Signature of Invigilators

1. .....

2. .....

# LIFE SCIENCES
## Paper II

Roll No. [ ][ ][ ][ ][ ]
(In figures as in Admit Card)

Roll No. .....

.....
(In words)

**JY—04/4**

Name of the Areas/Section (if any).....

Time Allowed : 75 Minutes] [Maximum Marks : 100

**Instructions for the Candidates**

1. Write your Roll Number in the space provided on the top of this page.
2. This paper consists of *fifty* **(50)** multiple choice type questions. *All* questions are compulsory.
3. Each item has upto four alternative responses marked (A), (B), (C) and (D). The answer should be a capital letter for the selected option. The answer letter should entirely be contained within the corresponding square.

   Correct method [A] Wrong Method [ A or [A]

4. Your responses to the items for this paper are to be indicated on the ICR Answer Sheet under paper II only.
5. Read instructions given inside carefully.
6. One sheet is attached at the end of the booklet for rough work.
7. You should return the test booklet to the invigilator at the end of paper and should not carry any paper with you outside the examination hall.

**પરીક્ષાર્થીઓ માટેની સૂચનાઓ :**

૧. આ પાનાની ટોચમાં દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.
૨. આ પ્રશ્નપત્રમાં કુલ **પચાસ (50)** બહુવૈકલ્પિક ઉત્તરો ધરાવતા પ્રશ્નો આપેલા છે. **બધા જ** પ્રશ્નો ફરજિયાત છે.
૩. પ્રત્યેક પ્રશ્ન વધુમાં વધુ ચાર બહુવૈકલ્પિક ઉત્તરો ધરાવે છે. જે (A), (B), (C) અને (D) વડે દર્શાવવામાં આવ્યા છે. પ્રશ્નનો ઉત્તર કેપીટલ સંજ્ઞા વડે આપવાનો રહેશે. ઉત્તરની સંજ્ઞા આપેલ ખાનામાં બરાબર સમાઈ જાય તે રીતે લખવાની રહેશે.

   ખરી રીત : [A] ખોટી રીત : [ A , [A]

૪. આ પ્રશ્નપત્રના જવાબ આપેલ ICR Answer Sheet ના Paper II વિભાગની નીચે આપેલ ખાનાંઓમાં આપવાના રહેશે.
૫. અંદર આપેલ સૂચનાઓ કાળજીપૂર્વક વાંચો.
૬. આ બુકલેટની પાછળ આપેલું પાનું રફ કામ માટે છે.
૭. પરીક્ષા સમય પૂરો થઈ ગયા પછી આ બુકલેટ જે તે નિરીક્ષકને સોંપી દેવી. કોઈપણ કાગળ પરીક્ષા ખંડની બહાર લઈ જવો નહીં.

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# LIFE SCIENCES

## PAPER-II

*Note :* This paper contains **fifty (50)** multiple-choice questions, each question carrying **two (2)** marks. Attempt *all* the questions.

1. One of the proteins present in Cilia is :

   (A) Casein (B) Tubulin

   (C) Resilin (D) Keratin

2. Acid-fast organism such as Mycobactreium tuberculosis resist decolourization by an acid alcohol wash because in their walls, they contain high concentration of :

   (A) Proteins (B) Carbohydrates

   (C) Lipids (D) Peptidoglycans

3. The dehydration of the core of a bacterial spore is responsible for all of the following *except* :

   (A) Its heat resistance

   (B) Its reduced rate of enzyme synthesis

   (C) Metabolic dormancy

   (D) DNA strand breakage

4. Synaptonemal complex can be observed during which stage of meiosis ?

   (A) Pachytene (B) Leptotene

   (C) Zygotene (D) Diplotene

5. The function of cytochrome in mitochondria is to transfer :

   (A) Water molecules to ADP (B) Electrons to oxygen

   (C) ADP to ATP (D) Oxaloacetate to Citrate

6. The Ames test is performed :
   (A) To determine the effectiveness of an antibiotic
   (B) To determine the pathogenicity of a bacterium
   (C) On bacteria to determine the carcinogenicity of chemicals
   (D) On laboratory animals to determine the carcinogenicity of chemicals

7. The main function of nucleolus is to control the synthesis of :
   (A) DNA (B) mRNA
   (C) rRNA (D) tRNA

8. Which type of molecule forms the bilayer in cell membrane ?
   (A) Cholesterol
   (B) Phospholipids
   (C) Neutral Lipids
   (D) Proteins

9. To detect HIV infection the confirmatory test is :
   (A) Elisa (B) Western blot
   (C) Southern blot (D) Assay of T-lymphocytes

10. Different enzymes catalyzing the same biochemical reaction are :
   (A) Isozymes (B) Allosteric enzymes
   (C) Constitutive enzymes (D) Ribozymes

11. A coenzyme is :
   (A) A substrate which performs catalysis and is changed in the process
   (B) A complex organic molecule needed by an enzyme for its function
   (C) A metal ion needed by an enzyme for its function
   (D) The intact complex of an enzyme needed for the function

12. Higher activity of malic enzyme is an indication of :
   (A) Very high aerobic oxidation
   (B) High lipid synthesis
   (C) Lower activity of malate dehydrogenase
   (D) Increased gluconeogenesis

13. The energy needed for protein synthesis is provided by the hydrolysis of :
(A) ATP alone (B) GTP alone
(C) ATP and GTP (D) CTP alone

14. Which of the following is a heteropolysaccharide ?
(A) Glycogen (B) Hyaluronate
(C) Starch (D) Cellulose

15. An open reading frame refers to :
(A) A sequence of DNA that can be translated between any two nucleotides
(B) A sequence in the database that can be accessed freely
(C) The sequence of DNA between translation initiation codon and first termination codon in frame
(D) The entire sequence corresponding to a transcript

16. Sodium chloride stabilizes double stranded DNA because :
(A) The chloride ions bind with the bases
(B) The sodium ions complex with sugar
(C) The sodium ions neutralize phosphate group
(D) Chloride ions cause deionization of phosphate

17. Cyclic AMP levels increase when :
(A) Epinephrine binds to $\alpha$ receptors
(B) Epinephrine binds to $\beta$ receptors
(C) Insulin binds to its receptors
(D) Growth hormone binds to its receptor

18. The hormone that inhibits movement of calcium from bone into the blood is :
(A) Thyroxine (B) Calcitonin
(C) Parathormone (D) Insulin

19. Precursor for the biosynthesis of auxin is :
(A) Tryptophan (B) Methionine
(C) Cysteine (D) Phenylalanine

20. Which of the following nutrients need not be taken in our diet :
(A) Iron (B) Selenium
(C) Vitamin K (D) Vitamin E

21. Which of the following nutrients has function of a morphogen :

(A) Magnesium (B) Vitamin A

(C) Vitamin C (D) Zinc

22. Flexion reflexes depend on the :

(A) Brain (B) Direction of the stimulus

(C) Spinal Cord (D) Autonomic neuron

23. Which of the following processes does not show saturable uptake rates ?

(A) Active transport (B) Passive diffusion

(C) Facilitated diffusion (D) Group translocation

24. Water stress is most harmful to the plants during :

(A) Seedling stage (B) Vegetative growth

(C) Flowering stage (D) Senescence

25. Non-coding DNA in eukaryotic cell may include all of the following *except* :

(A) Introns

(B) Pseudogenes

(C) Simple sequence DNA

(D) Mobile genetic elements

26. Which of the following has cytosolic receptors ?

(A) Insulin (B) Cytokine

(C) Glucocorticoid (D) Growth hormone

27. All of the following are true about nucleotide excision repair *except* :

(A) It is deficient in Xeroderma pigmentosum

(B) It removes thymine dimers generated by U.V. light

(C) It requires polymerase I and ligase

(D) It occurs in prokaryotes but not in eukaryotes

28. $T_n$ elements can promote genome restructuring by :

(A) Deletion (B) Insertion

(C) Inversion (D) All of these

29. Which of the following types of mutation will have lowest reversion frequency ?

(A) Transition (B) Transversion

(C) Frameshift mutation (D) Nonsense mutation

30. If a UV irradiated bacterial suspension is held in liquid medium before plating on nutrient agar, viable counts will :

(A) Increase

(B) Decrease

(C) Increase only when they are exposed to light

(D) Decrease upon exposure to light

31. Which of the following repair mechanism is error-free ?

(A) Mismatch (B) Excision

(C) SOS (D) Photoreactivation

32. Haemophilia is a human disorder caused by a sex-linked recessive mutation. How would male and female progeny be affected ?

(A) Females and males in equal numbers

(B) Mainly females but also rarely males

(C) Mainly males but also rarely females

(D) Females or males randomly depending on parental genotypes

33. In carcadian populations the frequency of the autosomal recessive cystic fibrosis mutation are allele in 50. What will be the frequency of individuals affected by cystic fibrosis ?

(A) 1 in 50 (B) 1 in 100

(C) 1 in 2500 (D) Unpredictable

34. When Monohybridic $F_1$ plants are crossed with recessive parent the typical ratio is :

(A) 9 : 3 : 3 : 1 (B) 9 : 7

(C) 1 : 1 (D) 3 : 1

35. The phenomenon where a recalcitrant toxic compound exhibit mobility within the biosphere is called :

(A) Biosorption (B) Biomagnification

(C) Eutrophication (D) Asphyxiaton

36. The process of transforming a compound by microorganisms that cannot use this compound as a source of carbon and energy is called :

(A) Co-oxidation (B) Co-metabolism

(C) Fortuitous metabolism (D) All of these

37. The major purpose of primary sewage treatment is to :

(A) Reduce BOD

(B) Remove most of the suspended and floating particles

(C) Remove pathogenes

(D) Oxidize the organic constituents

38. Which organisms are most susceptible to heat loss :

(A) Large cylinderical ones (B) Small spherical ones

(C) Large spherical ones (D) Small cylinderical ones

39. Colmer and Hinkle in 1947 were the first to discover ..... for its role in biobleaching.

(A) *Thiobacillus ferroxidans* (B) *Thiobacillus thiooxidans*

(C) *Leptospirillum ferroxidans* (D) *Thiobacillus acidophilus*

40. Which of the following best describes the bioaugmentation ?

(A) Introduction of a pollutant specific organism on the site

(B) Introduction of specific genetically engineered organisms on the site capable of degrading the particular pollutant

(C) Process of augmenting the site with nutrient

(D) All of the above are characteristics of bioaugmentation

41. According to Darwin's theory of evolution, differences between species may be the result of :

(A) The disuse of body structures

(B) The transmission of acquired characters

(C) Natural selection

(D) Mutagenic agents

42. Assuming that information storage and catalytic activity are essential to life, which of the following is most likely to be equipped with both :

(A) Proteins (B) DNA

(C) RNA (D) Lipids

43. Before origin of first cell, organic molecules would have been formed by :

(A) High pressure driven reactions

(B) UV mediated linking of reduced carbon and nitrogen compounds

(C) Hydrolysis of polymers

(D) High temperature driven condensation of reduced carbon and nitrogen compounds

44. The endosymbiotic theory of eukaryotic cell evolution proposes that the mitochondria and chloroplast arose from symbiotic prokaryotes that were ..... respectively.

(A) A chemoorganotroph and oxygenic phototroph

(B) A chemotithotroph and oxygenic phototroph

(C) A chemoorganotroph and anoxygenic phototroph

(D) A chemotithotroph and anoxygenic phototroph

45. Which of the following incorrectly matches a phylum with its members ?

(A) Platyhelminthes — planaria, tapeworm, flukes

(B) Mollusca — mussels, octopus, claus

(C) Annelida — millipede, eel, roundworm

(D) Chordata — bears, bat, lamprey

46. Euryhaline animals are those which are found within :

(A) Narrow range of temperature

(B) Narrow range of salinity

(C) Wide range of salinity

(D) Wide range of habitat

47. Opium comes from :

(A) Dried leaf

(B) Dried flowers

(C) Dried stem

(D) Immature green capsule

48. Onion belongs to the family :

(A) Fabaceae

(B) Poaceae

(C) Solanaceae

(D) Liliaceae

49. How is extinction represented in a tree diagram ?

(A) A branch splits

(B) A branch ends

(C) A branch shifts along the X axis

(D) A branch splits along the Y axis

50. The fishes of class Dipnoi are found in :

(A) North America, India, Australia

(B) South America, Africa, Europe

(C) South America, Africa, Australia

(D) Africa, Australia, China

## ROUGH WORK

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