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Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक

D

Paper-III
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)

JAN - 34318

Time Allowed : 2½ Hours] **[Maximum Marks : 150**

Number of Pages in this Booklet : **20** Number of Questions in this Booklet : **75**

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 **75** objective type questions. Each question will carry *two* marks. *All* questions of Paper-III will be compulsory, covering entire syllabus (including all electives, without options).
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. परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
2. सदर प्रश्नपत्रिकेत **75** बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
   (*ii*) **पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चूकीचा 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 पहिल्यानंतरच 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 लिहीलेली 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 ठिकाणा व्यतिरीक्त 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. तथापी, 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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Life Science
Paper III

Time Allowed : 2½ Hours] **[Maximum Marks : 150**

Note : This paper contains **Seventy Five (75)** multiple choice questions. Each question carries **Two (2)** marks. Attempt *All* questions.

1. Which of the following components prevents vortex formation in a fermenter ?

   (A) Sparger

   (B) Propeller

   (C) Bafle

   (D) Impeller

2. Which of the following micro-organisms is most likely to be found in the human stomach ?

   (A) *Helicobacter pylori*

   (B) *Streptococcus sobrinus*

   (C) *Streptococcus mutans*

   (D) *Lactobacillus casei*

3. Naturally acquired active immunity would be most likely acquired through which of the following processes ?

   (A) Vaccination

   (B) Drinking colostrum

   (C) Natural birth

   (D) Infection with disease causing organism followed by recovery

4. Antibody titer refers to the :

   (A) Absolute amount of specific antibody

   (B) Avidity of specific antibody

   (C) Concentration of specific antibody

   (D) Highest dilution of antibody suitable to give a positive result in a test system.

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5. What is the value of V_{max} for an enzyme which follows simple Michaelis-Menten Kinetics, if V_o = 2 μ mol min^{-1} at 10 km ?

(A) 1.1 μ mol min^{-1}

(B) 2.2 μ mol min^{-1}

(C) 3.3 μ mol min^{-1}

(D) 11 μ mol min^{-1}

6. The glycosyl bond conformation in *z*-form of DNA is :

(A) Syn for pyrimidines and Anti for purines

(B) Anti for pyrimidines and Syn for purines

(C) Anti for both pyrimidines and purines

(D) Syn for both pyrimidines and purines

7. Which of the following amino acids among the following is preferred in a reverse turn ?

(A) Proline

(B) Histidine

(C) Glutamic acid

(D) Alanine

8. Electrons from cytoplasmic NADH are brought into mitochondria by malate-aspartate shuttle pathway. Select the *correct* option from below for which this shuttle specifically operate.

(A) Skeletal muscle

(B) Pancreas

(C) Brain

(D) Heart and Liver

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9. Epinephrine is synthesized from which of the following amino acids ?

(A) Tryptophan

(B) Proline

(C) Glycine

(D) Tyrosine

10. The feasibility of a biochemical reaction is decided by the equation $\Delta G = \Delta H - T\Delta S$. If both ΔH and ΔS have negative values, the reaction :

(A) is not favoured at any temperature

(B) happens spontaneously

(C) is exergonic, favoured below $T = \Delta H/\Delta S$

(D) is endergonic, favoured above $T = \Delta H/\Delta S$

11. Which of the following DNA repair mechanism systems is operational, if environmental agents damage DNA ?

(A) Base excision repair

(B) Nucleotide excision repair

(C) Mismatch repair

(D) SOS response

12. Mechanism of gene regulation does *not* include :

(A) rate of transcription

(B) processing of RNA transcript

(C) stability of RNA transcript

(D) rate of replication

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13. A circular plasmid was digested with restriction enzymes to generate a map. Digestion with Bam H1 enzyme gave a single band of 11kb, while digestion with Not I gave two bands corresponding to 7kb and 8 kb. What is the minimal size of the circular plasmid that will be consistent with above observation ?

(A) 11 kb

(B) 15 kb

(C) 26 kb

(D) 22 kb

14. Recruitment of epigenetic factors on DNA can be detected by :

(A) Immunoprecipitation

(B) Immunoblotting

(C) Chromatin Immunoprecipitation followed by PCR

(D) Immunofluorescence

15. A messenger RNA is 222 nucleotides long including the initiator and termination codons. The number of amino acids in the protein translated from this mRNA is :

(A) 221

(B) 111

(C) 73

(D) 74

16. Name the drug molecule recommended for the treatment of H1N1 flu :

(A) Paracetamol

(B) Oseltamivir

(C) Amantidine

(D) Aspirin

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17. RNAs that catalyze biochemical reactions such as self-splicing nitrous are known as :

(A) Spliceosomes

(B) Mature RNAs

(C) Ribozymes

(D) Lariats

18. In what way does the ras oncogene contribute to cancers ?

(A) ras codes for anti-apoptotic protein, which is produced in abnormally large amounts

(B) ras codes for a GTPase switch protein, which in its mutated form cannot be switched off.

(C) ras codes for a transcription factor, which is produced in abnormally large amounts.

(D) ras codes for a truncated form of a growth factor receptor, which is continually active.

19. The concentration of infectious plaque forming units (pfu) per volume of fluid is known as the :

(A) Virulence

(B) Infectivity

(C) Titer

(D) Pathogenicity

20. Which one of the following could be a *correct* sequence for a restriction enzyme ?

(A) GAGAGA
CTCTCT

(B) AAGCTT
TTCGAA

(C) GAGTCG
CTCAGC

(D) AAAAAA
TTTTTT

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21. For direct shoot regeneration from leaf explants, requirement of growth hormones will be :

(A) Auxin : Kinetin (1 : 0)

(B) Auxin : Kinetin (0 : 1)

(C) Auxin : Kinetin (1 : 1)

(D) Auxin : Kinetin (1 : 2)

22. The total number of live cells in a culture is counted using the frypan blue exclusion assay and is found to be 2.7×10^6 cells/ml. The culture is diluted 1 : 27 and then 100 µl seeded per well into a 96 well plate. What is the final cell density per well ?

(A) 1×10^5

(B) 2.7×10^4

(C) 2.7×10^5

(D) 1×10^4

23. Which of the following is *not* a property of fluid mosaic of membranes with respect to the bacterial membrane components ?

(A) Lateral diffusion of proteins

(B) Presence of sterols

(C) Integral proteins

(D) Extrinsic proteins

24. Which one of the following statements is *incorrect* ? Calcium ions are necessary for :

(A) muscle contraction.

(B) release of neurotransmitter from the presynaptic terminal.

(C) propagation of action potential in a neuron.

(D) mediating the action of several second messengers.

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25. The scanning electron microscope produced useful magnification upto :

(A) 2,000 X

(B) 20,000 X

(C) 40,000 X

(D) 4,00,000 X

26. The affinity of an antibody can be determined by measuring :

(A) Its concentration

(B) The valency of antigen binding

(C) The amount of antibody bound at various antigen concentrations

(D) Its ability to neutralize toxins

27. In affinity chromatography heparin columns are used for purification of which of the following ?

(A) NAD^+ dependent dehydrogenases

(B) glycoproteins

(C) m-RNA of eukaryotes

(D) DNA polymerases

28. Movement of lipids in membrane can be studied using spectroscopic technique ?

(A) ESR

(B) NMR

(C) Fluorescence

(D) UV-visible absorption

29. The metal usually used as a source of electrons in an electron microscope is :

(A) Iron

(B) Tungsten

(C) Silver

(D) Copper

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30. Which one of the following electrodes will be a preferred choice for recording of transmembrane potential of a living cell ?

(A) Electrolyte filled glass capillary electrode.

(B) Solid steel uninsulated micro-electrode.

(C) Insulated copper microelectrode

(D) Solid glass uninsulated thin rods.

31. Carbon-14 undergoes beta decay upon which it is converted into a new element having :

(A) Increased atomic number

(B) Decreased atomic number

(C) Increased mass number

(D) Decreased mass number

32. Liquid scintillation counting is used for measurement of radioactivity of :

(A) ^{14}C

(B) ^{131}I

(C) ^{57}Cr

(D) ^{235}U

33. Electromagnetic radiation consists of discrete packets of energy which are called as :

(A) Quarks

(B) Photons

(C) Positrons

(D) Electrons

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34. Radioisotope of the element used for positron emission tomography (PET) scan is :

(A) Sodium

(B) Iodine

(C) Uranium

(D) Xenon

35. In a chi-square test, what will be the degrees of freedom for a contingency table consisting of 3 rows (variable-1) and 2 columns (variable 2) ?

(A) 2

(B) 3

(C) 5

(D) 6

36. Family Gutliferae is a conserved name of an alternative name, family :

(A) Fabaceae

(B) Clusiaceae

(C) Arecaceae

(D) Apiaceae

37. Bentham & Hooker's system of classification of plants covers all :

(A) Embryophytes

(B) Thallophytes

(C) Seed plants

(D) Angiosperms

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38. The family is central in flowering plant systematics : This is the principle of.....system of classification.

(A) APG

(B) Bentham & Hooker

(C) Engler & Prantl

(D) Armen Takhtajan

39. Maleic acid and Fumaric acid are :

(A) Geometric isomers

(B) Chiral isomers

(C) Enantiomers

(D) Diastereomers

40. ***Usnea***, a lichen being used in the spices is of..... type.

(A) Crustose

(B) Foliose

(C) Squamulose

(D) Fruiticose

41. Association of algae and fungi is called as :

(A) Parasitism

(B) Symbiotism

(C) Helotism

(D) Heterothallism

42. Characteristic nodules are found on the roots of :

(A) Lamiaceae

(B) Asteraceae

(C) Acanthaceae

(D) Fabaceae

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43. Which of the following seed plants have retained the flagellated type of sperm ? Choose the *correct* option :

(*i*) *Cycas*

(*ii*) *Gnetum*

(*iii*) *Welwitschia*

(*iv*) *Casurina*

(*v*) *Ginkgo*

(A) (*i*) and (*ii*)

(B) (*iii*) and (*iv*)

(C) (*i*) and (*v*)

(D) (*iv*) and (*v*)

44. In viviparous plants, the seeds have :

(A) Longer dormancy period

(B) No dormancy period

(C) Low viability

(D) High viability

45. In Cucurbitaceae, during fertilization entry of the pollen tube occurs through integuments. This type of fertilization is referred as :

(A) Porogamy

(B) Mesogamy

(C) Chalazogamy

(D) Isogamy

46. Alkaloids–ajmalicine, serpentine and reserpine are obtained from the roots of :

(A) *Rauwolfia serpentina*

(B) *Bacopa monneiri*

(C) *Papaver somniferum*

(D) *Catharanthus roseus*

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47. Nitrogen availability will be highest on the supplement of..... to the plants.

(A) Ammonium sulphate

(B) Ammonium chloride

(C) Urea

(D) Potassium nitrate

48. In polymer-traping model of phloem loading, raffinose and stachyose are synthesized in the.....

(A) mesophyll cell

(B) bundle sheath cell

(C) intermediary cell

(D) sieve element

49. In photorespiration, the release of CO_2 occurs from..... :

(A) Ribulose 1,5-bisphosphate

(B) 2-Phosphoglycolate

(C) Glyoxylate

(D) Glycine

50. Which of the following is essential for Nitrogen fixation ?

(A) Anthocyanin

(B) Flavanoids

(C) Fatty acids & their derivatives

(D) Leghaemoglobin

51. ..... is not a naturally occurring plant growth regulator, and it does not occur as a base in the DNA of any species :

(A) Indole-3-acetic acid

(B) Kinetin

(C) Zeatin

(D) Gibberellin

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52. Genetic variation in pure lines is possible due to :

(A) Selfing

(B) Cloning

(C) Mutation

(D) Vegetative propagation

53. Gemmules are important for.

(A) Sexual reproduction

(B) Survival under drought conditions

(C) Asexual reproduction

(D) Survival in freshwater

54. The female genital pore of the earthworm *Pheretima posthuma* is located in segment :

(A) 11

(B) 14

(C) 18

(D) 21

55. Adult of urochordates are highly specialized having lost the following characteristics *except* :

(A) Notochord

(B) Siphon

(C) Nerve chord

(D) Coelom

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56. The opercular covering of gills is absent in :

(A) *Latimeria*

(B) Hammer-head

(C) *Labeo*

(D) Salmon

57. Podocytes are cells in the renal corpuscles that :

(A) form the outer wall of the Bowman's capsule.

(B) Form the muscle coating of the afferent and efferent arterioles

(C) Form the intra- and extra-glomerular mesangium

(D) Wrap around the glomerular capillaries

58. The hormone progesterone :

(A) is produced by the hypothalamus and stored in the posterior pituitary.

(B) plays a major role in preparing the uterus for implantation.

(C) is solely responsible for the maintenance of secondary sex characteristics.

(D) is solely responsible for stimulation of FSH production and follicle growth.

59. Organisms where various blastomeres become restricted to form only specific structures as soon as they are formed or during development the first few cleavages are :

(A) Tunicates

(B) Amniotes

(C) Amphibians

(D) Mammals

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60. In the Acrosome, there is an abundance of Bindin. The method to detect such *in situ* distribution is :

(A) Immuno cytochemistry

(B) Western blot

(C) ELISA

(D) SDS PAGE

61. Which one of the following statements is *correct* for Oxytocin and Vasopressin ?

(A) Oxytocin is released from the hypothalamus, while Vasopressin not.

(B) Oxytocin is involved in parturition, while Vasopressin with urine concentration.

(C) Vasopressin acts on muscles, while Oxytocin does not.

(D) Oxytocin is involved in urine concentration, while Vasopressin with milk ejection.

62. In species whose young are precocial, the father is more likely to be :

(A) Monogamous

(B) Polyandrous

(C) Polygamous

(D) Monoandrous.

63. Leishmania gains entry in the macrophages via the :

(A) FC receptors

(B) MHC II receptors

(C) Toll like receptors

(D) Pattern recognition receptors

64. The major ingredient of Bordeaux mixture is :

(A) Potassium chloride

(B) Copper sulphate

(C) Megnesium sulphate

(D) Ammoniun nitrate

65. The best method for controlling stored grain pests is through :

(A) Fumigation

(B) Systemic insecticide

(C) Heating

(D) Introduction of biological agents

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66. Artificial sweetener aspartame is :

(A) L- Aspartyl- L -Phenylalanine methyl ester.

(B) L-Aspartyl- D - Phenylalanine methyl ester

(C) D- Aspartyl - D - Phenylalanine methyl ester

(D) D- Aspartyl - L- Phenylalanine methyl ester

67. In human, hypertrichosis is inherited as Y-linked trait. If a man marries a normal woman, which of the following types of offspring may they have ?

(A) All sons and daughters will have hypertrichosis

(B) All sons will have hypertrichosis but none of the daughters.

(C) Only half of their sons will have hypertrichosis but none of the daughters

(D) None of the children will have hypertrichosis.

68. When a signal molecule binds to a G protein-linked receptor the G Protein :

(A) gets activated

(B) binds with a Ca_2^+ molecule

(C) binds with Calmodulin

(D) None of the above

69. The largest and potential reservoir of carbon is :

(A) Forests

(B) Agricultural fields

(C) Oceans

(D) Atmosphere

70. Which one of the following birds is recorded as last extinct species from earth ?

(A) Blue rock pigeon

(B) White peacock

(C) Lesser Punguin

(D) Dodo

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71. Nilgiri Tahr or Nilgiritragus hylocrius is only confined to :

(A) Sasan Gir, Gujarat

(B) Eravikulam National Park, Kerala

(C) Tadoba, Maharashtra

(D) Bandhavgarh, Madhya Pradesh

72. Which one of the following animals inhabits metahaline environment of salt pens ?

(A) Grabs

(B) Artemia

(C) Prawns

(D) Shrimps

73. Which of the following set of abiotic factors, the organisms need to adapt for survival in deep sea ?

(A) Low temperature, high pressure, and low oxygen level.

(B) Low temperature, low pressure and low oxygen level.

(C) High temperature, high pressure and high oxygen level.

(D) High temperature, low pressure and high oxygen level.

74. Which one of the following statements regarding HIV is *not correct* ?

(A) It belongs to family Retroviridale

(B) It is an Oncovirus

(C) It is associated with the enzyme reverse transcriptase

(D) The virus is present in body fluids.

75. T-even bacteriophages have :

(A) Binal symmetry

(B) Helical symmetry

(C) Complex symmetry

(D) Polyhedral symmetry

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