



Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक
Paper-II
LIFE SCIENCE

A

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 - 34225
Time Allowed : 2 Hours]
Number of Pages in this Booklet : 24

[Maximum Marks : 200
Number of Questions in this Booklet : 100

- Instructions for the Candidates**
1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.

2. This paper consists of 100 objective type questions. Each question will carry two marks. All questions of Paper II will be compulsory.

3. 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 :

(i) 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.

(ii) 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.

(iii) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.

4. 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 (B) is the correct response.

A

☒

C

D

Following wrong methods should not be used as they are not recognised by scanning machine in digitized assessment. Candidate using such method will be responsible for their loss.

WRONG METHODS			
A B C D	A B C D	A B C D	A B C D

5. 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.

6. Read instructions given inside carefully.

7. Rough Work is to be done at the end of this booklet.

8. 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.

9. 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.

10. Use only Blue/Black Ball point pen.

11. Use of any calculator or log table, etc., is prohibited.

12. There is no negative marking for incorrect answers.
- विद्यार्थ्यासाठी महत्वाच्या सूचना**

1. परीक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणास दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.

2. सदर प्रश्नपत्रिकेत 100 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे.

3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनिटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून घ्याव्यात.

(i) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्वीकारू नये.

(ii) पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून घ्यावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा क्रम असलेली किंवा इतर त्रुटी असलेली संपूर्ण प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटांतच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.

(iii) वरीलप्रमाणे सर्व पडताळून पाहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.

4. प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काढू/निळा करावा.
उदा. : जर (B) हे योग्य उत्तर असेल तर.

A

☒

C

D

खालील चुकीच्या पद्धती वापरू नये, कारण डिजिटाइज्ड (Digitized) मूल्यांकनात स्कॅनिंग मशीन त्यांना ओळखत नाही. त्या पद्धती वापरून नुकसान झाल्यास त्यास विद्यार्थीच जबाबदार असतील.

WRONG METHODS			
A B C D	A B C D	A B C D	A B C D

5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.

6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.

7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.

8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणाव्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गांचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस आपात्र ठरविण्यात येईल.

9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापि, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.

10. फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.

11. कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.

12. चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.



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Your Personal Exam Guide





JUN - 34225/II—A

Life Science
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. DNA is supercoiled state can be relaxed by an enzymatic process. Which enzyme catalyses relaxation of supercoiled DNA ? (A) DNA helicase (B) Type-I topoisomerase (C) DNA ligase (D) Type-II topoisomerase	3. Which one of the following conditions is true for parthenogenesis ? (A) Syngamy occurs (B) Syngamy fails (C) Gametogenesis fails (D) Gametogenesis occurs
2. Adaptive radiation produced numerous lineages from reptiles during chordates evolution, one of the following gave rise to mammals : (A) Plesiosaurus (B) Ichthyosaurus (C) Pterosaurus (D) Therapsids	4. Which one produces highest isotope effect ? (A) ³H (B) ¹⁴C (C) ³²P (D) ³⁵S 5. Which of the following is critical for differentiation of bipotential gonads towards ovarian pathway ? (A) SOX 9 (B) FGF 8 (C) Wnt 4 (D) BMP 4





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|---|--|
| <p>6. The urge to inhale in human being results from :</p> <p>(A) Rising level of PCO_2</p> <p>(B) Rising level of PO_2</p> <p>(C) Falling level of PCO_2</p> <p>(D) Falling level of PO_2</p> <p>7. Which of the following is responsible for triggering formation of other enzymes ?</p> <p>(A) Trypsin</p> <p>(B) Enterokinase</p> <p>(C) Carboxypeptidase</p> <p>(D) Chymotrypsin</p> <p>8. Embryo of marine organism Bonellia develop into male if it develops in</p> <p>(A) Isolated condition</p> <p>(B) Close vicinity of mature male</p> <p>(C) Close vicinity of mature female</p> <p>(D) Starved condition</p> | <p>9. The PCR technique that allows measuring of DNA amplification at each cycle of PCR rather than the end point detection is :</p> <p>(A) Hot start PCR</p> <p>(B) Nested PCR</p> <p>(C) Real Time PCR</p> <p>(D) Reverse Transcriptase PCR</p> <p>10. How many different amino acid sequences are possible in a polypeptide 146 amino acids long ?</p> <p>(A) $(20)^{146}$</p> <p>(B) 20×146</p> <p>(C) $(3)^{146}$</p> <p>(D) $(146)^{20}$</p> <p>11. During photosynthesis, which minerals are required in a splitting reaction ?</p> <p>(A) Potassium and Manganese</p> <p>(B) Magnesium and Chlorine</p> <p>(C) Potassium and Chlorine</p> <p>(D) Manganese and Chlorine</p> |
|---|--|



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12. Absciscic acid responsive elements (ABREs) are over-represented in promoter of genes involved in
(A) Biotic stress
(B) Nitrogen fixation
(C) Drought stress
(D) Flowering
13. In humans pointed eyebrows are dominant over smooth eyebrows and downward pointed frontal hairline is dominant over continuous hairline. What phenotypic ratio would you expect in the offspring from a cross between an individual heterozygous for both genes and an individual homozygous recessive for both genes ?
(A) 9 : 3 : 3 : 1
(B) 9 : 3 : 4
(C) 1 : 1 : 1 : 1
(D) 9 : 7
14. From a human usage perspective, and as long as the rate of replenishment or recovery exceeds the rate of consumption such resource is termed as :
(A) Non-renewable resource
(B) Limited resource
(C) Renewable resource
(D) Short-term resource
15. To capture the data of various resources ISRO developed one of the following sensors and deployed on IRS satellites :
(A) MSS-TM
(B) LISS
(C) AVHRR
(D) CZCS



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16. The highly repetitive DNA sequences form a cluster upto 20 kb with 20-59 repeat units each containing 15 to 100 bp are called as :
- (A) Satellite DNA
(B) Minisatellites
(C) Microsatellites
(D) Pseudogenes
17. Glycosyl transferases and glycosidases are predominantly found in which cell organelle ?
- (A) Golgi apparatus
(B) Endoplasmic reticulum
(C) Nucleus
(D) Mitochondria
18. Which of the following transport process is carried out by receptor mediated endocytosis ?
- (1) Cholesterol uptake
(2) Calcium uptake
(3) Virus entry into the host cell
(4) Proton movement
- (A) (1) and (2)
(B) (2) and (3)
(C) (1) and (3)
(D) (3) and (4)
19. In mammals, during development from which cell population the embryo will form :
- (A) Blastocyst
(B) Inner cell mass
(C) Trophectoderm
(D) Extra embryonic membrane
20. The light sensitive photoproteins responsive to red light are :
- (A) Phytochromes
(B) Cryptochromes
(C) Phototropins
(D) Cytochromes
21. A single gene can often have multiple effects on the phenotype of an organism, affecting a number of apparently unrelated traits. This phenomenon is known as :
- (A) Epistasis
(B) Polygenic inheritance
(C) Pleiotropy
(D) Epigenetic effect



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22. The flip-flop movement of lipids in biological membranes is studied using which spectroscopic technique ?
- (A) UV-visible absorption spectroscopy
 - (B) Atomic absorption spectroscopy
 - (C) ESR spectroscopy
 - (D) NMR spectroscopy
23. Which phase of microbial growth is characterized by synthesis of secondary metabolites that may not be critical to the microbe's function ?
- (A) Exponential phase
 - (B) Early stationary phase
 - (C) Late stationary phase
 - (D) Lag phase
24. What provision a typical bioreactor possess to overcome the vortex formation during fermentation ?
- (A) Stuffing boxes
 - (B) Sparger
 - (C) Agitator
 - (D) Baffles on the side walls of fermentor
25. Normally, S-A node of the heart, rather than the A-V node, controls the heart rhythmicity because :
- (A) A-V node does not possess self-excitatory property
 - (B) S-A node has rich nerve connection from the brain autonomic nervous system
 - (C) Purkinje fibres keep S-A node depolarized
 - (D) Discharge rate of the S-A node is considerably faster than the natural self-excitatory discharge rate of the A-V node
26. Which of the following component binds to protein and guides for its degradation ?
- (A) Ubiquitin
 - (B) Methylation
 - (C) Acetylation
 - (D) Phosphorylation





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27. Which of the following type of RNA functions as components of RNA splicing machinery ?
- (A) *t*-RNA
(B) Small nuclear RNA (Sn RNA)
(C) Small interfering RNA (Si RNA)
(D) Micro RNA
28. Genes coding for which of the following do not form an integral component of the conserved genetic pathway that controls ageing :
- (A) DNA repair enzymes
(B) Proteins involved in insulin signalling pathway
(C) Chromatin remodelling enzymes
(D) Enzymes involved in cellular respiration
29. In the absence of element, Nitrogen metabolism is not possible.
- (A) Zinc
(B) Molybdenum
(C) Boron
(D) Manganese
30. On handling *Physalia*, a representative of phylum Cnidaria, it stimulates nematocysts to release bio-active compound. This compound is of the nature of :
- (A) Hypnotoxin
(B) Haemotoxin
(C) Neurotoxin
(D) Metalotoxin
31. Which of the following is considered as a natural place of an organism or community ?
- (A) Habit
(B) Habitat
(C) Niche
(D) Biome
32. Which form of the DNA is most often formed as a result of deoxyguanosine-deoxycytosine [Poly (dG-dC)] and require fairly high salt concentration *in vitro* ?
- (A) A-form
(B) B-form
(C) Z-form
(D) PNA





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33. Antibody engineering can be done by :

 - (A) Hybridoma technique
 - (B) Injecting antigens into animals for a prolonged period
 - (C) Site directed mutagenesis
 - (D) Embryo cloning technique

34. Prions have been reported to kill :

 - (A) Humans only
 - (B) Cattle only
 - (C) Monkeys and Poultry
 - (D) Humans and Cattle

35. To which kingdom do cyanobacteria belong ?

 - (A) Fungi
 - (B) Eubacteria
 - (C) Plantae
 - (D) Protista

36. What is the role of β -mercapto-ethanol and bromophenol blue used in separation of proteins by SDS-PAGE ?

 - (A) Anionic detergent and protein staining
 - (B) Reducing agent and tracking dye
 - (C) Oxidising agent and protein staining
 - (D) Reducing agent and marker protein

37. Groups of alleles associated with lactose operon are as follows (in order of dominance for each allelic series) : Repressor – I^S -(super repressor), I^+ (inducible), I^- (constitutive);

Operator – O^C (Constitutive, cis dominant),
 O^+ (Inducible, cis dominant)

Structural – Z^+ , Z^-

Which of the following genotypes will produce β galactosidase if lactose is present ?

 - (I) $I^+ O^+ Z^+ Y^+$
 - (II) $I^- O^C Z^+ Y^+$
 - (III) $I^S O^C Z^- Y^-$
 - (IV) $I^S O^+ Z^+ Y^+$
 - (A) (I) and (II) only
 - (B) (I), (II) and (IV) only
 - (C) (I), (III) and (IV) only
 - (D) (I) only





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38. The presence of auxin can be detected using the following bioassay :

- (A) Only tobacco pith culture
- (B) Tobacco pith culture and *Avena* curvature test
- (C) A curvature test related to tobacco pith culture and split pea stem
- (D) Tests related to split pea stem curvature and *Avena* curvature

39. Which of the following is the earliest indication of the first differentiation event in mammalian embryos ?

- (A) Maternal to zygotic transition
- (B) Cavitation
- (C) Blastocyst formation
- (D) Compaction

40. Select the description from Column II that best fits the conidiospores given in Column I :

Column I

- (L) Arthrospore
- (M) Phialospore
- (N) Blastospore
- (O) Chlamydospore

Column II

- (1) Spherical spore formed by thickening of hyphal cells
- (2) Spore produced by budding from a parent cell
- (3) Budded from the mouth of sterigma
- (4) Rectangular spore formed when septate hyphae fragments at the cross walls

Codes :

	(L)	(M)	(N)	(O)
(A)	(1)	(2)	(4)	(3)
(B)	(4)	(1)	(3)	(2)
(C)	(4)	(3)	(2)	(1)
(D)	(3)	(4)	(1)	(2)





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41. The following list describes the specific activities and goals of associated with genome analysis. Indicate which one of the following cannot be described as an example of functional genomics.
- (A) Making gene knock outs and observing phenotypic changes associated with them
 - (B) Developing DNA microarrays
 - (C) Characterizing the proteome present in a cell at a specific developmental stage
 - (D) Sequencing individual BAC or PAC clones aligned in a contig using shotgun approach
42. What type of bacteria usually lack the genetic and metabolic mechanisms to synthesize growth factor they need for survival in the environment ?
- (A) Prototrophic bacteria
 - (B) Auxotroph or fastidious bacteria
 - (C) Autotrophic bacteria
 - (D) Syntrophic bacteria
43. Cytoplasm consists of all the fluid part :
- (A) Within a cell, except the fluid within the nucleus
 - (B) As well as structures within cell membrane
 - (C) And structures within the plasma membrane except the nucleus
 - (D) Inside the cell membrane including the nucleus
44. Which of the following two statements are not true with respect to the properties of water molecules ?
- (i) Density of water is maximum at 4°C
 - (ii) Water molecules dissociate very strongly
 - (iii) Water has high heat of vaporization
 - (iv) Water is a non-polar molecule
- (A) (i) and (ii)
 - (B) (ii) and (iii)
 - (C) (i) and (iv)
 - (D) (ii) and (iv)



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45. The mice that are homozygous for null allele of which of the following exhibit defective spermatogenesis ?
- (A) Sonic hedgehog
(B) Desert hedgehog
(C) Indian hedgehog
(D) Fibroblast growth factor
46. Which one of the following species of Mycobacteria is generally regarded as non-pathogenic ?
- (A) Mycobacterium bovis
(B) Mycobacterium smegmatis
(C) Mycobacterium leprae
(D) Mycobacterium tuberculosis
47. Find out the pKa value of an acid HA. The concentration of HA and A^- are 0.90 M and 0.30 M respectively at pH 6.0.
- (A) 3.68
(B) 4.48
(C) 5.52
(D) 6.48
48. Allosteric enzymes will have the following property :
- (A) Sigmoidal kinetics
(B) Rectangular hyperbolic curve
(C) Competitive inhibition
(D) Fixed K_m value.
49. Which of the following are key regulatory enzymes of the citric acid cycle ?
- (A) Aconitase and isocitrate dehydrogenase
(B) Pyruvate dehydrogenase and citrate synthase
(C) Isocitrate dehydrogenase and α -ketoglutarate dehydrogenase
(D) Succinate dehydrogenase and malate dehydrogenase
50. Which of the following mutagens is most likely to result in a single amino acid change in a gene product ?
- (A) Ethidium bromide
(B) Acriflavine
(C) Ethyl methane sulphonate
(D) Acridine orange



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51. The composition of constituents of the interstitial fluid where it is formed is :
- (A) Identical to that of the plasma
- (B) Almost similar as that of the plasma, except that the protein concentration is significantly lesser than those in the plasma
- (C) Almost similar as that of the plasma, except that the concentration of Na^+ , K^+ , Ca^{2+} is significantly lesser than in the plasma
- (D) Lower, except the protein concentration, which is higher than that in the plasma
52. During accommodation, for distinct vision in human eyes, the :
- (A) Cornea moves front and back
- (B) Anterior surface of the lens changes its curvature
- (C) Posterior surface of the lens changes its curvature
- (D) The lens moves back and front
53. Which of the following is not likely to be dependent on adult body size ?
- (A) Area of habitat required to support reproductive activity
- (B) Generation time
- (C) Adaptability
- (D) Number of reproductive events





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54. Consider the following statements about binary vector used for plant transformation ?

- (i) Binary vector are *Agrobacterium* based vectors
- (ii) Binary vector contains both bacterial and plant selectable marker
- (iii) Binary vector have virulence (Vir) region
- (iv) There is presence of T-DNA left and right border repeat sequences

Which of the above statements are correct :

- (A) (i), (ii), (iii) and (iv)
- (B) (i), (ii) and (iii)
- (C) (i), (ii) and (iv)
- (D) (ii), (iii) and (iv)

55. Which of the following transcription factor phosphorylates Carboxy Terminal Domain (CTD) of RNA polymerase-II ?

- (A) TFIIA
- (B) TFIIF
- (C) TFIIB
- (D) TFIIE

56. Which one of the following RNA sequence is not involved in regulation of λ phase gene expression ?

- (A) Box A
- (B) Box B
- (C) Box C
- (D) Box D





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57. Anthocyanins are coloured

(A) Flavonoids

(B) Alkaloids

(C) Terpenoids

(D) Tannins
58. Which one of the following joints is highly flexible for articulation and movements ?

(A) Sutures

(B) Gomphoses

(C) Synovial

(D) Symphyses
59. Which one of the following reptilian organism is found exclusively in New Zealand only ?

(A) Alligator

(B) Gavial

(C) Helloderma

(D) Tuatara
60. is *not* a gene in the terminator gene technology construct.

(A) Tissue specific promoters

(B) Rec A proteins

(C) Ribosome inactivating proteins

(D) Betagalactosidase protein
61. The sterile nutrient medium is contaminated by 10 *E. coli*. How many *E. coli* will be present in nutrient medium after 1 hour at room temperature ?

(A) 20

(B) 80

(C) 10

(D) 00





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62. State the bacterial transport system that does not need ATP molecule nor carrier protein to transport solute across the cell membrane :
- (A) Active transport
(B) Passive transport
(C) Group translocation
(D) ABC transporter system
63. Floral development associated AGAMOVs, PISTILLATA and APETALA3 genes of Arabidopsis encodes proteins with domain.
- (A) GRASS
(B) WRKY
(C) MADS
(D) NAC
64. The type of divisions of cytoplasm around the periphery of cell due to presence of centrally located large amount of yolk is called as :
- (A) Holoblastic cleavage
(B) Meroblastic cleavage
(C) Superficial cleavage
(D) Mesoblastic cleavage
65. In Drosophila, which portion of body plan is responsible for formation of wing ?
- (A) Telson
(B) Dorsal
(C) Abdomen
(D) Thorax
66. Which helix has an axial hole ?
- (A) π -helix
(B) 3_1 -helix
(C) α^{10} -helix
(D) 2.2_7 -ribbon
67. In visual cycle the opsin protein of the rod cells of the retina combines with which form of vitamin A to form rhodopsin, which is responsible for vision in poor light ?
- (A) 11 Cis retinal
(B) 11 Cis retinol
(C) All trans retinal
(D) All trans retinol





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68. Cri-du-chat syndrome is caused due to which one of the following phenomenon ?

(A) Deletion of short arm of chromosome no. 5

(B) Translocation of short arm of chromosome no. 5

(C) Inversion of long arm of chromosome no. 5

(D) Duplication of short arm of chromosome no. 5
69. For a trait in a population, higher heritability is possible when :

(A) Homozygous genes affecting that trait

(B) Environment is uniform

(C) Heterozygous genes affecting that trait

(D) Environment is heterogenous
70. In the majority of plants photosynthesis is carried out in leaves but in cacti inhabiting desert, photosynthesis is carried out by stem. This type of evolutionary change in the position is referred to as

(A) Heterochrony

(B) Heterotropy

(C) Heterotopy

(D) Heteroplasmy
71. Scientific theories :

(A) arise through deductive reasoning

(B) arise through inductive reasoning

(C) arise through least generalization

(D) can never be disproved





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| <p>72. Which of the following molecules plays a pivotal role in presenting the paracrine factors to their target cells ?</p> <p>(A) Fibronectin</p> <p>(B) Heparin sulphate</p> <p>(C) Laminin</p> <p>(D) Collagen</p> <p>73. Which one of the following is <i>not</i> involved in SOS repair mechanism ?</p> <p>(A) Rec A</p> <p>(B) umu B</p> <p>(C) umu C</p> <p>(D) umu D</p> <p>74. The suffixes used in viral taxonomy for order, family, sub-family and genus are respectively.</p> <p>(A) Viridae, Virales, Virnae, Virus</p> <p>(B) Virales, Viridae, Virnae, Virus</p> <p>(C) Virales, Virus, Virnae, Viridae</p> <p>(D) Virus, Virales, Virnae, Viridae</p> | <p>75. The process by which the species composition and habitat in an area changes over time until replaced by a “Climax community” is termed as :</p> <p>(A) Primary succession</p> <p>(B) Secondary succession</p> <p>(C) Community succession</p> <p>(D) Ecological succession</p> <p>76. Which of the following does not describe the features of transmission electron microscope ?</p> <p>(A) Ultrathin sections are stained and observed</p> <p>(B) Intracellular organelles are observed</p> <p>(C) Three-dimensional image is observed</p> <p>(D) Two-dimensional image is observed</p> |
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77. Which of the following signalling molecules acting as a morphogen plays a key role in patterning the digits of vertebrate limb ?
- (A) Desert hedgehog
(B) Sonic hedgehog
(C) Indian hedgehog
(D) Transforming growth factor- β
78. Acetylcholine when applied on skeletal muscle, it causes contraction, while on heart muscle, it causes muscle relaxation. This is due to :
- (A) Subtypes of cholinergic receptors present in the muscle
(B) Difference in the type of muscles
(C) Difference in the quantity of acetylcholine released
(D) Skeletal muscles are supplied by peripheral nervous system, while heart muscles by central nervous system
79. Which of the following islands visited by Darwin inspired him to propose theory of evolution ?
- (A) Guatemala
(B) Galapagos islands
(C) Faroe islands
(D) Solomon islands
80. Which of the following pairs is a mismatch ?
- (A) Evergreen trees – Coniferous forest
(B) Thorny trees – Savanna
(C) Permafrost – Tundra
(D) Epiphytes – Prairie
81. In which organelle DNA, UGA codes for tryptophan ?
- (A) Chloroplast DNA
(B) Mitochondrial DNA
(C) Both mitochondrial and chloroplast DNA
(D) Nuclear DNA





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82. In Kreb’s cycle, ketoglutarate dehydrogenase catalyses which of the following reactions ?

 - (A) Oxidation
 - (B) Reduction
 - (C) Decarboxylation
 - (D) Oxidation and decarboxylation

83. In anoxia condition during flooding, ATPs are generated through :

 - (A) Aerobic respiration
 - (B) Glycolysis
 - (C) Fermentation
 - (D) Oxidative phosphorylation

84. G-banding techniques are used for :

 - (A) Protein banding in isoelectric focussing
 - (B) DNA bands in pulse field electrophoresis
 - (C) Karyotyping in cytogenetics
 - (D) Microarray systems
85. Near-Isogenic lines in plants can be developed by

 - (A) Mass selection
 - (B) Bulk method
 - (C) Backcross method
 - (D) Mutation breeding

86. Transition from Metaphase to Anaphase involves activation of Anaphase Promoting Complex (APC) by

 - (A) CDC20
 - (B) CDC25
 - (C) CDC18
 - (D) CDC13

87. Sets of genes located on same chromosome are called :

 - (A) Allotype
 - (B) Isotype
 - (C) Haplotype
 - (D) Idiotype





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88. An organism that contains 48% A-T shall also contain :

(A) 48% G – C

(B) 48% G + 48% C

(C) 52% G + 48% C

(D) 52% G – C
89. Gastrulation in *Drosophila* begins with a change in cell shape and contraction of an epithelium sheet from the apical surface, this process is called as :

(A) Involution

(B) Convergent extension

(C) Epiboly

(D) Invagination
90. The purification and characterization of insecticidal protein/s produced by *Bacillus thuringiensis* during the exponential phase of growth was carried out. Protein fractions were purified both from cell pellet (P) as well as from culture supernatant (S). The purified toxin proteins were heated at indicated temperatures and then used in bioassays against first instar larvae of black cut worm. Percent mortality of the larvae when feeded with toxin proteins were as follows :

Temperature °C	Mortality %	
	Toxin Protein (P)	Toxin Protein (S)
28	100	50
37	75	50
50	68	50
65	40	50
85	10	50
Boiled	0	30

Which of the following is *not true* for the given data ?

(A) Toxin [S] is thermolabile

(B) Higher temperatures adversely affect activity of toxin (P)

(C) Both toxins are insecticidal although with varying stability

(D) Insecticidal activity of toxin (P) is better than toxin (S)



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91. An instrument (A) can differentiate between 1 and 3 units, while another instrument (B) can differentiate between 0.01 and 0.1 kilo-units of the same parameter. Which one of the following statements is *correct* ?
- (A) Instrument 'A' is more sensitive than 'B'
 - (B) Instrument 'A' is less sensitive than 'B'
 - (C) Both the instruments are equally sensitive
 - (D) Instrument 'A' can record upto 3 parameters, while instrument 'B' can record upto 100 parameters
92. Which bioremediation process incorporate essential nutrients (Viz.N, P, etc.) and electron acceptor to contaminated area (aquatic, soil) in order to promote the activity of native microbes for degradation of hydrocarbons ?
- (A) Preferential biodegradation
 - (B) Bioaugmentation
 - (C) Biostimulation
 - (D) Biosparging
93. In a biological study, keeping all conditions similar, an experiment recorded observations from many repetitions of experiments. None of the readings was identical, although the variations were statistically comparable. The variations in the readings :
- (A) Suggest error in observations and/or calculations
 - (B) Cannot be ideally minimized to zero, even if the experiments are repeated many times
 - (C) Suggest more experiments are to be repeated until a few readings become identical (no variation)
 - (D) Are indicative of imperfect experimental design or failure of experiments
94. Classically, stereotaxic surgery is used for :
- (A) IOL implantation (Cataract surgery)
 - (B) IVF (in-vitro fertilization)
 - (C) To direct an electrode to a defined region deep into the brain in-vivo
 - (D) Endoscopy





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95. Insects, ammonoids and amphibians have originated in which of the following periods of Paleozoic era ?
- (A) Cambrian period
(B) Ordovician period
(C) Silurian period
(D) Devonian period
96. Covishield is a :
- (A) DNA Vaccine
(B) Chemically attenuated vaccine
(C) Recombinant vector vaccine
(D) Live attenuated vaccine
97. The fins are locomotor organs of fishes. The Dipnoians possess unpaired fin without skeletal support, such fin is called as :
- (A) Actinopterygii
(B) Brachipterygii
(C) Crossopterygii
(D) Sarcopterygii
98. Each of the following parasite is transmitted by mosquito *except* :
- (A) *Leishmania donovi*
(B) *Wuchereria bancrofti*
(C) *Plasmodium vivax*
(D) *Plasmodium falciparum*
99. Which of the following is NOT correct for an ideal plasmid cloning vector ?
- (A) Smaller size
(B) Presence of multiple cloning site
(C) Absence of origin of replication
(D) Presence of selectable marker
100. What will be the possible RNA sequence from complete transcription of a DNA molecule with the sequence in one of the strand is 5' – AGCTGCAATG –3' ?
- (A) 5' – UCGACCUUAC –3'
(B) 5' – AGCUGCAAUG –3'
(C) 5' – TCGACGTTAC –5'
(D) 5' – AGCTGCAATG –3'





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ROUGH WORK

