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FOR MAHA SET PREPARATION

MAHA SET 2024 Paper II Life Sciences Set A Question Paper

EXAM	YEAR	TYPE
MAHA SET	2024	Question Paper

Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक

A

Paper-II
LIFE SCIENCE

Signature and Name of Invigilator

1. (Signature) .....

(Name) .....

2. (Signature) .....

(Name) .....

Seat No. | | | | | | | |

(In figures as in Admit Card)

Seat No. .....

(In words)

OMR Sheet No. | | | | | | | |

(To be filled by the Candidate)

APR - 34224

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

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 (C) is the correct response.
   (A) (B) ● (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.

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

1. परीक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस 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 पहाव्यात.
   (*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 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.
   (*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 काळा/निळा करावा.
   उदा. : जर (C) हे योग्य उत्तर असेल तर.
   (A) (B) ● (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 अपात्र 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.

APR - 34224/II—A

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APR - 34224/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. Hydrogen bonds are present in water structure. Presence of hydrogen bonds gives a characteristic property to water, which is :

   (A) High melting and high boiling points

   (B) High melting and low boiling points

   (C) Low melting and high boiling points

   (D) Low melting and low boiling points

2. Which of the following membrane associated process involves the step of Clathrin coated vesicle formation during its mechanism ?

   (A) Phagocytosis

   (B) Amino acid uptake

   (C) Receptor mediated endocytosis

   (D) Calcium uptake

3. Which one of the following is not a part of cell theory ?

   (A) Organism(s) are made up of cell(s)

   (B) Cells are functional unit(s) of multicellular organisms

   (C) Cells in a multicellular organism arise from preexisting cells

   (D) Cells in a multicellular organism are derived from non-cells

4. Assembly of cytoplasmic micro-tubule from the tubulin dimers is inhibited if the cell is treated with .....

   (A) Streptomycin

   (B) Calmodulin

   (C) Colchicine

   (D) Carbenicillin

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5. Prokaryotes may be characterised by :

(A) Presence of nucleus or nucleoid

(B) Absence of DNA

(C) Absence of membrane surrounding organells

(D) Presence of membrane around RNA

6. The following are the characteristics of which type of transposable element ?

Simplest transposable element found in bacteria that encode transposase, with less than 5 kb size and with terminal inverted repeats that can transfer DNA directly is :

(A) Composite transposons

(B) Retrotransposons

(C) IS element

(D) Tn3-like elements

7. The first chromosomal linkage map for five genes on the X chromosome of Drosophilla was constructed by :

(A) S. Benzer

(B) T.H. Morgan

(C) A.H. Sturtevant

(D) G.J. Mendel

8. A chromosomal site at which a group of genes affecting quantitative traits are located is called as :

(A) Qualitative trait locus

(B) Quantitative trait locus

(C) Multiple allele locus

(D) Dominant locus

9. In prion disease, classically, the :

(A) Liver becomes excessively enlarged

(B) Liver becomes sponge like

(C) Brain ventricles are squeezed

(D) Brain becomes sponge like

10. Which one of the following is not a diversity index of living organism ?

(A) Shannon index

(B) Simpson index

(C) Berger-Parker index

(D) MPN index

11. Articulation of both the jaws with skull is termed as Jaw suspension. One of the following types is observed in the teleost fishes :

(A) Craniostylic

(B) Autostylic

(C) Holostylic

(D) Hyostylic

12. In the representatives of order Cestoda, the mature proglottids get separated from main body by a process known as :

(A) Apoptosis

(B) Apolysis

(C) Homolysis

(D) Genolysis

13. Taxonomic hierarchy refers to :

(A) Classification of species based on fossil record

(B) A list of taxonomists worked on taxonomy of a species

(C) A group of taxonomists who decide nomenclature of animals and plants

(D) Stepswise arrangement of all categories for classification of animals and plants

14. Mycoplasmas, rickettsiae, and chlamydiae are :

(A) Types of fungi

(B) Small bacteria

(C) Species of protozoa

(D) Forms of viruses

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15. When biological oxygen demand becomes very high ?

(A) The water becomes suitable for growth of aerobic microbes

(B) The amount of dissolved oxygen increases

(C) The water becomes anaerobic

(D) Both concentration of microbes and dissolved oxygen decreases

16. Which one of the following extra embryonic membrane found as unique feature in terrestrial vertebrates only ?

(A) Yolk sac

(B) Chorion

(C) Allantois

(D) Amnion

17. Since humans are having such a notable impact on the Earth and its life—a new, youngest epoch of the quaternary period is termed as :

(A) The Holocene

(B) The Paleocene

(C) The Anthropocene

(D) The Eocene

18. What largest bacterium of > 600 μm size is known to inhabit the gut of *Acantharus nigrofuscus* ?

(A) *Vibrio fischeri*

(B) *Spirillum volutans*

(C) *Epulopiscium fishelsoni*

(D) *Borrelia burgdorferi*

19. Heliophytes are the plants :

(A) Growing under shade

(B) Growing under direct sunlight

(C) Growing under waterlogged conditions

(D) Growing under saline conditions

20. The largest 'carbon sink' on the earth is :

(A) Forests

(B) Soils

(C) Oceans

(D) Animals

21. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature ?

(A) The first word represents genus and second is a specific epithet

(B) The names are written in Latin and italicised

(C) Biological names can be written in any language

(D) When written by hand, names are to be underlined

22. Which among the following is functionally more diverse ?

(A) DNA

(B) RNA

(C) Protein

(D) Lipid

23. River blindness disease occurs due to :

(A) Loa loa

(B) Mansonella perstans

(C) Mansonella streptocerca

(D) Onchocerca volvulus

24. Cridu chat syndrome is caused due to which of the following ?

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

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

(C) Duplication of short arm of chromosome no. 5

(D) Inversion of short arm of chromosome no. 5

25. If the genotypes of a husband and a wife are I^AI^B, how many different genotypes and phenotypes are possible among the blood types of their children.

(A) 2 genotypes : 3 phenotypes

(B) 3 genotypes : 4 phenotypes

(C) 4 genotypes : 3 phenotypes

(D) 4 genotypes : 4 phenotypes

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26. The maternal characteristics are inherited through cytoplasmic inheritance also. One of the following organell is involved in :

(A) Mitochondria

(B) Golgi body

(C) Lysosomes

(D) Endoplasmic reticulum

27. Trisomy of chromosome no. 21 is :

(A) Edwards syndrome

(B) Klinefelter syndrome

(C) Down syndrome

(D) Patau syndrome

28. A bacterial strain that is lys^+ his^+ val^+ is used as a donor, and another strain that is lys^- his^- val^- as the recipient for setting up an experiment on transformation. Initial transformants were isolated on a minimal medium with supplemented with lysine and valine. Which of the following maximum genotypes will grow on this medium ?

(A) lys^- his^+ val^+; lys^+ his^+ val^-; lys^+ his^+ val^+; lys^- his^+ val^-

(B) lys^+ his^+ val^+; lys^- his^- val^+

(C) lys^- his^- val^- only

(D) lys^+ his^- val^+ only

29. In addition to serving as the building blocks for nucleic acid, nucleotides have many functions. Which of the following is not a function of a nucleotide ?

(A) They work as carriers of energy

(B) They are serving as secondary messengers in cells

(C) They are the components of coenzymes

(D) They provide electrons to the ETC

30. A DNA sample contains 30% adenine on molar basis. What will be the percentage of cytosine ?

(A) 30%

(B) 20%

(C) 40%

(D) 60%

31. Which of the following would contribute to intrinsic fluorescence in a protein ?

(A) Aromatic amino acids

(B) Charged amino acids

(C) Branched chain amino acids

(D) Disulfide bonds

32. The screw sense of DNA can be right handed or left handed. Which of the following statements is correct with respect to the screw sense of A, B and Z type of DNA ?

(A) A and Z both right handed

(B) A and B both right handed

(C) A left handed and B right handed

(D) A right handed and B left handed

33. Which chiral angle in the peptide backbone does not undergo rotation ?

(A) ϕ (Phi)

(B) ψ (Psi)

(C) χ (Chi)

(D) ω (Omega)

34. Efficiency of enzyme can be better measured in terms of :

(A) K_m

(B) K_m/V_{max}

(C) K_{cat}

(D) K_{cat}/K_m

35. What is the resultant pH of a phosphate buffer made by mixing 0.2 M NaH_2PO_4 and 0.2 M Na_2HPO_4 ? (pKa = 6.86)

(A) 5.86

(B) 6.86

(C) 7.86

(D) 7.00

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36. A protein mixture contains three polypeptides A, B and C, whose masses are 63, 28 and 79 kDa with pI values of 6.5, 7.0 and 8.0, respectively, were subjected to standard reducing SDS-PAGE. The order of their separation from top to bottom would be :

(A) A, B and C

(B) C, B and A

(C) A, C and B

(D) C, A and B

37. A geographically variable species often divided into many subspecies is referred to as .....

(A) Monotypic species

(B) Sister species

(C) Sibling species

(D) Polytypic species

38. First fossil record of vascular plants appeared in the ..... period.

(A) Silurian

(B) Jurassic

(C) Triassic

(D) Cambrian

39. Inclusive fitness refers to .....

(A) Reproductive success of an individual

(B) Reproductive success of an individual along with its neighbour's reproductive success

(C) Reproductive success of an individual along with its relatives' reproductive success

(D) Reproductive success of an individual and its partners

40. In a classical experiment, a standard is usesd to :

(A) Add background noise

(B) Record the absolute value of a signal

(C) Compare and eliminate non-specific background noise

(D) Record the non-specific error in the experiment

41. Why sexual selection can lead to extreme phenotypes ?

(A) Because the extreme phenotype incurs lower costs than the mean train in the population

(B) Because the partner quickly learns and favours new images

(C) Because a positive feedback exists between the gene favouring the trait and the gene coding for it

(D) Because a negative feedback exists between the trait and the risk of predation

42. Sarich and Wilson (1967) demonstrated that human, Gorilla and Chimpanzee were genetically equidistant and distinct for Orang-utan and the divergence time is approximately :

(A) 30 mya

(B) 05 mya

(C) 10 mya

(D) 100 mya

43. Beaker 'A' has 100 ml of some fluid at 80°C. Beaker B contains the some fluid 200 ml at 20ºC. If both the fluids are mixed, what would be the temperature of the resultant mixture ?

(A) 25ºC

(B) 65ºC

(C) 40ºC

(D) 50ºC

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44. With the advent of Remote Sensing and Geographical Information System, the city planners have begun to use the Indian satellite data. Which one of the following satellite data are useful for such tasks ?

(A) CARTOSAT

(B) LANDSAT

(C) OCEANSAT

(D) RESOURCESAT

45. Which of the following statements is not true about phase contract microscopy ?

(A) It is a modified version of the bright field microscope that is fitted with a condenser (annular ring) and objective (phase plate)

(B) It uses a special condenser and objective that accentuate small differences in the refractive index of various structures within the organism

(C) It can be used to observe living cells in their natural state

(D) It uses laser light to obtain focal level sections through a specimen

46. What will be the radioactivity of ^{125}I labelled 2 mCi thyroxine after 4 generations ($t_{½}$ = 60 days) :

(A) 0.25 mCi

(B) 0.125 mCi

(C) 0.125 µCi

(D) 1 mCi

47. Among the different types of phytoremediation ..... is the process in which plants limit contaminated soil movement and migration.

(A) Phytostabilization

(B) Phytotransformation

(C) Phytodegradation

(D) Phytoextraction

48. Which of the following proteins helps to maintain and stabilizes protein tertiary structure during temperature stress in plants ?

(A) Defensins

(B) Thionins

(C) Late embryogenesis abundant (LEA)

(D) Osmotin

49. Enzyme labelled antibodies are not generally used for which of the following techniques ?

(A) FACS

(B) Immunohistochemistry

(C) ELISA

(D) Western blot

50. In watermelons, to induce seedlessness in triploid population, which of the following strategies is useful ?

(A) Self-pollinate resistant triploids

(B) Cross unrelated triploids

(C) Select for unreduced gametes in triploids

(D) Cross tetraploids with diploids to produce triploids

51. Amplification of a DNA fragment by PLR requires primers.

Which of the following statements are correct for primers ?

(*i*) Primers with hairpin structure formation are not desirable

(*ii*) Primer sequence should not have long runs (>3) of a single nucleotide

(*iii*) GC content of the primer should be less than 20%

(*iv*) Both the forward and reverse primers must have high percentage of base complementarities

(A) (*i*), (*ii*) and (*iii*)

(B) (*ii*), (*iii*) and (*iv*)

(C) (*i*) and (*ii*)

(D) (*iii*) and (*iv*)

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52. When subcultured into fresh medium, a bacterium grows with a lag phase of 2 hours followed by log phase and a stationary phase. If the bacterium was treated with ethidium bromide for 3 hours in all the phases of growth to cure a plasmid, it is more likely to lose the plasmid in :

(A) Early stationary phase

(B) Late stationary phase

(C) Logarithmic phase

(D) Lag phase

53. The free hydroxyl groups present on either end of chemically synthesized. Oligonucleotides are 5'–phosphorylated with ATP by the enzyme :

(A) Polynucleotide phosphatase

(B) Polynucleotide phosphorylase

(C) Polynucleotide ATPase

(D) Polynucleotide kinase

54. Which one of the following is not a fluorophore ?

(A) Acridine orange

(B) Acrylamide

(C) Quinacrine

(D) Ethidium bromide

55. Which of the following best describes principle of western blotting technique ?

(A) A means of separation of restriction fragments on the basis of size

(B) It is based on attraction to a specific chemical group

(C) The proteins have a net charge zero at a particular pH

(D) It is an immunoassay technique preceded by electrophoresis

56. Which of the following is resulted due to photorespiration reaction catalysed by oxygenase activity of rubisco ?

(A) 3-phosphoglycerate only

(B) 2-phosphoglycolate only

(C) Fructose 6-phosphate

(D) 3-phosphoglycerate and 2-phosphoglycolate

57. Mutation in ACC synthase enzyme will inhibit synthesis of .....

(A) Gibberellins

(B) Salicyclic acid

(C) Ethylene

(D) Auxin

58. Which of the following phytohormone accumulates during Systemic Acquired Resistance (SAR) in plants ?

(A) Salicylic acid

(B) Jasmonic acid

(C) Abscisic acid

(D) Ethylene

59. The hormone auxin was first discovered in :

(A) Mustard

(B) Pea

(C) Oats

(D) Rice

60. How many times more energy gained in aerobic respiration over anaerobic respiration ?

(A) 8

(B) 12

(C) 18

(D) 32

61. Which of the following is NOT involved in electron transport during Photosystem I and II ?

(A) Ferredoxin

(B) Plastocyanin

(C) Cytochrome b6f complex

(D) Cytochrome oxidase

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62. The treatment of abscisic acid is associated with .....

(A) Internode elongation

(B) Expansion of lead area

(C) Closure of stomata

(D) Axillary root elongation

63. Action potential is generated due to :

(A) Influx of Na^+ and efflux of K^+

(B) Influx of Ca^{2+} and efflux of K^+

(C) Influx of Na^+ and efflux of Ca^{2+}

(D) Influx of K^+ and efflux of Na^+

64. Hookworm infection can lead to deficiency of :

(A) Vitamin B_{12}

(B) Iron

(C) Vitamin B_6

(D) Folic acid

65. What kind of microbes grow best at higher CO_2 tension (~ 10%) than are normally present in the atmosphere ?

(A) Microaerophilic microorganisms

(B) Capnophilic microorganisms

(C) Aerotolerant anaerobic microorganisms

(D) Obligate anaerobic microorganisms

66. Which free living microorganisms occupy a niche to feed primarily on organic detritus from dead organisms and unable to adapt to the body of live host ?

(A) Obligate saprobic microorganisms

(B) Parasitic microorganisms

(C) Facultative parasitic microorganisms

(D) Auxotrophic microorganisms

67. The DNA of each chromosome occupies a defined volume of the nucleus and only overlaps with its immediate neighbours is called as :
(A) Chromosome territories
(B) Nuclear scaffolds
(C) Nucleosome assembly
(D) Chromatin

68. Amphibians contain 30X more DNA than human beings. However human beings are more complex than amphibians. This lack of correlation is called as :
(A) Species specificity
(B) C-value paradox
(C) D-value paradox
(D) P-value paradox

69. Which one of the following is not true in relation to eukaryotic gene expression ?
(A) RNA POl I synthesizes pre-γRNA
(B) RNA POl II synthesizes γRNA
(C) RNA POl III synthesizes tRNA
(D) All three polymerase contains β', β, α and ω subunits.

70. The triple helix domain of collagen consists of repeats of the X-Y-Z amino acids. The amino acid present at 'X' position is required in every third position in order for the polypeptide chain is :
(A) Lysine
(B) Proline
(C) Hydroxy proline
(D) Glycine

71. Which DNA binding domain is present in steroid hormone receptors family of ligand inducible transcription factors ?
(A) Helix-loop-helix
(B) Zinc fingers
(C) Helix-turn-helix
(D) Leucine zipper

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72. Which of the following elongation factor is called as translocase ?

(A) EF-G

(B) EF-2

(C) EF-G and EF-2

(D) EF-Tu and EF-Ts

73. Which of the following post-translational modification is not related with epigenetic regulation ?

(A) Histone acetylation

(B) Sumoylation

(C) Ubiquitination

(D) DNA methylation

74. The disease which arises because of aberrant splicing is :

(A) Huntington's disease

(B) Cystic fibrosis

(C) Sickle cell anemia

(D) Thalassemia

75. Identify the enzymes involved in DNA replication for their function :

(Enzyme)

(P) DNA polymerase I

(Q) Primase

(R) Helicase

(S) Gyrase

(Funtion)

(1) Unzipping the DNA helix

(2) Supercoiling of DNA

(3) Remove primer and close gaps

(4) Synthesize RNA primer

(A) (P)-(2),(Q)-(3),(R)-(4),(S)-(1)

(B) (P)-(3),(Q)-(4),(R)-(1),(S)-(2)

(C) (P)-(1),(Q)-(4),(R)-(2),(S)-(3)

(D) (P)-(3),(Q)-(1),(R)-(2),(S)-(4)

76. (I) The 3' to 5' exonuclease activity of eukaryotic DNA polymerase operates in reverse direction of DNA synthesis and participate in fidelity of replication.

(II) The ability of DNA polymerase to extend a primer only in 5' to 3' direction appears to make replication a complicated process, it is necessary for proof-reading of duplicated DNA.

Choose the correct answer :

(A) (I) is correct, (II) is wrong

(B) (II) is correct, (I) is wrong

(C) Both (I) and (II) are correct

(D) Both (I) and (II) are wrong

77. Which of the following is a wrong statement in SOS repair system ?

(A) Lex A shows autorepression of lex A

(B) Lex A shows repression of rec A

(C) Negative regulation of Lex A blocks the SOS repair

(D) Rec A shows negative regulation of lex A

78. Which of the following statements about apoptosis is fasle ?

(A) Cell shrinks

(B) Chromatin condenses

(C) Cell contents are leaked

(D) Apoptotic bodies are formed, which are phagocytosed by macrophages

79. Which of the following signalling molecules plays a key role in the patterning of neural tube along its anterior-posterior axis ?

(A) Wnt4

(B) BMP4

(C) FGF4

(D) Retinoic acid

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80. If you compare the B cell epitope against T cell epitope :

(A) B cell epitopes are based more on primary sequence of protein antigen

(B) B cell epitopes are based more on nature conformation of protein antigen

(C) B cell epitopes are based more on presentation of antigen by MHC molecule

(D) B cell epitopes are of continuous epitopes than the B cell epitope

81. Mark the correct statement for antigenicity of molecule :

(A) Antigenicity is the ability of the molecule to provocate immune response in the body

(B) Antigenicity refers to the binding ability of Antibody to its antigen

(C) Antigenicity and immunogenicity are synonyms

(D) All antigens are immunogens

82. Which of the following molecules acts as a general adhesive connecting one cell to another and cells to other substrates ?

(A) Fibronectin

(B) Heparin sulphate

(C) Collagen

(D) Laminin

83. Formation and migration of epiblast as a sheet of cells during gastrulation in zebra fish requires the expression of .....

(A) P-cadherins

(B) R-cadherins

(C) N-cadherins

(D) E-cadherins

84. Which of the following groups of transcription factors (TFs) is responsible for maintaining the pluripotency of stem cells ?

(A) Oct 4, Nanog and Stat 3

(B) Oct 4, Nanog and SOX 2

(C) Eomesodermin, Cdx 2 and SOX 2

(D) Cdx 2, Nanog and SOX 2

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85. Yersinia pestis is the causative agent for .....

(A) Gas gangrene

(B) Tularemia

(C) Lyme disease

(D) Plague

86. Pseudohermaphroditism is a condition in which the individual is insensitive to .....

(A) Androgen

(B) Estrogen

(C) Progesterone

(D) Corticosterone

87. In plants, when the apical cell of the 2-celled pro-embryo divides longitudinally and further the basal cell plays only a minor role or none in the development of the embryo proper then the embryo is ..... type.

(A) Asterad

(B) Onagrad

(C) Solanad

(D) Chenopodial

88. Which of the following is necessary for the development of epididymis in mammals ?

(A) Dihydrotestosterone

(B) Methyl testosterone

(C) Testosterone

(D) Androsterone

89. The mid-blastula transition is the point in the development when .....

(A) Translation of maternal mRNA is initiated

(B) Cell determination is fixed

(C) Cell-division in the zygote begins

(D) Transcription of zygotic genes begins

90. In the chick limb, the signal for condensation of mesenchymal cells to give rise to cartilage comes from the appearance of :

(A) N-cadherins

(B) E-cadherins

(C) C-cadherins

(D) B-cadherins

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91. Which of the following is not a property of stem cells ?

(A) Ability to self-renew

(B) Ability to differentiate into different types of cells

(C) They are unspecialised cells with cell markers

(D) They are actively dividing cells with cell marker changes

92. Which of the following proteins acts as a death receptor that triggers the extrinsic pathway of apoptosis ?

(A) Fas ligand

(B) FADD

(C) FaS

(D) Procaspase 9

93. With reference to normal ECG, the T-wave is :

(A) Negative in all standard bipolar limb leads recording

(B) Caused by repolorization of apex and outer surfaces of the ventricles

(C) Abnormal when normal sequence of depolarization does not occur

(D) Caused by depolarization of the septum and the ventricles

94. Increased muscle activity will increase generation of lactic acid. In this condition, blood coming from the lungs to the muscles, would show :

(A) Increased O_2 release from haemoglobin

(B) Decreased O_2 release from haemoglobin

(C) No change in O_2 release property

(D) Increased degradation of haemoglobin

95. The capability of vertebrate kidney and produce hypertonic urine is a function of :

(A) Reduced filtration at the glomerulus

(B) Increased reabsorption at Bowman's capsule

(C) The loop of Henle

(D) Addition of waste molecules in the Bowman's capsule

96. For long distance runner, the muscle needs increased O_2 supply. At the muscle, this is formed by :

(A) Increased and frequent muscle contraction

(B) Increased demand made by the muscles

(C) Increased squeezing of the muscles

(D) Increased accumulation of lactic acid causing demand blood pH

97. Which of the following heat shock proteins has both protein folding and degradation activities ?

(A) HSP 60

(B) HSP 70

(C) HSP 90

(D) HSP 100

98. The sequential order of various stages of a fermentation process are :

(A) Fermentation, removal of waste, inoculation, downstream processing

(B) Inoculation, downstream processing, fermentation, removal of waste

(C) Inoculation, fermentation, downstream processing, removal of waste

(D) Removal of waste, inoculation, fermentation, downstream processing

99. Match the following product/process to the microorganism involved :

Product/Process

(L) Biopol

(M) Biopesticide

(N) Bioleaching

(O) Bioremediation of oil

Microorganism

(1) *Thiobacillus ferroxidans*

(2) *Pseudomonas putida*

(3) *Bacillus sphaericus*

(4) *Alcaligenes eutrophus*

(A) (L)-(1),(M)-(4),(N)-(2),(O)-(3)

(B) (L)-(2),(M)-(1),(N)-(3),(O)-(4)

(C) (L)-(3),(M)-(1),(N)-(2),(O)-(4)

(D) (L)(-4),(M)-(3),(N)-(1),(O)-(2)

100. In golden rice, the gene phytoene desaturase (crtl) was obtained from :

(A) *Narcissus species*

(B) *Erwinia uredovera*

(C) *Zea mays*

(D) *Oryza sativa*

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ROUGH WORK