connecting link between :
- (1) Coelenterata and Porifera
  - (2) Ctenophora and Platyhelminthis
  - (3) Mollusca and Echinodermata
  - (4) Annelida and Arthropoda
91. Which one of the following organisms is scientifically correctly named, correctly Printed according to the International Rules of Nomenclature and correctly described ?
- (1) E.coli – Full name Entamoeba coli, a commonly occuring bacterium in human intestine
  - (2) Musca domestica – The common house lizard, a reptile
  - (3) Plasmodium falciparum – A protozoan pathogen causing the most serious type of malaria
  - (4) Felis tigris – The Indian tiger, well protected in Gir forests
92. What is true for mammalia ?
- (1) Platypus is oviparous
  - (2) Bats have feathers
  - (3) Elephant is ovoviviparous
  - (4) Diaphragm is absent in them

PG-EE-2021/(Life Sciences)(SET-X)/(A)



93. Which of the following character is present in all chordates ?
- (1) Diaphragm
  - (2) Vertebral column
  - (3) Pharyngeal gill clefts
  - (4) Dorsal solid nerve cord
94. In which of the following animal post anal tail is found ?
- (1) Earthworm
  - (2) Lower invertebrate
  - (3) Scorpion
  - (4) Snake
95. In which of the following notochord is present in embryonic stage ?
- (1) All chordate
  - (2) Some chordates
  - (3) Vertebrates
  - (4) Non chordates
96. Given below are four matches of an animal and its kind of respiratory organ :
- A. Silver fish – Trachea
  - B. Scorpion – Book lung
  - C. Sea squirt – Pharyngeal gills
  - D. Dolphin – Skin
- The correct matches are
- (1) A and B
  - (2) A, B and C
  - (3) B and D
  - (4) C and D



97. Which one of the following phyla is correctly matched with its two general characteristics ?
- (1) Mollusca – Normally oviparous and development through a trochophore or veliger larva
  - (2) Arthropoda – Body divided into head, thorax and abdomen and respiration by tracheae
  - (3) Chordata – Notochord at some stage and separate anal and urinary openings to the outside
  - (4) Echinodermata – Pentamerous radial symmetry and mostly internal fertilization
98. Which of the following are referred as non-vertebrate chordates ?
- (1) Ciona, Ascidia, Amphioxus
  - (2) Lamprey, Myxine, Shark
  - (3) Scoliodon, Torpedo, Trygon
  - (4) Pristis, Branchiostoma, Scyllium doutorostomes?
99. Lateral line sense organs are absent in :
- (1) Tadpole larva of frog
  - (2) Bony fishes
  - (3) Reptiles
  - (4) Cartilaginous fishes
100. The termination of gastrulation is indicated by :
- (1) closure of neural tube
  - (2) closure of blastopore
  - (3) obliteration of archenteron
  - (4) obliteration of blastocoel

PG-EE-2021/(Life Sciences)(SET-X)/(A)



Entrance Exam 2021 Answer Key held on dated 21/09/2021 at  
10:00 am  
Subjects of Life Sciences

Question No.	A	B	C	D
1	3	1	1	4
2	1	2	3	2
3	1	2	2	4
4	4	4	3	4
5	4	1	1	1
6	4	1	2	4
7	3	3	2	3
8	3	1	3	1
9	2	4	3	1
10	2	3	1	3
11	1	3	3	1
12	2	1	3	3
13	2	3	1	2
14	4	4	2	4
15	1	1	4	4
16	1	2	2	1
17	3	1	4	1
18	1	1	1	4
19	4	3	4	4
20	3	4	2	1
21	3	4	3	1
22	3	2	1	4
23	1	4	1	2
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26	2	4	4	4
27	4	3	3	4
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29	4	1	2	2
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31	1	1	3	1
32	4	3	1	2
33	2	2	3	2
34	2	4	4	4
35	3	4	1	1
36	4	1	2	1
37	4	1	1	3
38	1	4	1	1
39	2	4	3	4
40	1	1	4	3
41	1	1	3	3
42	3	4	2	1
43	2	2	4	3
44	3	2	2	4
45	1	3	2	1
46	2	4	3	2
47	2	4	3	1
48	3	1	1	1
49	3	2	3	3
50	1	1	1	4

*Chit*  
21/09/2021

*Umy*  
Page 1 of 2  
21/9/2021

*Syadav*  
21/9/2021

*Babits*  
21.9.21



**Entrance Exam 2021 Answer Key held on dated 21/09/2021 at  
10:00 am**

Question No.	A	B	C	D
51	1	3	1	3
52	3	3	4	2
53	2	1	2	4
54	4	2	2	2
55	4	4	3	2
56	1	2	4	3
57	1	4	4	3
58	4	1	1	1
59	4	4	2	3
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66	3	2	4	4
67	3	2	3	4
68	1	3	1	2
69	3	3	1	4
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83	1	1	2	1
84	3	4	4	2
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87	4	3	3	4
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91	3	1	1	3
92	1	3	3	1
93	3	1	2	1
94	4	3	4	4
95	1	4	4	4
96	2	4	1	4
97	1	4	1	3
98	1	2	4	3
99	3	4	4	2
100	4	4	1	2

*Qulp*  
*21/09/21*

*Key*  
*21/9/2021* Page 2 of 2

*Hyadaw*  
*21/9/2021*

*Babia*  
*21/9/21*



Total No. of Printed Pages : 21

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU  
ARE ASKED TO DO SO)

**B**

**SET-X**

**PG-EE-2021**

**SUBJECT : Life Sciences**

**12494**

Sr. No. ....

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Date of Birth \_\_\_\_\_

Father's Name \_\_\_\_\_ Mother's Name \_\_\_\_\_

Date of Examination \_\_\_\_\_

\_\_\_\_\_  
(Signature of the Candidate)

\_\_\_\_\_  
(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE  
STARTING THE QUESTION PAPER.**

1. **All questions are compulsory.**
2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only **Black** or **Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. **Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

**PG-EE-2021/(Life Sciences)(SET-X)/(B)**



1. Cytokines are produced by cells of the immune system in response to various physiological stimuli that :
  - (1) modulate cell function through subsequent cell differentiation or cell proliferation.
  - (2) facilitate cell lysis.
  - (3) cause glycosylation of immunoglobulins.
  - (4) cause histamine release.
  
2. In what way, if any, does the chromosomal determination of sex differ in *Drosophila* and humans ?
  - (1) In humans, the Y-chromosome determines maleness, with female development being a default process, but in *Drosophila*, the presence of two X-chromosomes determines femaleness, and male development is the default process.
  - (2) In humans, the Y-chromosome determines maleness, but in *Drosophila*, the ratio of X-chromosomes to autosomes determines maleness or femaleness.
  - (3) In humans, it is the presence of only one X-chromosome that triggers male development and two X-chromosomes trigger female development, just as occurs in *Drosophila*.
  - (4) In human males, a single Y-chromosome is present in the absence of an X-chromosome, while in *Drosophila*, a single X-chromosome is present in the absence of a Y-chromosome.
  
3. How many generations are present in the seed of gymnosperm ?

(1) 2	(2) 3
(3) 1	(4) 4
  
4. Bryophytes are *not* characterised by :
  - (1) Sporophyte parasitic over gametophyte
  - (2) Independent gametophyte
  - (3) Absence of vascular tissues
  - (4) Independent sporophyte

5. Stems and leaves of bryophytes are :
- (1) Analogous to vascular plants
  - (2) Homologous to vascular plants
  - (3) Analogous to algae & fungal thallus
  - (4) None of these
6. The dominant photosynthetic phase in the life-cycle of pteridophyta is equivalent to the :
- (1) Gametophytic phase of bryophyta
  - (2) Sporophytic phase of bryophyta
  - (3) Gametophytic phase of pteridophytes
  - (4) Gametophytic phase of gymnosperm
7. In Pteridophytes, reduction division occurs when :
- (1) Prothallus is formed
  - (2) Sex organs are formed
  - (3) Spores are formed
  - (4) Gametes are formed
8. In which of the following gametophyte is not independent free living ?
- (1) Pinus
  - (2) Funaria
  - (3) Marchantia
  - (4) Pteris
9. Seasonal activity of vascular cambium is influenced by many factors, except :
- (1) Geographical location of plant
  - (2) Relative humidity and temperature
  - (3) Photoperiod and water supply
  - (4) Leaf orientation

10. When secondary growth is initiated in dicot stem, what will happen first ?
- (1) The cells of cambium divide periclinally to form xylem mother cells
  - (2) Interfascicular cambium join with intrafascicular cambium
  - (3) Parenchymatous cells present between vascular bundles become meristematic
  - (4) Pith get obliterated
11. Which one of the following organisms is scientifically correctly named, correctly printed according to the International Rules of Nomenclature and correctly described ?
- (1) E.coli – Full name Entamoeba coli, a commonly occurring bacterium in human intestine
  - (2) Musca domestica – The common house lizard, a reptile
  - (3) Plasmodium falciparum – A protozoan pathogen causing the most serious type of malaria
  - (4) Felis tigris – The Indian tiger, well protected in Gir forests
12. What is true for mammalia ?
- (1) Platypus is oviparous
  - (2) Bats have feathers
  - (3) Elephant is ovoviviparous
  - (4) Diaphragm is absent in them
13. Which of the following character is present in all chordates ?
- (1) Diaphragm
  - (2) Vertebral column
  - (3) Pharyngeal gill clefts
  - (4) Dorsal solid nerve cord
14. In which of the following animal post anal tail is found ?
- (1) Earthworm
  - (2) Lower invertebrate
  - (3) Scorpion
  - (4) Snake

15. In which of the following notochord is present in embryonic stage ?

- (1) All chordate
- (2) Some chordates
- (3) Vertebrates
- (4) Non chordates

16. Given below are four matches of an animal and its kind of respiratory organ :

- A. Silver fish – Trachea
- B. Scorpion – Book lung
- C. Sea squirt – Pharyngeal gills
- D. Dolphin – Skin

The correct matches are

- (1) A and B
- (2) A, B and C
- (3) B and D
- (4) C and D

17. Which one of the following phyla is correctly matched with its two general characteristics ?

- (1) Mollusca – Normally oviparous and development through a trochophore or veliger larva
- (2) Arthropoda – Body divided into head, thorax and abdomen and respiration by tracheae
- (3) Chordata – Notochord at some stage and separate anal and urinary openings to the outside
- (4) Echinodermata – Pentamerous radial symmetry and mostly internal fertilization

18. Which of the following are referred as non-vertebrate chordates ?
- (1) Ciona, Ascidia, Amphioxus
  - (2) Lamprey, Myxine, Shark
  - (3) Scoliodon, Torpedo, Trygon
  - (4) Pristis, Branchiostoma, Scyllium doutorostomes?
19. Lateral line sense organs are absent in :
- (1) Tadpole larva of frog
  - (2) Bony fishes
  - (3) Reptiles
  - (4) Cartilaginous fishes
20. The termination of gastrulation is indicated by :
- (1) closure of neural tube
  - (2) closure of blastopore
  - (3) obliteration of archenteron
  - (4) obliteration of blastocoel
21. All enzymes are proteins except :
- (1) Trypsin
  - (2) Pepsin
  - (3) Steapsin
  - (4) Ribozyme and Ribonuclease-P
22. Which of the following is the best evidence for the lock and key theory of enzyme action ?
- (1) All isolated enzymes have been identified as protein
  - (2) Compounds similar in structure to the substrate inhibit the reaction
  - (3) Enzymes are found in living organisms and speed up certain reaction
  - (4) Enzymes determine the direction of a reaction

23. Co-enzyme is :
- (1) Always a protein
  - (2) Often a metal
  - (3) Always an inorganic compound
  - (4) Often a vitamin
24. A person is eating boiled potato. His food contains :
- (1) Cellulose, which can be digested by cellulase
  - (2) Starch, which cannot be digested
  - (3) Lactose, which cannot be digested
  - (4) DNA, which can be digested by pancreatic DNAase
25. Which of the following is a reducing sugar ?
- (1) Galactose
  - (2) Gluconic acid
  - (3) B-methyl galactoside
  - (4) Sucrose
26. Which of the following hormones is not secreted by duodenum to inhibit the gastric motility ?
- (1) GIP
  - (2) Enterogastrone
  - (3) Secretin
  - (4) Enterokinase
27. In case of vertebrates, lacteals are found in :
- (1) Oesophagus
  - (2) Ear
  - (3) Small intestine
  - (4) Ischium

28. The movement of ions against the concentration gradient will be :
- (1) Active transport
  - (2) Osmosis
  - (3) Diffusion
  - (4) All of these
29. Vomiting centre is located in the :
- (1) Medulla oblongata
  - (2) Stomach and sometimes in duodenum
  - (3) GI tract
  - (4) Hypothalamus
30. Which one of the following vitamins can be synthesised by bacteria inside the gut ?
- |                    |       |
|--------------------|-------|
| (1) D              | (2) A |
| (3) B <sub>1</sub> | (4) C |
31. In history of biology, human genome project led to the development of :
- (1) Bioinformatics
  - (2) Eugeneics
  - (3) Biotechnology
  - (4) Genetic engineering
32. If there are 999 bases in an RNA that codes for a protein with 333 amino acids and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered ?
- |        |         |
|--------|---------|
| (1) 1  | (2) 11  |
| (3) 33 | (4) 333 |

33. The final proof for DNA as the genetic material came from the experiments of :
- (1) Griffith
  - (2) Hershey and Chase
  - (3) Avery, Mcleod and McCarty
  - (4) Hargobind Khurana
34. Which one of the following is not a gaseous biogeochemical cycle in ecosystem ?
- (1) Nitrogen cycle
  - (2) Carbon cycle
  - (3) Sulphur cycle
  - (4) Phosphorus cycle
35. Which of the following ecological pyramids is generally inverted ?
- (1) Pyramid of numbers in grassland
  - (2) Pyramid of energy
  - (3) Pyramid of biomass in a forest
  - (4) Pyramid of biomass in a sea
36. What type of ecological pyramid would be obtained with the following data ?
- Secondary consumer : 120 g  
Primary consumer : 60g  
Primary producer : 10 g
- (1) Inverted pyramid of biomass
  - (2) Pyramid of energy
  - (3) Upright pyramid of biomass
  - (4) Upright pyramid of numbers
37. Which ecosystem has the maximum biomass ?
- (1) Forest ecosystem
  - (2) Grassland ecosystem
  - (3) Pond ecosystem
  - (4) Lake ecosystem

PG-EE-2021/(Life Sciences)(SET-X)/(B)



38. Limit of BOD prescribed by Central Pollution Control Board for the discharge of industrial and municipal waste water into natural surface water, is :
- (1) < 3.0 ppm (2) < 10 ppm  
(3) < 100 ppm (4) < 30 ppm
39. More than 70% of world's freshwater is contained in:
- (1) Antarctica  
(2) Glaciers and Mountains  
(3) Greenland  
(4) Polar ice
40. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called :
- (1) Convergent evolution  
(2) Non-random evolution  
(3) Adaptive radiation  
(4) Natural selection
41. Select a correct match :
- (1) GA<sub>3</sub> – Early seed production in conifers  
(2) Cytokinin – Synchronise fruit set in pineapples  
(3) Auxin – Overcomes senescence  
(4) Ethylene – Seed maturation and development
42. Where is the respiratory electron transport system (ETS) located in plants ?
- (1) Intermembrane space  
(2) Mitochondrial matrix  
(3) Outer mitochondrial membrane  
(4) Inner mitochondrial membrane

43. Respiratory Quotient (RQ) value of tripalmitin is :
- (1) 0.9
  - (2) 0.7
  - (3) 0.07
  - (4) 0.09
44. Conversion of glucose to glucose-6-phosphate, the first irreversible reaction of glycolysis, is catalyzed by :
- (1) Aldolase
  - (2) Hexokinase
  - (3) Enolase
  - (4) Phosphofructokinase
45. How many ATP molecules will be produced in muscles by aerobic oxidation of one molecule of glucose ?
- |        |        |
|--------|--------|
| (1) 2  | (2) 4  |
| (3) 36 | (4) 34 |
46. Plants, but not animals, can convert fatty acids to sugars by a series of reactions called :
- (1) Photosynt
  - (2) Krebs cycle
  - (3) Glycolysis
  - (4) Glyoxylate cycle
47. Pasteurization is a process, which means heating of drinks. It is carried out, at what temperature and for how much duration ?
- (1) 70°C and 60 minutes
  - (2) 80°C and 30 minutes
  - (3) 120°C and 60 minutes
  - (4) 60-70°C and 30 minutes

48. Lenticels are involved in :
- |                      |                    |
|----------------------|--------------------|
| (1) Gaseous exchange | (2) Food Transport |
| (3) Photosynthesis   | (4) Transpiration  |
49. Guttation is the result of :
- |               |                   |
|---------------|-------------------|
| (1) Osmosis   | (2) Root pressure |
| (3) Diffusion | (4) Transpiration |
50. Photosynthetic Active Radiation (PAR) has the following range of wavelengths :
- (1) 400-700 nm
  - (2) 450-950 nm
  - (3) 340-450 nm
  - (4) 500-600 nm
51. Select one of the following of important features distinguishing Gnetum from Cycas and Pinus and showing affinities with angiosperms :
- (1) Embryo development and apical meristem
  - (2) Absence of resin duct and leaf venation
  - (3) Presence of vessel elements and absence of archegonia
  - (4) Perianth and two integuments
52. Which one of the following is heterosporous ?
- (1) Equisetum
  - (2) Dryopteris
  - (3) Salvinia
  - (4) Adiantum
53. A system of classification, in which a large number of traits are considered, is :
- (1) Natural system
  - (2) Phylogenetic system
  - (3) Artificial system
  - (4) Synthetic system

54. The book 'Genera plantarum' was written by :
- (1) Engler & Prantl (2) Bentham & Hooker  
(3) Bessey (4) Hutchinson
55. Phylogenetic classification is one which is based on :
- (1) Overall similarities (2) Utilitarian system  
(3) Habits of plants (4) Common evolutionary descent
56. Endosperm of gymnosperm is ontogenetically similar to angiospermic :
- (1) Endosperm (2) Embryo sac  
(3) Archegonium (4) Megasporangia
57. Flowering plants are more successful than other members of the plant world because :
- (1) They are large and have a good vascular tissue system  
(2) They carry out variety of pollination mechanism  
(3) The protected plant embryo can survive in the period of unfavourable conditions  
(4) All of these
58. A. Heterospory is found in all members of pteropsida :  
B. Selaginella is advance among pteridophytes as it produces seeds  
C. Pinus leaves are monomorphic, pinnate compound and have sunken stomata as adaptation against transpiration  
D. Sporic meiosis is characteristic of life cycle in many organisms like Volvox, Chlamydomonas and Ulothrix.
- (1) All are incorrect (2) Both B and C are correct  
(3) Only B is correct (4) Only D is incorrect
59. Which phytohormone is synthesised in ripened fruits ?
- (1) ABA (2) Auxin  
(3) Cytokinin (4) Ethylene

60. Which of the following is incorrect about ethylene ?
- (1) Promotes root hair formation
  - (2) It is natural and derivative of carotenoids
  - (3) It increases the number of female flowers
  - (4) It causes synchronisation of flowering and fruit set in pineapples
61. The C 4 plants are photosynthetically more efficient than C 3 plants because :
- (1) They have more chloroplasts
  - (2) The CO<sub>2</sub> compensation point is more
  - (3) CO<sub>2</sub> generated during photorespiration is trapped and recycled through PEP carboxylase
  - (4) The CO<sub>2</sub> efflux is not prevented
62. The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by :
- (1) T.H. Morgan
  - (2) Gregor J. Mendel
  - (3) Alfred Sturtevant
  - (4) Sutton Boveri
63. What is the genetic disorder in which an individual has an overall masculine development gynaecomastia, and is sterile ?
- |                       |                            |
|-----------------------|----------------------------|
| (1) Turner's syndrome | (2) Klinefelter's syndrome |
| (3) Edward syndrome   | (4) Down's syndrome        |
64. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by :
- |                             |                        |
|-----------------------------|------------------------|
| (1) Only daughters          | (2) Only sons          |
| (3) Both sons and daughters | (4) Only grandchildren |

65. Which one of the following discoveries resulted in a Nobel Prize ?
- (1) X-rays induce sex-linked recessive lethal mutations
  - (2) Cytoplasmic inheritance
  - (3) Recombination of linked genes
  - (4) Genetic engineering
66. Normally DNA molecule has A-T, G-C pairing. However, these bases can exist in alternative valency status owing to rearrangements called :
- (1) Frame-shift mutation
  - (2) Tautomerisational mutation
  - (3) Analog substitution
  - (4) Point mutation
67. The most striking example of point mutation is found in a disease called :
- (1) Down's syndrome
  - (2) Sickle cell anaemia
  - (3) Edward syndrome
  - (4) Night blindness
68. When two genetic loci produce identical phenotypes in cis and trans position, they are considered to be :
- (1) Multiple alleles
  - (2) The parts of same gene
  - (3) Pseudoalleles
  - (4) Different genes
69. What map unit (Centimorgan) is adopted in the construction of genetic maps ?
- (1) A unit of distance between two expressed genes representing 10% cross over
  - (2) A unit of distance between two expressed genes representing 100% cross over
  - (3) A unit of distance between genes on chromosomes, representing 1 % cross over
  - (4) A unit of distance between genes on chromosomes, representing 50% cross over
70. Expressed Sequence Tags (ESTS) refers to :
- (1) Genes expressed as RNA
  - (2) Polypeptide expression
  - (3) DNA polymorphism
  - (4) Novel DNA sequences

PG-EE-2021/(Life Sciences)(SET-X)/(B)

71. The tendency of population to remain in genetic equilibrium may be disturbed by :
- (1) Lack of migration
  - (2) Lack of mutations
  - (3) Lack of random mating
  - (4) Random mating
72. The two antibiotic resistance genes on vector pBR322 are for :
- (1) Tetracycline and Kanamycin
  - (2) Ampicillin and Tetracycline
  - (3) Ampicillin and Chloramphenicol
  - (4) Chloramphenicol and Tetracycline
73. Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes ?
- (1) BOD incubator
  - (2) Sludge digester
  - (3) Industrial oven
  - (4) Bioreactor
74. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :
- (1) Isopropanol
  - (2) Chilled ethanol
  - (3) Methanol at room temperature
  - (4) Chilled chloroform
75. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.
- (1) The enzyme cuts DNA molecule at identified position within the DNA.
  - (2) The enzyme binds DNA at specific sites and cuts only one of the two strands.
  - (3) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.
  - (4) The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.

76. The correct order of steps in Polymerase Chain Reaction (PCR) is :
- (1) Extension, Denaturation, Annealing
  - (2) Annealing, Extension, Denaturation
  - (3) Denaturation, Annealing, Extension
  - (4) Denaturation, Extension, Annealing
77. Enzyme used in ELISA test is :
- (1) Endonuclease
  - (2) Ligase
  - (3) Peroxidase
  - (4) Polymerase
78. What will be the  $p\text{CO}_2$  and  $p\text{O}_2$  in atmospheric air as compared to alveoli respectively ?
- |                   |                  |
|-------------------|------------------|
| (1) Low and high  | (2) High and low |
| (3) High and high | (4) Low and low  |
79. In ureotelic animals, urea is formed by :
- (1) Kreb's cycle
  - (2) EM pathway
  - (3) Ornithine cycle
  - (4) Cori's cycle
80. Which one of the following mammalian cells is not capable of metabolising glucose to carbon-dioxide aerobically ?
- (1) Red blood cells
  - (2) White blood cells
  - (3) Unstriated muscle cells
  - (4) Liver cells



81. All the following may be methods for the inhibition of microbial growth by antibiotics except :
- (1) Antibiotics disrupt cell wall synthesis.
  - (2) Antibiotics interfere with cell membrane function.
  - (3) Antibiotics prevent the release of energy from ATP.
  - (4) Antibiotics inhibit the synthesis of protein.
82. In which of the following would you place the plants having vascular tissue lacking seeds ?
- (1) Pteridophytes
  - (2) Gymnosperms
  - (3) Bryophytes
  - (4) Algae
83. Apomixis is a type of reproduction in plants in which ?
- (1) Fertilization does not take place.
  - (2) Male nucleus takes part in fertilization.
  - (3) Embryo formation does not take place.
  - (4) Generative nucleus takes part in fertilization.
84. From which of the following algae, agar is commercially extracted ?
- (A) Gracillaria
  - (B) Fucus
  - (C) Sargassum
  - (D) Gelidium
  - (E) Turbinaria
- (1) C and E
  - (2) B and C
  - (3) D and E
  - (4) A and D

85. In which one of the following pairs of diseases is viral as well as transmitted by mosquitoes ?
- (1) Elephantiasis and dengue                      (2) Yellow fever and sleeping sickness  
(3) Encephalitis and sleeping sickness      (4) Yellow fever and dengue
86. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern Azolla is :
- (1) Tolypothrix    (2) Nostoc  
(3) Chlorella    (4) Anabaena
87. Ionophores are :
- (1) the gating mechanisms associated with the transport of ions.  
(2) intrinsic proteins that passively transport ions.  
(3) chemicals that form pores in the plasma membrane and allow ions to cross.  
(4) intrinsic proteins that actively transport ions.
88. The trans Golgi network is :
- (1) the intermediate compartment between the ER and the Golgi.  
(2) the part of the Golgi where fusion of vesicles from the ER occurs.  
(3) where sorting of proteins to the lysosomes, plasma membrane and cell exterior occurs.  
(4) the network of vesicles that transport proteins between Golgi cisternae.
89. Most human cells are diploid with total DNA content of  $2C$ . The DNA content increases to  $4C$  before the onset of mitosis. At anaphase, the DNA content of each cluster will be :
- (1)  $4C$   
(2)  $2C$   
(3)  $1C$   
(4)  $3C$

90. Malignant cancer cells have all of the following properties except :
- (1) unregulated cell division                      (2) inhibition of angiogenesis  
(3) resistance to apoptosis                         (4) cellular immortality
91. Which one of the following is a protein deficiency disease ?
- (1) Kwashiorkor                                        (2) Night blindness  
(3) Eczema    (4) Cirrhosis
92. Which of the following statement is incorrect wrt inbreeding ?
- (1) Inbreeding increases homozygosity  
(2) Inbreeding exposes harmful recessive gene that are eliminated by selection  
(3) Inbreeding helps in accumulation of deleterious alleles and elimination of desirable alleles  
(4) Inbreeding helps in developing a pure-line animal
93. What is correct to say about the hormone action in humans ?
- (1) In females, FSH first binds with specific receptors on ovarian cell membrane  
(2) FSH stimulates the secretion of estrogen and progesterone  
(3) Glucagon is secreted by B-cells of Islets of langerhans and stimulates glycogenolysis  
(4) Secretion of thymosins is stimulated with aging
94. Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum :
- (1) Protozoa    (2) Coelenterata  
(3) Porifera    (4) Mollusca
95. Which of the following characteristics is mainly responsible for diversification of insects on land ?
- (1) Eyes    (2) Segmentation  
(3) Bilateral symmetry                                (4) Exoskeleton

96. Which of the following endoparasites of humans does show viviparity ?
- (1) *Ascaris lumbricoides* (2) *Ancylostoma duodenale*  
(3) *Enterobius vermicularis* (4) *Trichinella spiralis*
97. Select the Taxon mentioned which represents both marine and fresh water species.
- (1) Echinoderms  
(2) Ctenophora  
(3) Cephalochordata  
(4) Cnidaria
98. Which one of the following living organisms completely lacks a cell wall ?
- (1) Cyanobacteria  
(2) Sea-fan(*Gorgonia*)  
(3) *Saccharomyces*  
(4) Blue-green algae
99. Biological organisation starts with :
- (1) Cellular level  
(2) Organismic level  
(3) Atomic level  
(4) Submicroscopic molecular level
100. *Peripatus* is a connecting link between :
- (1) Coelenterata and Porifera  
(2) Ctenophora and Platyhelminthis  
(3) Mollusca and Echinodermata  
(4) Annelida and Arthropoda

Entrance Exam 2021 Answer Key held on dated 21/09/2021 at  
10:00 am

Subjects of Life Sciences

Question No.	A	B	C	D
1	3	1	1	4
2	1	2	3	2
3	1	2	2	4
4	4	4	3	4
5	4	1	1	1
6	4	1	2	4
7	3	3	2	3
8	3	1	3	1
9	2	4	3	1
10	2	3	1	3
11	1	3	3	1
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15	1	1	4	4
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18	1	1	1	4
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25	4	1	4	3
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27	4	3	3	4
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32	4	3	1	2
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35	3	4	1	1
36	4	1	2	1
37	4	1	1	3
38	1	4	1	1
39	2	4	3	4
40	1	1	4	3
41	1	1	3	3
42	3	4	2	1
43	2	2	4	3
44	3	2	2	4
45	1	3	2	1
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48	3	1	1	1
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Page 1 of 2

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**Subjects of Life Sciences**

Question No.	A	B	C	D
51	1	3	1	3
52	3	3	4	2
53	2	1	2	4
54	4	2	2	2
55	4	4	3	2
56	1	2	4	3
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58	4	1	1	1
59	4	4	2	3
60	1	2	1	1
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62	2	3	2	3
63	4	2	4	1
64	2	3	4	3
65	2	1	1	4
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67	3	2	3	4
68	1	3	1	2
69	3	3	1	4
70	1	1	3	4
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83	1	1	2	1
84	3	4	4	2
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87	4	3	3	4
88	2	3	1	1
89	4	2	4	4
90	4	2	3	2
91	3	1	1	3
92	1	3	3	1
93	3	1	2	1
94	4	3	4	4
95	1	4	4	4
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Page 2 of 2

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Total No. of Printed Pages : 21

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C

SET-X

PG-EE-2021

SUBJECT : Life Sciences

12491

Sr. No. ....

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Date of Birth \_\_\_\_\_

Father's Name \_\_\_\_\_ Mother's Name \_\_\_\_\_

Date of Examination \_\_\_\_\_

\_\_\_\_\_  
(Signature of the Candidate)

\_\_\_\_\_  
(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE  
STARTING THE QUESTION PAPER.**

1. **All questions are compulsory.**
2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only **Black or Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
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PG-EE-2021/(Life Sciences)(SET-X)/(C)

1. The C<sub>4</sub> plants are photosynthetically more efficient than C<sub>3</sub> plants because :
  - (1) They have more chloroplasts
  - (2) The CO<sub>2</sub> compensation point is more
  - (3) CO<sub>2</sub> generated during photorespiration is trapped and recycled through PEP carboxylase
  - (4) The CO<sub>2</sub> efflux is not prevented
  
2. The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by :
  - (1) T.H. Morgan
  - (2) Gregor J. Mendel
  - (3) Alfred Sturtevant
  - (4) Sutton Boveri
  
3. What is the genetic disorder in which an individual has an overall masculine development gynaecomastia, and is sterile ?
  - (1) Turner's syndrome
  - (2) Klinefelter's syndrome
  - (3) Edward syndrome
  - (4) Down's syndrome
  
4. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by :
  - (1) Only daughters
  - (2) Only sons
  - (3) Both sons and daughters
  - (4) Only grandchildren
  
5. Which one of the following discoveries resulted in a Nobel Prize ?
  - (1) X-rays induce sex-linked recessive lethal mutations
  - (2) Cytoplasmic inheritance
  - (3) Recombination of linked genes
  - (4) Genetic engineering



6. Normally DNA molecule has A-T, G-C pairing. However, these bases can exist in alternative valency status owing to rearrangements called :
- (1) Frame-shift mutation
  - (2) Tautomerisational mutation
  - (3) Analog substitution
  - (4) Point mutation
7. The most striking example of point mutation is found in a disease called :
- (1) Down's syndrome
  - (2) Sickle cell anaemia
  - (3) Edward syndrome
  - (4) Night blindness
8. When two genetic loci produce identical phenotypes in cis and trans position, they are considered to be :
- (1) Multiple alleles
  - (2) The parts of same gene
  - (3) Pseudoalleles
  - (4) Different genes
9. What map unit (Centimorgan) is adopted in the construction of genetic maps ?
- (1) A unit of distance between two expressed genes representing 10% cross over
  - (2) A unit of distance between two expressed genes representing 100% cross over
  - (3) A unit of distance between genes on chromosomes, representing 1 % cross over
  - (4) A unit of distance between genes on chromosomes, representing 50% cross over
10. Expressed Sequence Tags (ESTS) refers to :
- (1) Genes expressed as RNA
  - (2) Polypeptide expression
  - (3) DNA polymorphism
  - (4) Novel DNA sequences
11. Select one of the following of important features distinguishing Gnetum from Cycas and Pinus and showing affinities with angiosperms :
- (1) Embryo development and apical meristem
  - (2) Absence of resin duct and leaf venation
  - (3) Presence of vessel elements and absence of archegonia
  - (4) Perianth and two integuments

12. Which one of the following is heterosporous ?
- (1) Equisetum
  - (2) Dryopteris
  - (3) Salvinia
  - (4) Adiantum
13. A system of classification, in which a large number of traits are considered, is :
- (1) Natural system
  - (2) Phylogenetic system
  - (3) Artificial system
  - (4) Synthetic system
14. The book 'Genera plantarum' was written by :
- |                     |                      |
|---------------------|----------------------|
| (1) Engler & Prantl | (2) Bentham & Hooker |
| (3) Bessey          | (4) Hutchinson       |
15. Phylogenetic classification is one which is based on :
- |                          |                                 |
|--------------------------|---------------------------------|
| (1) Overall similarities | (2) Utilitarian system          |
| (3) Habits of plants     | (4) Common evolutionary descent |
16. Endosperm of gymnosperm is ontogenetically similar to angiospermic :
- |                 |                   |
|-----------------|-------------------|
| (1) Endosperm   | (2) Embryo sac    |
| (3) Archegonium | (4) Megasporangia |
17. Flowering plants are more successful than other members of the plant world because :
- (1) They are large and have a good vascular tissue system
  - (2) They carry out variety of pollination mechanism
  - (3) The protected plant embryo can survive in the period of unfavourable conditions
  - (4) All of these

18. A. Heterospory is found in all members of pteropsida :  
B. Selaginella is advance among pteridophytes as it produces seeds  
C. Pinus leaves are monomorphic, pinnate compound and have sunken stomata as adaptation against transpiration  
D. Sporic meiosis is characteristic of life cycle in many organisms like Volvox, Chlamydomonas and Ulothrix.
- (1) All are incorrect (2) Both B and C are correct  
(3) Only B is correct (4) Only D is incorrect
19. Which phytohormone is synthesised in ripened fruits ?  
(1) ABA (2) Auxin  
(3) Cytokinin (4) Ethylene
20. Which of the following is incorrect about ethylene ?  
(1) Promotes root hair formation  
(2) It is natural and derivative of carotenoids  
(3) It increases the number of female flowers  
(4) It causes synchronisation of flowering and fruit set in pineapples
21. All the following may be methods for the inhibition of microbial growth by antibiotics except :  
(1) Antibiotics disrupt cell wall synthesis.  
(2) Antibiotics interfere with cell membrane function.  
(3) Antibiotics prevent the release of energy from ATP.  
(4) Antibiotics inhibit the synthesis of protein.
22. In which of the following would you place the plants having vascular tissue lacking seeds ?  
(1) Pteridophytes  
(2) Gymnosperms  
(3) Bryophytes  
(4) Algae

23. Apomixis is a type of reproduction in plants in which ?
- (1) Fertilization does not take place.
  - (2) Male nucleus takes part in fertilization.
  - (3) Embryo formation does not take place.
  - (4) Generative nucleus takes part in fertilization.
24. From which of the following algae, agar is commercially extracted ?
- (A) Gracillaria
  - (B) Fucus
  - (C) Sargassum
  - (D) Gelidium
  - (E) Turbinaria
- (1) C and E
  - (2) B and C
  - (3) D and E
  - (4) A and D
25. In which one of the following pairs of diseases is viral as well as transmitted by mosquitoes ?
- (1) Elephantiasis and dengue
  - (2) Yellow fever and sleeping sickness
  - (3) Encephalitis and sleeping sickness
  - (4) Yellow fever and dengue
26. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern Azolla is :
- |                 |              |
|-----------------|--------------|
| (1) Tolypothrix | (2) Nostoc   |
| (3) Chlorella   | (4) Anabaena |

27. Ionophores are :

- (1) the gating mechanisms associated with the transport of ions.
- (2) intrinsic proteins that passively transport ions.
- (3) chemicals that form pores in the plasma membrane and allow ions to cross.
- (4) intrinsic proteins that actively transport ions.

28. The trans Golgi network is :

- (1) the intermediate compartment between the ER and the Golgi.
- (2) the part of the Golgi where fusion of vesicles from the ER occurs.
- (3) where sorting of proteins to the lysosomes, plasma membrane and cell exterior occurs.
- (4) the network of vesicles that transport proteins between Golgi cisternae.

29. Most human cells are diploid with total DNA content of  $2C$ . The DNA content increases to  $4C$  before the onset of mitosis. At anaphase, the DNA content of each cluster will be :

- (1)  $4C$
- (2)  $2C$
- (3)  $1C$
- (4)  $3C$

30. Malignant cancer cells have all of the following properties except :

- (1) unregulated cell division
- (2) inhibition of angiogenesis
- (3) resistance to apoptosis
- (4) cellular immortality

31. Which one of the following organisms is scientifically correctly named, correctly printed according to the International Rules of Nomenclature and correctly described ?

- (1) E.coli – Full name Entamoeba coli, a commonly occurring bacterium in human intestine
- (2) Musca domestica – The common house lizard, a reptile
- (3) Plasmodium falciparum – A protozoan pathogen causing the most serious type of malaria
- (4) Felis tigris – The Indian tiger, well protected in Gir forests

32. What is true for mammalia ?

- (1) Platypus is oviparous
- (2) Bats have feathers
- (3) Elephant is ovoviviparous
- (4) Diaphragm is absent in them

33. Which of the following character is present in all chordates ?

- (1) Diaphragm
- (2) Vertebral column
- (3) Pharyngeal gill clefts
- (4) Dorsal solid nerve cord

34. In which of the following animal post anal tail is found ?

- (1) Earthworm
- (2) Lower invertebrate
- (3) Scorpion
- (4) Snake

35. In which of the following notochord is present in embryonic stage ?

- (1) All chordate
- (2) Some chordates
- (3) Vertebrates
- (4) Non chordates

36. Given below are four matches of an animal and its kind of respiratory organ :

- A. Silver fish – Trachea
- B. Scorpion – Book lung
- C. Sea squirt – Pharyngeal gills
- D. Dolphin – Skin

The correct matches are

- (1) A and B
- (2) A, B and C
- (3) B and D
- (4) C and D

37. Which one of the following phyla is correctly matched with its two general characteristics ?

- (1) Mollusca – Normally oviparous and development through a trochophore or veliger larva
- (2) Arthropoda – Body divided into head, thorax and abdomen and respiration by tracheae
- (3) Chordata – Notochord at some stage and separate anal and urinary openings to the outside
- (4) Echinodermata – Pentamerous radial symmetry and mostly internal fertilization

38. Which of the following are referred as non-vertebrate chordates ?

- (1) Ciona, Ascidia, Amphioxus
- (2) Lamprey, Myxine, Shark
- (3) Scoliodon, Torpedo, Trygon
- (4) Pristis, Branchiostoma, Scyllium doutorostomes?

PG-EE-2021/(Life Sciences)(SET-X)/(C)

39. Lateral line sense organs are absent in :
- (1) Tadpole larva of frog
  - (2) Bony fishes
  - (3) Reptiles
  - (4) Cartilaginous fishes
40. The termination of gastrulation is indicated by :
- (1) closure of neural tube
  - (2) closure of blastopore
  - (3) obliteration of archenteron
  - (4) obliteration of blastocoel
41. The tendency of population to remain in genetic equilibrium may be disturbed by :
- (1) Lack of migration
  - (2) Lack of mutations
  - (3) Lack of random mating
  - (4) Random mating
42. The two antibiotic resistance genes on vector pBR322 are for :
- (1) Tetracycline and Kanamycin
  - (2) Ampicillin and Tetracycline
  - (3) Ampicillin and Chloramphenicol
  - (4) Chloramphenicol and Tetracycline
43. Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes ?
- (1) BOD incubator
  - (2) Sludge digester
  - (3) Industrial oven
  - (4) Bioreactor



44. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :
- (1) Isopropanol
  - (2) Chilled ethanol
  - (3) Methanol at room temperature
  - (4) Chilled chloroform
45. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.
- (1) The enzyme cuts DNA molecule at identified position within the DNA.
  - (2) The enzyme binds DNA at specific sites and cuts only one of the two strands.
  - (3) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.
  - (4) The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.
46. The correct order of steps in Polymerase Chain Reaction (PCR) is :
- (1) Extension, Denaturation, Annealing
  - (2) Annealing, Extension, Denaturation
  - (3) Denaturation, Annealing, Extension
  - (4) Denaturation, Extension, Annealing
47. Enzyme used in ELISA test is :
- (1) Endonuclease
  - (2) Ligase
  - (3) Peroxidase
  - (4) Polymerase
48. What will be the  $p\text{CO}_2$  and  $p\text{O}_2$  in atmospheric air as compared to alveoli respectively ?
- |                   |                  |
|-------------------|------------------|
| (1) Low and high  | (2) High and low |
| (3) High and high | (4) Low and low  |

49. In ureotelic animals, urea is formed by :
- (1) Kreb's cycle
  - (2) EM pathway
  - (3) Ornithine cycle
  - (4) Cori's cycle
50. Which one of the following mammalian cells is not capable of metabolising glucose to carbon-dioxide aerobically ?
- (1) Red blood cells
  - (2) White blood cells
  - (3) Unstriated muscle cells
  - (4) Liver cells
51. Select a correct match :
- (1) GA<sub>3</sub> – Early seed production in conifers
  - (2) Cytokinin – Synchronise fruit set in pineapples
  - (3) Auxin – Overcomes senescence
  - (4) Ethylene – Seed maturation and development
52. Where is the respiratory electron transport system (ETS) located in plants ?
- (1) Intermembrane space
  - (2) Mitochondrial matrix
  - (3) Outer mitochondrial membrane
  - (4) Inner mitochondrial membrane
53. Respiratory Quotient (RQ) value of tripalmitin is :
- (1) 0.9
  - (2) 0.7
  - (3) 0.07
  - (4) 0.09

54. Conversion of glucose to glucose-6-phosphate, the first irreversible reaction of glycolysis, is catalyzed by :
- (1) Aldolase
  - (2) Hexokinase
  - (3) Enolase
  - (4) Phosphofructokinase
55. How many ATP molecules will be produced in muscles by aerobic oxidation of one molecule of glucose ?
- (1) 2
  - (2) 4
  - (3) 36
  - (4) 34
56. Plants, but not animals, can convert fatty acids to sugars by a series of reactions called :
- (1) Photosynt
  - (2) Krebs cycle
  - (3) Glycolysis
  - (4) Glyoxylate cycle
57. Pasteurization is a process, which means heating of drinks. It is carried out, at what temperature and for how much duration ?
- (1) 70°C and 60 minutes
  - (2) 80°C and 30 minutes
  - (3) 120°C and 60 minutes
  - (4) 60-70°C and 30 minutes
58. Lenticels are involved in :
- (1) Gaseous exchange
  - (2) Food Transport
  - (3) Photosynthesis
  - (4) Transpiration
59. Guttation is the result of :
- (1) Osmosis
  - (2) Root pressure
  - (3) Diffusion
  - (4) Transpiration

60. Photosynthetic Active Radiation (PAR) has the following range of wavelengths :
- (1) 400-700 nm
  - (2) 450-950 nm
  - (3) 340-450 nm
  - (4) 500-600 nm
61. All enzymes are proteins except :
- (1) Trypsin
  - (2) Pepsin
  - (3) Steapsin
  - (4) Ribozyme and Ribonuclease-P
62. Which of the following is the best evidence for the lock and key theory of enzyme action ?
- (1) All isolated enzymes have been identified as protein
  - (2) Compounds similar in structure to the substrate inhibit the reaction
  - (3) Enzymes are found in living organisms and speed up certain reaction
  - (4) Enzymes determine the direction of a reaction
63. Co-enzyme is :
- (1) Always a protein
  - (2) Often a metal
  - (3) Always an inorganic compound
  - (4) Often a vitamin
64. A person is eating boiled potato. His food contains :
- (1) Cellulose, which can be digested by cellulase
  - (2) Starch, which cannot be digested
  - (3) Lactose, which cannot be digested
  - (4) DNA, which can be digested by pancreatic DNAase

65. Which of the following is a reducing sugar ?
- (1) Galactose
  - (2) Gluconic acid
  - (3) B-methyl galactoside
  - (4) Sucrose
66. Which of the following hormones is not secreted by duodenum to inhibit the gastric motility ?
- (1) GIP
  - (2) Enterogastrone
  - (3) Secretin
  - (4) Enterokinase
67. In case of vertebrates, lacteals are found in :
- (1) Oesophagus
  - (2) Ear
  - (3) Small intestine
  - (4) Ischium
68. The movement of ions against the concentration gradient will be :
- (1) Active transport
  - (2) Osmosis
  - (3) Diffusion
  - (4) All of these
69. Vomiting centre is located in the :
- (1) Medulla oblongata
  - (2) Stomach and sometimes in duodenum
  - (3) GI tract
  - (4) Hypothalamus



75. Which of the following characteristics is mainly responsible for diversification of insects on land ?
- (1) Eyes
  - (2) Segmentation
  - (3) Bilateral symmetry
  - (4) Exoskeleton
76. Which of the following endoparasites of humans does show viviparity ?
- |                                    |                                  |
|------------------------------------|----------------------------------|
| (1) <i>Ascaris lumbricoides</i>    | (2) <i>Ancylostoma duodenale</i> |
| (3) <i>Enterobius vermicularis</i> | (4) <i>Trichinella spiralis</i>  |
77. Select the Taxon mentioned which represents both marine and fresh water species.
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  - (2) Ctenophora
  - (3) Cephalochordata
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  - (3) *Saccharomyces*
  - (4) Blue-green algae
79. Biological organisation starts with :
- (1) Cellular level
  - (2) Organismic level
  - (3) Atomic level
  - (4) Submicroscopic molecular level

PG-EE-2021/(Life Sciences)(SET-X)/(C)

- 80.** Peripatus is a connecting link between :
- (1) Coelenterata and Porifera
  - (2) Ctenophora and Platyhelminthis
  - (3) Mollusca and Echinodermata
  - (4) Annelida and Arthropoda
- 81.** Cytokines are produced by cells of the immune system in response to various physiological stimuli that :
- (1) modulate cell function through subsequent cell differentiation or cell proliferation.
  - (2) facilitate cell lysis.
  - (3) cause glycosylation of immunoglobulins.
  - (4) cause histamine release.
- 82.** In what way, if any, does the chromosomal determination of sex differ in *Drosophila* and humans ?
- (1) In humans, the Y-chromosome determines maleness, with female development being a default process, but in *Drosophila*, the presence of two X-chromosomes determines femaleness, and male development is the default process.
  - (2) In humans, the Y-chromosome determines maleness, but in *Drosophila*, the ratio of X-chromosomes to autosomes determines maleness or femaleness.
  - (3) In humans, it is the presence of only one X-chromosome that triggers male development and two X-chromosomes trigger female development, just as occurs in *Drosophila*.
  - (4) In human males, a single Y-chromosome is present in the absence of an X-chromosome, while in *Drosophila*, a single X-chromosome is present in the absence of a Y-chromosome.
- 83.** How many generations are present in the seed of gymnosperm ?
- |       |       |
|-------|-------|
| (1) 2 | (2) 3 |
| (3) 1 | (4) 4 |



84. Bryophytes are *not* characterised by :
- (1) Sporophyte parasitic over gametophyte
  - (2) Independent gametophyte
  - (3) Absence of vascular tissues
  - (4) Independent sporophyte
85. Stems and leaves of bryophytes are :
- (1) Analogous to vascular plants
  - (2) Homologous to vascular plants
  - (3) Analogous to algae & fungal thallus
  - (4) None of these
86. The dominant photosynthetic phase in the life-cycle of pteridophyta is equivalent to the :
- (1) Gametophytic phase of bryophyta
  - (2) Sporophytic phase of bryophyta
  - (3) Gametophytic phase of pteridophytes
  - (4) Gametophytic phase of gymnosperm
87. In Pteridophytes, reduction division occurs when :
- (1) Prothallus is formed
  - (2) Sex organs are formed
  - (3) Spores are formed
  - (4) Gametes are formed
88. In which of the following gametophyte is not independent free living ?
- (1) Pinus
  - (2) Funaria
  - (3) Marchantia
  - (4) Pteris
89. Seasonal activity of vascular cambium is influenced by many factors, except :
- (1) Geographical location of plant
  - (2) Relative humidity and temperature
  - (3) Photoperiod and water supply
  - (4) Leaf orientation

90. When secondary growth is initiated in dicot stem, what will happen first ?
- (1) The cells of cambium divide periclinally to form xylem mother cells
  - (2) Interfascicular cambium join with intrafascicular cambium
  - (3) Parenchymatous cells present between vascular bundles become meristematic
  - (4) Pith get obliterated
91. In history of biology, human genome project led to the development of :
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  - (2) Eugeneics
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  - (4) Genetic engineering
92. If there are 999 bases in an RNA that codes for a protein with 333 amino acids and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered ?
- (1) 1
  - (2) 11
  - (3) 33
  - (4) 333
93. The final proof for DNA as the genetic material came from the experiments of :
- (1) Griffith
  - (2) Hershey and Chase
  - (3) Avery, Mcleod and McCarty
  - (4) Hargobind Khurana
94. Which one of the following is not a gaseous biogeochemical cycle in ecosystem ?
- (1) Nitrogen cycle
  - (2) Carbon cycle
  - (3) Sulphur cycle
  - (4) Phosphorus cycle
95. Which of the following ecological pyramids is generally inverted ?
- (1) Pyramid of numbers in grassland
  - (2) Pyramid of energy
  - (3) Pyramid of biomass in a forest
  - (4) Pyramid of biomass in a sea

96. What type of ecological pyramid would be obtained with the following data ?  
Secondary consumer : 120 g  
Primary consumer : 60g  
Primary producer : 10 g
- (1) Inverted pyramid of biomass
  - (2) Pyramid of energy
  - (3) Upright pyramid of biomass
  - (4) Upright pyramid of numbers
97. Which ecosystem has the maximum biomass ?
- (1) Forest ecosystem
  - (2) Grassland ecosystem
  - (3) Pond ecosystem
  - (4) Lake ecosystem
98. Limit of BOD prescribed by Central Pollution Control Board for the discharge of industrial and municipal waste water into natural surface water, is :
- (1) < 3.0 ppm
  - (2) < 10 ppm
  - (3) < 100 ppm
  - (4) < 30 ppm
99. More than 70% of world's freshwater is contained in :
- (1) Antarctica
  - (2) Glaciers and Mountains
  - (3) Greenland
  - (4) Polar ice
100. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called :
- (1) Convergent evolution
  - (2) Non-random evolution
  - (3) Adaptive radiation
  - (4) Natural selection

**Entrance Exam 2021 Answer Key held on dated 21/09/2021 at  
10:00 am**

**Subjects of Life Sciences**

Question No.	A	B	C	D
1	3	1	1	4
2	1	2	3	2
3	1	2	2	4
4	4	4	3	4
5	4	1	1	1
6	4	1	2	4
7	3	3	2	3
8	3	1	3	1
9	2	4	3	1
10	2	3	1	3
11	1	3	3	1
12	2	1	3	3
13	2	3	1	2
14	4	4	2	4
15	1	1	4	4
16	1	2	2	1
17	3	1	4	1
18	1	1	1	4
19	4	3	4	4
20	3	4	2	1
21	3	4	3	1
22	3	2	1	4
23	1	4	1	2
24	2	4	4	2
25	4	1	4	3
26	2	4	4	4
27	4	3	3	4
28	1	1	3	1
29	4	1	2	2
30	2	3	2	1
31	1	1	3	1
32	4	3	1	2
33	2	2	3	2
34	2	4	4	4
35	3	4	1	1
36	4	1	2	1
37	4	1	1	3
38	1	4	1	1
39	2	4	3	4
40	1	1	4	3
41	1	1	3	3
42	3	4	2	1
43	2	2	4	3
44	3	2	2	4
45	1	3	2	1
46	2	4	3	2
47	2	4	3	1
48	3	1	1	1
49	3	2	3	3
50	1	1	1	4

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Page 1 of 2

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21/9/2021



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**Subjects of Life Sciences**

Question No.	A	B	C	D
51	1	3	1	3
52	3	3	4	2
53	2	1	2	4
54	4	2	2	2
55	4	4	3	2
56	1	2	4	3
57	1	4	4	3
58	4	1	1	1
59	4	4	2	3
60	1	2	1	1
61	3	1	4	1
62	2	3	2	3
63	4	2	4	1
64	2	3	4	3
65	2	1	1	4
66	3	2	4	4
67	3	2	3	4
68	1	3	1	2
69	3	3	1	4
70	1	1	3	4
71	4	3	1	1
72	2	2	3	3
73	4	4	1	2
74	4	2	3	3
75	1	2	4	1
76	4	3	4	2
77	3	3	4	2
78	1	1	2	3
79	1	3	4	3
80	3	1	4	1
81	1	3	1	3
82	3	1	2	3
83	1	1	2	1
84	3	4	4	2
85	4	4	1	4
86	4	4	1	2
87	4	3	3	4
88	2	3	1	1
89	4	2	4	4
90	4	2	3	2
91	3	1	1	3
92	1	3	3	1
93	3	1	2	1
94	4	3	4	4
95	1	4	4	4
96	2	4	1	4
97	1	4	1	3
98	1	2	4	3
99	3	4	4	2
100	4	4	1	2

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21/9/21 Page 2 of 2

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21/9/2021

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Total No. of Printed Pages : 21

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D

SET-X

PG-EE-2021

SUBJECT : Life Sciences

12492

Sr. No. ....

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

Name \_\_\_\_\_ Date of Birth \_\_\_\_\_

Father's Name \_\_\_\_\_ Mother's Name \_\_\_\_\_

Date of Examination \_\_\_\_\_

\_\_\_\_\_  
(Signature of the Candidate)

\_\_\_\_\_  
(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE  
STARTING THE QUESTION PAPER.**

1. **All questions are compulsory.**
2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
6. **There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only **Black or Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. **Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

PG-EE-2021/(Life Sciences)(SET-X)/(D)

D

1

1. All enzymes are proteins except :
  - (1) Trypsin
  - (2) Pepsin
  - (3) Steapsin
  - (4) Ribozyme and Ribonuclease-P
  
2. Which of the following is the best evidence for the lock and key theory of enzyme action ?
  - (1) All isolated enzymes have been identified as protein
  - (2) Compounds similar in structure to the substrate inhibit the reaction
  - (3) Enzymes are found in living organisms and speed up certain reaction
  - (4) Enzymes determine the direction of a reaction
  
3. Co-enzyme is :
  - (1) Always a protein
  - (2) Often a metal
  - (3) Always an inorganic compound
  - (4) Often a vitamin
  
4. A person is eating boiled potato. His food contains :
  - (1) Cellulose, which can be digested by cellulase
  - (2) Starch, which cannot be digested
  - (3) Lactose, which cannot be digested
  - (4) DNA, which can be digested by pancreatic DNAase
  
5. Which of the following is a reducing sugar ?
  - (1) Galactose
  - (2) Gluconic acid
  - (3) B-methyl galactoside
  - (4) Sucrose

PG-EE-2021/(Life Sciences)(SET-X)/(D)

P. T. O.

6. Which of the following hormones is not secreted by duodenum to inhibit the gastric motility ?
- (1) GIP
  - (2) Enterogastrone
  - (3) Secretin
  - (4) Enterokinase
7. In case of vertebrates, lacteals are found in :
- (1) Oesophagus
  - (2) Ear
  - (3) Small intestine
  - (4) Ischium
8. The movement of ions against the concentration gradient will be :
- (1) Active transport
  - (2) Osmosis
  - (3) Diffusion
  - (4) All of these
9. Vomiting centre is located in the :
- (1) Medulla oblongata
  - (2) Stomach and sometimes in duodenum
  - (3) GI tract
  - (4) Hypothalamus
10. Which one of the following vitamins can be synthesised by bacteria inside the gut ?
- |                    |       |
|--------------------|-------|
| (1) D              | (2) A |
| (3) B <sub>1</sub> | (4) C |

**PG-EE-2021/(Life Sciences)(SET-X)/(D)**



11. In history of biology, human genome project led to the development of :
- (1) Bioinformatics
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12. If there are 999 bases in an RNA that codes for a protein with 333 amino acids and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered ?
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16. What type of ecological pyramid would be obtained with the following data ?  
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20. The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge, is called :
- (1) Convergent evolution
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  - (3) Adaptive radiation
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21. Select a correct match :
- (1) GA, – Early seed production in conifers
  - (2) Cytokinin – Synchronise fruit set in pineapples
  - (3) Auxin – Overcomes senescence
  - (4) Ethylene – Seed maturation and development
22. Where is the respiratory electron transport system (ETS) located in plants ?
- (1) Intermembrane space
  - (2) Mitochondrial matrix
  - (3) Outer mitochondrial membrane
  - (4) Inner mitochondrial membrane
23. Respiratory Quotient (RQ) value of tripalmitin is :
- (1) 0.9
  - (2) 0.7
  - (3) 0.07
  - (4) 0.09
24. Conversion of glucose to glucose-6-phosphate, the first irreversible reaction of glycolysis, is catalyzed by :
- (1) Aldolase
  - (2) Hexokinase
  - (3) Enolase
  - (4) Phosphofructokinase
25. How many ATP molecules will be produced in muscles by aerobic oxidation of one molecule of glucose ?
- |        |        |
|--------|--------|
| (1) 2  | (2) 4  |
| (3) 36 | (4) 34 |

26. Plants, but not animals, can convert fatty acids to sugars by a series of reactions called :
- (1) Photosynt (2) Krebs cycle  
(3) Glycolysis (4) Glyoxylate cycle
27. Pasteurization is a process, which means heating of drinks. It is carried out, at what temperature and for how much duration ?
- (1) 70°C and 60 minutes  
(2) 80°C and 30 minutes  
(3) 120°C and 60 minutes  
(4) 60-70°C and 30 minutes
28. Lenticels are involved in :
- (1) Gaseous exchange (2) Food Transport  
(3) Photosynthesis (4) Transpiration
29. Guttation is the result of :
- (1) Osmosis (2) Root pressure  
(3) Diffusion (4) Transpiration
30. Photosynthetic Active Radiation (PAR) has the following range of wavelengths :
- (1) 400-700 nm  
(2) 450-950 nm  
(3) 340-450 nm  
(4) 500-600 nm
31. Cytokines are produced by cells of the immune system in response to various physiological stimuli that :
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- |       |       |
|-------|-------|
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41. Which one of the following organisms is scientifically correctly named, correctly Printed according to the International Rules of Nomenclature and correctly described ?
- (1) E.coli – Full name Entamoeba coli, a commonly occurring bacterium in human intestine
  - (2) Musca domestica – The common house lizard, a reptile
  - (3) Plasmodium falciparum – A protozoan pathogen causing the most serious type of malaria
  - (4) Felis tigris – The Indian tiger, well protected in Gir forests
42. What is true for mammalia ?
- (1) Platypus is oviparous
  - (2) Bats have feathers
  - (3) Elephant is ovoviviparous
  - (4) Diaphragm is absent in them
43. Which of the following character is present in all chordates ?
- (1) Diaphragm
  - (2) Vertebral column
  - (3) Pharyngeal gill clefts
  - (4) Dorsal solid nerve cord
44. In which of the following animal post anal tail is found ?
- (1) Earthworm
  - (2) Lower invertebrate
  - (3) Scorpion
  - (4) Snake
45. In which of the following notochord is present in embryonic stage ?
- (1) All chordate
  - (2) Some chordates
  - (3) Vertebrates
  - (4) Non chordates

46. Given below are four matches of an animal and its kind of respiratory organ :

- A. Silver fish – Trachea
- B. Scorpion – Book lung
- C. Sea squirt – Pharyngeal gills
- D. Dolphin – Skin

The correct matches are

- (1) A and B
- (2) A, B and C
- (3) B and D
- (4) C and D

47. Which one of the following phyla is correctly matched with its two general characteristics ?

- (1) Mollusca – Normally oviparous and development through a trochophore or veliger larva
- (2) Arthropoda – Body divided into head, thorax and abdomen and respiration by tracheae
- (3) Chordata – Notochord at some stage and separate anal and urinary openings to the outside
- (4) Echinodermata – Pentamerous radial symmetry and mostly internal fertilization

48. Which of the following are referred as non-vertebrate chordates ?

- (1) Ciona, Ascidia, Amphioxus
- (2) Lamprey, Myxine, Shark
- (3) Scoliodon, Torpedo, Trygon
- (4) Pristis, Branchiostoma, Scyllium doutorostomes?



49. Lateral line sense organs are absent in :
- (1) Tadpole larva of frog (2) Bony fishes  
(3) Reptiles (4) Cartilaginous fishes
50. The termination of gastrulation is indicated by :
- (1) closure of neural tube (2) closure of blastopore  
(3) obliteration of archenteron (4) obliteration of blastocoel
51. The tendency of population to remain in genetic equilibrium may be disturbed by :
- (1) Lack of migration (2) Lack of mutations  
(3) Lack of random mating (4) Random mating
52. The two antibiotic resistance genes on vector pBR322 are for :
- (1) Tetracycline and Kanamycin  
(2) Ampicillin and Tetracycline  
(3) Ampicillin and Chloramphenicol  
(4) Chloramphenicol and Tetracycline
53. Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes ?
- (1) BOD incubator (2) Sludge digester  
(3) Industrial oven (4) Bioreactor
54. DNA precipitation out of a mixture of biomolecules can be achieved by treatment with :
- (1) Isopropanol  
(2) Chilled ethanol  
(3) Methanol at room temperature  
(4) Chilled chloroform

55. Following statements describe the characteristics of the enzyme Restriction Endonuclease. Identify the incorrect statement.
- (1) The enzyme cuts DNA molecule at identified position within the DNA.
  - (2) The enzyme binds DNA at specific sites and cuts only one of the two strands.
  - (3) The enzyme cuts the sugar-phosphate backbone at specific sites on each strand.
  - (4) The enzyme recognizes a specific palindromic nucleotide sequence in the DNA.
56. The correct order of steps in Polymerase Chain Reaction (PCR) is :
- (1) Extension, Denaturation, Annealing
  - (2) Annealing, Extension, Denaturation
  - (3) Denaturation, Annealing, Extension
  - (4) Denaturation, Extension, Annealing
57. Enzyme used in ELISA test is :
- (1) Endonuclease
  - (2) Ligase
  - (3) Peroxidase
  - (4) Polymerase
58. What will be the  $p\text{CO}_2$  and  $p\text{O}_2$  in atmospheric air as compared to alveoli respectively ?
- |                   |                  |
|-------------------|------------------|
| (1) Low and high  | (2) High and low |
| (3) High and high | (4) Low and low  |
59. In ureotelic animals, urea is formed by :
- (1) Krebs's cycle
  - (2) EM pathway
  - (3) Ornithine cycle
  - (4) Cori's cycle

PG-EE-2021/(Life Sciences)(SET-X)/(D)

60. Which one of the following mammalian cells is not capable of metabolising glucose to carbon-dioxide aerobically ?
- (1) Red blood cells
  - (2) White blood cells
  - (3) Unstriated muscle cells
  - (4) Liver cells
61. Which one of the following is a protein deficiency disease ?
- (1) Kwashiorkor
  - (2) Night blindness
  - (3) Eczema
  - (4) Cirrhosis
62. Which of the following statement is incorrect wrt inbreeding ?
- (1) Inbreeding increases homozygosity
  - (2) Inbreeding exposes harmful recessive gene that are eliminated by selection
  - (3) Inbreeding helps in accumulation of deleterious alleles and elimination of desirable alleles
  - (4) Inbreeding helps in developing a pure-line animal
63. What is correct to say about the hormone action in humans ?
- (1) In females, FSH first binds with specific receptors on ovarian cell membrane
  - (2) FSH stimulates the secretion of estrogen and progesterone
  - (3) Glucagon is secreted by B-cells of Islets of langerhans and stimulates glycogenolysis
  - (4) Secretion of thymosins is stimulated with aging

64. Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect development are the characteristics of phylum :
- (1) Protozoa
  - (2) Coelenterata
  - (3) Porifera
  - (4) Mollusca
65. Which of the following characteristics is mainly responsible for diversification of insects on land ?
- (1) Eyes
  - (2) Segmentation
  - (3) Bilateral symmetry
  - (4) Exoskeleton
66. Which of the following endoparasites of humans does show viviparity ?
- |                                    |                                  |
|------------------------------------|----------------------------------|
| (1) <i>Ascaris lumbricoides</i>    | (2) <i>Ancylostoma duodenale</i> |
| (3) <i>Enterobius vermicularis</i> | (4) <i>Trichinella spiralis</i>  |
67. Select the Taxon mentioned which represents both marine and fresh water species.
- (1) Echinoderms
  - (2) Ctenophora
  - (3) Cephalochordata
  - (4) Cnidaria
68. Which one of the following living organisms completely lacks a cell wall ?
- (1) Cyanobacteria
  - (2) Sea-fan(*Gorgonia*)
  - (3) *Saccharomyces*
  - (4) Blue-green algae

69. Biological organisation starts with :
- (1) Cellular level
  - (2) Organismic level
  - (3) Atomic level
  - (4) Submicroscopic molecular level
70. Peripatus is a connecting link between :
- (1) Coelenterata and Porifera
  - (2) Ctenophora and Platyhelminthis
  - (3) Mollusca and Echinodermata
  - (4) Annelida and Arthropoda
71. The C 4 plants are photosynthetically more efficient than C 3 plants because :
- (1) They have more chloroplasts
  - (2) The CO<sub>2</sub> compensation point is more
  - (3) CO<sub>2</sub> generated during photorespiration is trapped and recycled through PEP carboxylase
  - (4) The CO<sub>2</sub> efflux is not prevented
72. The frequency of recombination between gene pairs on the same chromosome as a measure of the distance between genes was explained by :
- (1) T.H. Morgan
  - (2) Gregor J. Mendel
  - (3) Alfred Sturtevant
  - (4) Sutton Boveri
73. What is the genetic disorder in which an individual has an overall masculine development gynaecomastia, and is sterile ?
- |                       |                            |
|-----------------------|----------------------------|
| (1) Turner's syndrome | (2) Klinefelter's syndrome |
| (3) Edward syndrome   | (4) Down's syndrome        |

74. A woman has an X-linked condition on one of her X chromosomes. This chromosome can be inherited by :
- (1) Only daughters (2) Only sons  
(3) Both sons and daughters (4) Only grandchildren
75. Which one of the following discoveries resulted in a Nobel Prize ?
- (1) X-rays induce sex-linked recessive lethal mutations  
(2) Cytoplasmic inheritance  
(3) Recombination of linked genes  
(4) Genetic engineering
76. Normally DNA molecule has A-T, G-C pairing. However, these bases can exist in alternative valency status owing to rearrangements called :
- (1) Frame-shift mutation (2) Tautomerisational mutation  
(3) Analog substitution (4) Point mutation
77. The most striking example of point mutation is found in a disease called :
- (1) Down's syndrome (2) Sickle cell anaemia  
(3) Edward syndrome (4) Night blindness
78. When two genetic loci produce identical phenotypes in cis and trans position, they are considered to be :
- (1) Multiple alleles (2) The parts of same gene  
(3) Pseudoalleles (4) Different genes
79. What map unit (Centimorgan) is adopted in the construction of genetic maps ?
- (1) A unit of distance between two expressed genes representing 10% cross over  
(2) A unit of distance between two expressed genes representing 100% cross over  
(3) A unit of distance between genes on chromosomes, representing 1 % cross over  
(4) A unit of distance between genes on chromosomes, representing 50% cross over

80. Expressed Sequence Tags (ESTS) refers to :
- (1) Genes expressed as RNA                      (2) Polypeptide expression  
(3) DNA polymorphism                          (4) Novel DNA sequences
81. Select one of the following of important features distinguishing Gnetum from Cycas and Pinus and showing affinities with angiosperms :
- (1) Embryo development and apical meristem  
(2) Absence of resin duct and leaf venation  
(3) Presence of vessel elements and absence of archegonia  
(4) Perianth and two integuments
82. Which one of the following is heterosporous ?
- (1) Equisetum  
(2) Dryopteris  
(3) Salvinia  
(4) Adiantum
83. A system of classification, in which a large number of traits are considered, is :
- (1) Natural system  
(2) Phylogenetic system  
(3) Artificial system  
(4) Synthetic system
84. The book 'Genera plantarum' was written by :
- (1) Engler & Prantl                              (2) Bentham & Hooker  
(3) Bessey    (4) Hutchinson
85. Phylogenetic classification is one which is based on :
- (1) Overall similarities                              (2) Utilitarian system  
(3) Habits of plants                                  (4) Common evolutionary descent

86. Endosperm of gymnosperm is ontogenetically similar to angiospermic :
- (1) Endosperm (2) Embryo sac  
(3) Archegonium (4) Megasporangia
87. Flowering plants are more successful than other members of the plant world because :
- (1) They are large and have a good vascular tissue system  
(2) They carry out variety of pollination mechanism  
(3) The protected plant embryo can survive in the period of unfavourable conditions  
(4) All of these
88. A. Heterospory is found in all members of pteropsida :  
B. Selaginella is advance among pteridophytes as it produces seeds  
C. Pinus leaves are monomorphic, pinnate compound and have sunken stomata as adaptation against transpiration  
D. Sporic meiosis is characteristic of life cycle in many organisms like Volvox, Chlamydomonas and Ulothrix.
- (1) All are incorrect (2) Both B and C are correct  
(3) Only B is correct (4) Only D is incorrect
89. Which phytohormone is synthesised in ripened fruits ?
- (1) ABA (2) Auxin  
(3) Cytokinin (4) Ethylene
90. Which of the following is incorrect about ethylene ?
- (1) Promotes root hair formation  
(2) It is natural and derivative of carotenoids  
(3) It increases the number of female flowers  
(4) It causes synchronisation of flowering and fruit set in pineapples



91. All the following may be methods for the inhibition of microbial growth by antibiotics except :
- (1) Antibiotics disrupt cell wall synthesis.
  - (2) Antibiotics interfere with cell membrane function.
  - (3) Antibiotics prevent the release of energy from ATP.
  - (4) Antibiotics inhibit the synthesis of protein.
92. In which of the following would you place the plants having vascular tissue lacking seeds ?
- |                   |                 |
|-------------------|-----------------|
| (1) Pteridophytes | (2) Gymnosperms |
| (3) Bryophytes    | (4) Algae       |
93. Apomixis is a type of reproduction in plants in which ?
- (1) Fertilization does not take place.
  - (2) Male nucleus takes part in fertilization.
  - (3) Embryo formation does not take place.
  - (4) Generative nucleus takes part in fertilization.
94. From which of the following algae, agar is commercially extracted ?
- (A) Gracillaria  
(B) Fucus  
(C) Sargassum  
(D) Gelidium  
(E) Turbinaria
- |             |             |
|-------------|-------------|
| (1) C and E | (2) B and C |
| (3) D and E | (4) A and D |
95. In which one of the following pairs of diseases is viral as well as transmitted by mosquitoes ?
- |  |  |
|--|--|
| (1) Elephantiasis and dengue           | (2) Yellow fever and sleeping sickness |
| (3) Encephalitis and sleeping sickness | (4) Yellow fever and dengue            |

96. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern Azolla is :
- (1) Tolypothrix (2) Nostoc  
(3) Chlorella (4) Anabaena
97. Ionophores are :
- (1) the gating mechanisms associated with the transport of ions.  
(2) intrinsic proteins that passively transport ions.  
(3) chemicals that form pores in the plasma membrane and allow ions to cross.  
(4) intrinsic proteins that actively transport ions.
98. The trans Golgi network is :
- (1) the intermediate compartment between the ER and the Golgi.  
(2) the part of the Golgi where fusion of vesicles from the ER occurs.  
(3) where sorting of proteins to the lysosomes, plasma membrane and cell exterior occurs.  
(4) the network of vesicles that transport proteins between Golgi cisternae.
99. Most human cells are diploid with total DNA content of  $2C$ . The DNA content increases to  $4C$  before the onset of mitosis. At anaphase, the DNA content of each cluster will be :
- (1)  $4C$  (2)  $2C$   
(3)  $1C$  (4)  $3C$
100. Malignant cancer cells have all of the following properties except :
- (1) unregulated cell division  
(2) inhibition of angiogenesis  
(3) resistance to apoptosis  
(4) cellular immortality