

Test Booklet Code & Serial No.

प्रश्नपत्रिका कोड व क्रमांक

Paper-II

LIFE SCIENCES

C

Signature and Name of Invigilator

1. (Signature)

(Name)

2. (Signature)

(Name)

Seat No.

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(In figures as in Admit Card)

Seat No.

(In words)

OMR Sheet No.

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(To be filled by the Candidate)

JUN - 34220

Time Allowed : 2 Hours]

[Maximum Marks : 200

Number of Pages in this Booklet : 24

Number of Questions in this Booklet : 100

Instructions for the Candidates

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- This paper consists of 100 objective type questions. Each question will carry two marks. All questions of Paper II will be compulsory.
- At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
 - To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal or open booklet.
 - Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to missing pages/questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.
 - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- Each question has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
Example : where (C) is the correct response.

<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
A	B	C	D
- Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only**. If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done at the end of this booklet.
- If you write your Name, Seat Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
- You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and duplicate copy of OMR Sheet on conclusion of examination.
- Use only Blue/Black Ball point pen.
- Use of any calculator or log table, etc., is prohibited.
- There is no negative marking for incorrect answers.

विद्यार्थ्यांसाठी महत्वाच्या सूचना

- परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
- सदर प्रश्नपत्रिकेत 100 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
 - प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये. पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.
 - वरीलप्रमाणे सर्व पडताळून पाहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
- प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळा करावा.
उदा. : जर (C) हे योग्य उत्तर असेल तर.

<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
A	B	C	D
- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शावावीत. इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
- आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
- प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
- जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूप केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गांचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापि, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
- फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.

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Life Sciences Paper II

Time Allowed : 120 Minutes]

[Maximum Marks : 200

Note : This Paper contains **Hundred (100)** multiple choice questions. Each question carrying **Two (2)** marks. Attempt *All* questions.

1. The way, species behave, obtain food and utilize the natural resources of an ecosystem, is called :

- (A) Species diversity
- (B) Ecosystem diversity
- (C) Functional diversity
- (D) Genetic diversity

2. In numerical taxonomy OTUS for analysis of species are :

- (A) Families
- (B) Genera
- (C) Species
- (D) Populations

3. Which of the following plant species has contributed to 'A' genome of *Triticum aestivum* ?

- (A) *Aegilops squarrosa*
- (B) *Aegilops tauschii*
- (C) *Triticum monococcum*
- (D) *Aegilops speltoides*

4. *Brassica juncea* is an amphidiploid from interspecific cross of *B. nigra* and

- (A) *B. napus*
- (B) *B. campestris*
- (C) *B. oleracea*
- (D) *B. carinata*

5. Which of the following display insecticidal activity ?

- (A) *Bacillus cereus*
- (B) *Bacillus subtilis*
- (C) *Bacillus stearothermophilus*
- (D) *Bacillus sphaericus*

6. Which of the following genotypes are most suitable as parents for hybrid variety development ?
- (A) Isogenic lines
 - (B) Near-Isogenic lines
 - (C) Pure lines
 - (D) Inbred lines
7. Which of the following DNA sequencing method uses luciferase to generate light for detection of the individual nucleotide added to the nascent DNA, and the combined data are used to generate DNA sequence ?
- (A) Maxam-Gilbert method
 - (B) Chain termination method
 - (C) Pyrosequencing
 - (D) Dye-terminator sequencing
8. In commercially available TLC plates the size of thin layer of absorbent is about :
- (A) 50 microns
 - (B) 0.2 mm
 - (C) 0.1 cm
 - (D) 600 microns
9. Higher supply of glucose inhibits transcription of lac operon because of low synthesis of :
- (A) Cyclic AMP
 - (B) Lac I encoded repressor protein
 - (C) Catabolite repressor protein
 - (D) Lactose
10. Androgenesis in plants refers to :
- (A) development of androecium
 - (B) development of anthers
 - (C) development of haploid embryo from microspores or pollen *in vitro*
 - (D) Initiation of androecium

11. Which of the following is *not* an *ex-situ* germplasm conservation strategy ?
- (A) Seed gene bank
 - (B) DNA gene bank
 - (C) Biosphere reserve
 - (D) Botanical garden
12. Hormone which substitutes long photoperiod required for flowering is :
- (A) Auxin
 - (B) Cytokinin
 - (C) Gibberellin
 - (D) Brassinosteroids
13. One of the following is very essential activity before execution of any developmental projects :
- (A) Biodiversity Surveys
 - (B) Environmental Impact Assessment
 - (C) Environmental Auditing
 - (D) Demographic Surveys
14. Which of the following statements is *not* true for satellite DNAs ?
- (A) These are highly repetitive DNA sequences
 - (B) They do not code for protein
 - (C) They are major constituent of centromeric heterochromatin region
 - (D) These are repetitive DNA sequences characterized by its relatively low rate of renaturation
15. A hybrid operon was constructed by fusing the structural genes of trp operon and promoter region of lac operon. Efficient expression of this chimeric operon will require :
- (A) Presence of both lactose and glucose
 - (B) Absence of lactose and presence of glucose
 - (C) Presence of both lactose and tryptophan
 - (D) Presence of lactose and absence of glucose

16. During respiration *correct* sequence of electron acceptors in ATP synthesis is :

- (A) Cyt *b*, *c*, a_3 , *a*
- (B) Cyt *c*, *b*, *a*, a_3
- (C) Cyt a_3 , *a*, *b*, *c*
- (D) Cyt *b*, *c*, *a*, a_3

17. A transcription unit is 8000 nucleotides long. If only 15% of this unit is exon, calculate the approximate molecular weight of the protein encoded :

- (A) 40 kDa
- (B) 1200 kDa
- (C) 44 kDa
- (D) 100 kDa

18. DNA repair mechanisms are able to distinguish newly synthesized DNA strands from older strands because :

- (A) new strands do not contain cytosine bases
- (B) old strands are methylated while new strands are not
- (C) new strands are methylated while old strands are not
- (D) new strands are heavy

19. Which of the following phosphorylated compounds on hydrolysis will yield highest amount of energy ?

- (A) Glucose 6-phosphate
- (B) ATP
- (C) 1, 3 Bisphosphoglycerate
- (D) Phosphoenolpyruvate

20. Fungi can synthesize one of the following structural polysaccharide from the beta-glucose :
- (A) amylopectin
 (B) chitin
 (C) cellulose
 (D) lignin
21. Which one of the following is a monophyletic group representing entirely parasitic species ?
- (A) Microsporida
 (B) Sarco-mastigophora
 (C) Apicomplexa
 (D) Helminthes
22. One of the common symptoms of a metabolic disorder is that the patients have lighter hair and skin colour than their siblings. What is the name of this disorder ?
- (A) Alkaptonuria
 (B) Tay-Sachs disease
 (C) Phenylketonuria
 (D) Cori's disease
23. Which of the following is the *correct* set of Lipinski's rules that helps in predicting poor absorption of a drug molecule in human physiological system ?
- (A) (i) The molecular weight is greater than 500.
 (ii) The number of hydrogen bonds is less than 5.
- (B) (i) The molecular weight is greater than 500.
 (ii) The number of hydrogen bonds is greater than 5.
- (C) (i) The molecular weight is less than 500.
 (ii) The number of hydrogen bonds is less than 5.
- (D) (i) The molecular weight is less than 500.
 (ii) The number of hydrogen bonds is greater than 5.

24. The final stable community in ecological succession is :
- (A) Climax
 - (B) Sere
 - (C) Pioneers
 - (D) Carnivores
25. Which one of the following is *not* a functional unit of an ecosystem ?
- (A) Productivity
 - (B) Stratification
 - (C) Energy flow
 - (D) Decomposition
26. Cyanide or azide used in poisoning, irreversibly bind to that acts as a critical link between aerobic respiration and oxygen.
- (A) Succinate dehydrogenase
 - (B) Coenzyme Q
 - (C) NADH dehydrogenase
 - (D) Cytochrome C Oxidase
27. Klinefelter's Syndrome is identified by one of the following karyotypes ?
- (A) 45, XO
 - (B) 47, XXY
 - (C) 45, XY
 - (D) 45, XX
28. What is the normal role of restriction enzyme in bacterial cells ?
- (A) to degrade the bacterial chromosome into small pieces during replication
 - (B) to degrade invading phage DNA
 - (C) to produce RNA primers for replication
 - (D) to restrict growth of the bacterium

29. The tryptophan operon in *Escherichia coli* demonstrates level of regulation called by the termination of transcription if tryptophan is abundant in cells.
- (A) activation
(B) corepression
(C) attenuation
(D) termination
30. Which of the following transmits 'Yellow fever' and 'West Nile fever' ?
- (A) Ticks
(B) Kissing bugs
(C) Deer flies
(D) Mosquitoes
31. The highest level of succinic dehydrogenase is found in which one of the following muscle fiber types ?
- (A) White fibers
(B) Intermediate fibers
(C) Pink fibers
(D) Red fibers
32. The traditional division of the flowering plants into monocots and dicots is not followed into system of classification.
- (A) APG
(B) Bentham and Hooker's
(C) Engler and Prantl's
(D) Armen Takhtajan's
33. Active transport of a substance across a membrane requires :
- (A) a gradient
(B) water
(C) ATP
(D) Phospholipid
34. Most fungi derive nutrition through :
- (A) Photosynthesis
(B) Engulfing bacteria
(C) Digesting organic substrates
(D) Engulfing protozoa

35. Cytokinines are :

- (A) Adenine derivatives
- (B) Guanine derivatives
- (C) Cytosine derivatives
- (D) Thymine derivatives

36. Coiled cochlea is found in :

- (A) Mammals
- (B) Mammals as well as in birds
- (C) Birds and reptiles
- (D) All vertebrates without exception

37. Some behaviour patterns appear only after a specific developmental stage or time. This stage/time is called :

- (A) Imprinting
- (B) Maturation
- (C) Learning
- (D) Instinct

38. The absorbance A , of a 5×10^{-4} M solution of the amino acid tyrosine, at a wavelength of 280 nm, is 0.75. The path length of cuvette is 1 cm. What is the molar absorption coefficient (ϵ) ?

- (A) $150 \text{ M}^{-1} \text{ cm}^{-1}$
- (B) $1500 \text{ M}^{-1} \text{ cm}^{-1}$
- (C) $3000 \text{ M}^{-1} \text{ cm}^{-1}$
- (D) $4500 \text{ M}^{-1} \text{ cm}^{-1}$

39. Secondary conformation of a globular protein in solution can be best determined by :

- (A) Fluorescence spectroscopy
- (B) Electron microscopy
- (C) Analytical ultracentrifugation
- (D) Circular dichroism

40. The transition from mitotically dividing spermatogonia to meiotically dividing spermatocytes is promoted by :
- (A) Nerve growth factor
 (B) Retinoic acid
 (C) Stem cell factor
 (D) Glial-derived neurotrophic factor
41. The nerve impulse :
- (A) can propagate in both the directions in an axon
 (B) can propagate from axon hillock towards terminal only
 (C) cannot propagate from terminal towards soma
 (D) can propagate in an injured neuron only
42. Which of the following sequence of biomass is *not* correct ?
- (A) Tundra-Taiga-Steppes
 (B) Downs-Savannah-Mediterranean
 (C) Veldts-Tropical rain forests-Deserts
 (D) Tropical rain forests-Mediterranean-Savannah
43. The radioactive iodine (^{131}I) has a half life of eight days. The amount of 0.5 g sample left after 32 days would be :
- (A) 125 mg
 (B) 62.5 mg
 (C) 31.25 mg
 (D) 0.25 g

44. ATP can be formed from ADP by direct transfer of a phosphoryl group from phosphoenol pyruvate. Such type of reaction is called as :
- (A) Photo-phosphorylation
 (B) Oxidative phosphorylation
 (C) Substrate level phosphorylation
 (D) Reductive phosphorylation
45. Which of the following viruses has DNA as its genome ?
- (A) HIV
 (B) Tobacco mosaic virus
 (C) Cauliflower mosaic virus
 (D) Cucumber mosaic virus
46. Two proteins have the same molecular weight and same isoelectric point. The best way to resolve them would be by :
- (A) Ion exchange chromatography
 (B) Gel filtration chromatography
 (C) Reverse-phase chromatography
 (D) Chromato-focusing
47. The unit of pollen dispersal in *Calotropis* is :
- (A) dyad
 (B) tetrad
 (C) monad
 (D) pollinium
48. Root Inducing (RI) plasmid was derived from :
- (A) *Agrobacterium tumefaciens*
 (B) *Agrobacterium rhizogenes*
 (C) *Azotobacter vinelandii*
 (D) *Azospirillum brasilense*
49. Synaptogenesis helps in :
- (A) Survival of glia
 (B) Survival of neurons
 (C) Giving shape to and keeping neurons in place
 (D) Memory formation and storage

50. In developing brain, notch signalling :
- (A) promotes neuron formation only
 - (B) promotes astrocyte formation and inhibits neuron formation
 - (C) inhibits stem cells to form neural progenitor cells
 - (D) inhibits astrocyte formation only
51. Which one of the following enzymes can alter the linking number of covalently closed circular form of DNA ?
- (A) Primase
 - (B) DNA polymerase
 - (C) Ligase
 - (D) Gyrase
52. The term carcinoma is applicable to malignant growth of :
- (A) bone tissues
 - (B) muscle tissues
 - (C) bone marrow cells
 - (D) epithelial tissues
53. Pseudo-metameric segmentation is a feature of one of the following :
- (A) Cestoda
 - (B) Nematoda
 - (C) Trematoda
 - (D) Ectoprocta
54. Microtubules are composed of :
- (A) Desmin
 - (B) Actin and Myosin
 - (C) Tubulin
 - (D) Flagellin
55. The grafting experiment of Hammerling established the role of nucleus in heredity. The experimental material used in this experiment was :
- (A) *Scenedesmus*
 - (B) *Acetabularia*
 - (C) *Chlorella*
 - (D) *Chara*

56. Monooxygenases that catalyse the additions of –OH during steroid biosynthesis and drug detoxifications are present in :

- (A) Peroxisomes
- (B) Smooth endoplasmic reticulum
- (C) Golgi complex
- (D) Rough endoplasmic reticulum

57. *Arenicola* and *Amphitrite* are :

- (A) “Missing link” between annelids and arthropods
- (B) Sedantary tube-dwelling polychaetes
- (C) Benthic trilobites
- (D) Planktonic trilobites

58. Thanatophoric dysplasia, in which growth plates of ribs and limbs fail to proliferate leading to the death of baby soon after its birth is due to mutations in pathway.

- (A) RTK
- (B) JAK-STAT
- (C) Hedgehog
- (D) Wnt

59. Heterocyst from cyanobacteria contains enzyme :

- (A) Pectinase
- (B) Cellulase
- (C) Nitrogenase
- (D) Phosphorylase

60. Which hormone is involved in counteracting apical dominance induced by auxin ?

- (A) Cytokinin
- (B) Ethylene
- (C) ABA
- (D) Brassinosteroids

61. You are looking at a specimen with a compound microscope. The ocular lens has a magnification of 8X and the objective lens has a magnification of 2X. What is the total magnification ?

- (A) 2X
- (B) 8X
- (C) 10X
- (D) 16X

62. Which of the following is *true* for enzyme catalyzed reactions ?

- (A) K_m is affinity constant
- (B) V_{max} can never be achieved
- (C) $K_m = \frac{1}{2}V_{max}$
- (D) $K_m = V_{max}$

63. Which of the following statements about monosaccharides is *correct* ?

P— Epimers of monosaccharides differ in chemical properties.

Q— In aldoses, C_1 is the anomeric carbon.

R— Anomers differ in configuration at the glycosidic carbon.

S— Epimers differ in configuration at any carbon other than glycosidic carbon.

- (A) R and S
- (B) P and Q
- (C) Q, R and S
- (D) P, Q, R and S

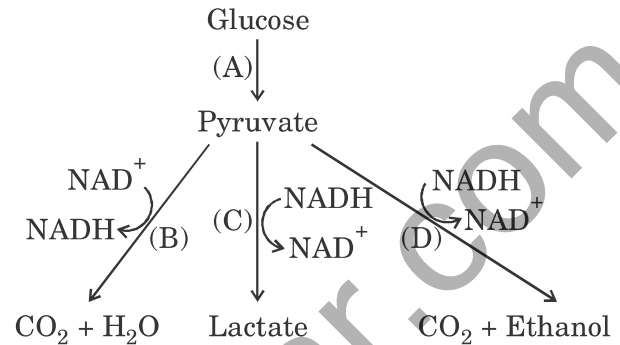
64. If a naive T cell recognizes an antigen-MHC complex on an appropriate antigen-presenting cell or target cell, it will be activated, initiating :

- (A) a primary response
- (B) a secondary response
- (C) a prophylactic response
- (D) degranulation of mast cells

65. A Ramchandran plot describes, for a particular amino acid in a polypeptide chain, sterically allowed angles for :

- (A) $C\alpha-C$ and $C\alpha-CB$ bonds
- (B) $C\alpha-C$ and $C\alpha-N$ bonds
- (C) $C\alpha-C$ and $C\alpha-H$ bonds
- (D) $C\alpha-N$ and $C\alpha-H$ bonds

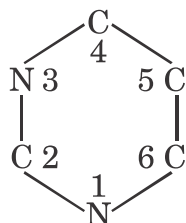
66.



What are (A), (B), (C) & (D) in the above diagram ?

- (A) Glycolysis, TCA cycle, homolactic fermentation and alcoholic fermentation
- (B) Glycolysis, TCA cycle, alcoholic fermentation and homolactic fermentation
- (C) Glycolysis, homolactic fermentation, TCA cycle and alcoholic fermentation
- (D) Glycolysis, alcoholic fermentation, homolactic fermentation and TCA cycle

67. Various atoms of pyrimidine ring are derived from :



- (A) N1, C4, C5, C6-Aspartate, C2-Bicarbonate and N3-Glutamine
- (B) N1, C4, C5, C6-Glutamine, C2-Bicarbonate and N3-Aspartate
- (C) N1, C4, C5, C6-Aspartate, C2-Bicarbonate and N3-Glutamate
- (D) N1, C4, C5, C6-Asparagine, C2-Bicarbonate and N3-Glutamine

68. Lac repressor is an example of :

- (A) Helix loop helix
- (B) Helix turn helix
- (C) C₂C₂ zinc finger
- (D) C₂H₂ zinc finger

69. Of the following which is *not* involved in steady state regulation of hematopoiesis ?

- (A) Control of the levels and types of cytokines produced by stromal cells in bone marrow
- (B) Production of cytokines with hematopoietic activity by cells such as activated T cells and macrophages
- (C) Removal of some cells by the controlled induction of cell death
- (D) Mesangial cells

70. The evolution of tetrapods marks their origin from :

- (A) Actinopterygians
- (B) Chondropterygians
- (C) Sarcopterygians
- (D) Holocephalians

71. is/are the only non-protein component/s of the electron transport system.
- (A) Cytochromes
 (B) NAD and FAD
 (C) Fe-S center
 (D) Coenzyme-Q
72. During the evolution of life, the first formed cells were :
- (A) Photoautotrophs
 (B) Saprotrophs
 (C) Chemoautotrophs
 (D) Chemoheterotrophs
73. In every cycle of its activity, at the expense of one ATP molecule, one Na-K ATPase :
- (A) extrudes 1Na^+ and takes in 3K^+
 (B) extrudes 3Na^+ and takes in 2K^+
 (C) extrudes 3K^+ and takes in 3Na^+
 (D) extrudes 1Na^+ and takes in 1K^+
74. During the evolution of life, the first formed photosynthetic organisms were :
- (A) algae
 (B) cyanobacteria
 (C) mycoplasmas
 (D) bryophytes
75. A phenomenon in which animals adapted to temperate regions have shorter and poorly developed ears, eyes, hair and other phenotypic traits follow :
- (A) Bergmann's law
 (B) Cope's law
 (C) Allen's law
 (D) Dollo's law
76. If one wishes to determine the variation in the body size of frogs from four different populations, the appropriate test statistics would be :
- (A) Student *t*-test
 (B) Chi-square
 (C) Regression analysis
 (D) F-test

77. Which one of the following is *not* a characteristic of competitive inhibition of an enzyme ?

- (A) It results in increase of K_m
- (B) There is no change in K_m
- (C) The inhibitor binds to active site of enzyme
- (D) It can be relieved by increasing the concentration of substrate

78. Sampling of a gene pool occurs in sexual reproduction because :

- (A) not all gametes form zygotes
- (B) not all of the alleles find their way into gametes
- (C) meiosis does not produce perfect copies of the parental genotype
- (D) recombination causes genes to be shuffled

79. State, whether the following two statements (I and II), are true or false :

- (I) A reaction is said to be spontaneous when it can proceed in either the forward or reverse direction.
- (II) A spontaneous process can occur with a large decrease in entropy.

- (A) I = False and II = False
- (B) I = True and II = False
- (C) I = False and II = True
- (D) I = True and II = True

80. Exo-erythrocytic schizogony in the life cycle of malarial parasite *Plasmodium* occurs in :

- (A) Red blood cells
- (B) Liver
- (C) Blood
- (D) Mosquito stomach

81. Two zoogeographical regions, separated by high mountain ranges are :
- (A) Palaearctic and Oriental
 - (B) Neotropical and Ethiopian
 - (C) Nearctic and Palaearctic
 - (D) Oriental and Australian
82. Members of all the following genera of bacteria are typically found in a maturing Winogradsky column *except* :
- (A) *Clostridium*
 - (B) *Rhodospirillum*
 - (C) *Desulfovibrio*
 - (D) *Escherichia*
83. Calculate the pI value of aspartic acid from the given pK values. (Given : $pK_1 = 1.99$, $pK_2 = 9.90$ and $pK_R = 3.90$)
- (A) 2.945
 - (B) 5.945
 - (C) 6.9
 - (D) 7.895
84. This type of enzyme regulation is irreversible in nature :
- (A) Allosteric regulation
 - (B) Regulation by covalent modification
 - (C) Zymogen activation
 - (D) cAMP mediated regulation
85. Stringent response in bacteria leads to accumulation of these unusual nucleotides :
- (A) pGpp and pGppp
 - (B) ppGpp and pppGpp
 - (C) pppGp and ppGp
 - (D) cGMP and cAMP
86. With passage of time, the molecular distance between organisms increases during evolution due to :
- (A) Random drift
 - (B) Genetic drift
 - (C) Neutral mutations
 - (D) Point mutations

87. Ernst Myer was a proponent of :

- (A) Phylogenetic species concept
- (B) Biological species concept
- (C) Recognition species concept
- (D) Evolutionary species concept

88. How many peptide fragments will be generated by the action of cyanogen bromide (CNBr) on the oligopeptide of the following sequence ?

Gly—Ala—His—Arg—Asp—Met—
Cys—Lys—Val—Leu

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

89. Alien species experience when introduced to a new ecosystem.

- (A) extinction
- (B) exponential growth
- (C) secondary succession
- (D) character displacement

90. Which of the following enzymes is only involved in gluconeogenesis pathway ?

- (A) Hexokinase
- (B) Phosphofructokinase
- (C) 3-phosphoglycerate kinase
- (D) Pyruvate kinase

91. The ability of a site to control adjacent genes in DNA sequence irrespective of the presence of the alleles is called as :

- (A) Overlapping site
- (B) Cis acting site
- (C) Trans acting site
- (D) Cis-trans acting site

92. Biome is :
- (A) The fauna of a terrestrial ecosystem
 - (B) The flora of an ecosystem
 - (C) Communities of organisms in an ecosystem interacting with each other
 - (D) A part of the earth along with its atmosphere inhabited by living organisms
93. The root mean square deviation is commonly known as :
- (A) Variance
 - (B) Standard deviation
 - (C) Mean deviation
 - (D) Quartile deviation
94. *Legionella* sp. multiply intracellularly within, just as they do within human monocytes and macrophages.
- (A) amoeba
 - (B) bacteria
 - (C) fungi
 - (D) plants
95. The Redfield ratio is an index of concentration of :
- (A) Carbon, hydrogen, oxygen
 - (B) Nitrogen, potassium, iron
 - (C) Carbon, nitrogen, sulfur
 - (D) Carbon, nitrogen, phosphorus
96. Transplantation of stem cell populations from genetically identical donor to recipient is said to be :
- (A) Autologous
 - (B) Syngeneic
 - (C) Allogeneic
 - (D) Xenogeneic
97. The procapsid is assembled with the aid of proteins.
- (A) Ladder
 - (B) Framing
 - (C) Scaffolding
 - (D) Form

98. *Arabidopsis* plants have 10 chromosomes (5 pairs) in their somatic cells. How many chromosomes are present in each of the following ?

- (i) egg cell nucleus in the female gametophyte
- (ii) generative cell nucleus in a pollen grain
- (iii) endosperm nucleus
- (iv) fertilized egg nucleus

- (A) 5, 5, 15, 10
- (B) 5, 5, 10, 15
- (C) 15, 10, 5, 5
- (D) 10, 15, 5, 5

99. Vegetable seeds purchased from the market germinate when exposed to light with wavelength 660 nm. When followed by a brief exposure to 730 nm they fail to germinate and will germinate when given an exposure of 660 nm.

So we can conclude :

- (A) Exposure to 660 nm converts Pr \rightarrow Pfr
- (B) Exposure to 730 nm converts Pr \rightarrow Pfr
- (C) Germination is influenced by red light
- (D) Germination is not influenced by red light

100. In Gymnosperms the wood is of two types namely :

- (A) Manoxylic and homoxylic
- (B) Pycnoxylic and homoxylic
- (C) Manoxylic and Pycnoxylic
- (D) Manoxylic and Polyxylic

ROUGH WORK

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