

LIFE SCIENCES

PAPER - II

Signature of Invigilators

1.

2.

Roll No.

(In figures as in Admit Card)

Roll No.

(in words)

JY-06/04

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. Extra 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 માટે સૂચનાઓ :

૧. આ પાનાની ટોચમાં દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.
૨. આ પ્રશ્નપત્રમાં કુલ પચાસ (૫૦) 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) and (D). વડે દર્શાવવામાં આવ્યા છે. પ્રશ્નનો ઉત્તર કેપીટલ સંજ્ઞા વડે આપવાનો રહેશે. ઉત્તરની સંજ્ઞા આપેલ ખાનામાં ખરાબર 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 ખાનાઓમાં 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 કાળજી પરીક્ષા ખંડની બહાર લઈ જવો નહીં.

LIFE SCIENCES

Paper - II

NOTE : This paper contains FIFTY (50) multiple-choice / Assertion & Reasoning / Matching questions, each questions carrying two (02) marks. Attempt ALL the questions.

- Gram negative bacterial flagellum is attached to cell by how many rings ?
(A) 1 (B) 2
(C) 4 (D) 8
- Structural polymer of the fungal cell wall is
(A) chitin (B) peptidoglycan
(C) cellulose (D) lipoprotein
- Mechanisms of cell divisions in prokaryotes is referred to as
(A) mitosis (B) meiosis
(C) primary fission (D) budding
- Which of the following meiotic phases involves genetic exchange between allelic pairs of chromosomes ?
(A) pachytene (B) diplotene
(C) zygotene (D) meiosis II
- Which of the following is most hydrophobic ?
(A) outer surface of the cell membrane
(B) matrix of the cell membrane
(C) inner surface of the cell membrane
(D) inner surface of the mitochondrial membrane
- A characteristic features of culture derived from cancerous cells is
(A) contact inhibition (B) surface adhesion
(C) G1 arrest (D) colony formation

7. Following is the marker enzyme of lysosomes
(A) Alkaline phosphatase (B) Acid phosphatase
(C) Alkaline protease (D) Invertase
8. Which of the following statement is true about adaptive immunity in vertebrates?
(A) They start making antibodies upon arrival of the antigen
(B) They fragment multivalent antibodies into divalent antibodies upon arrival of the antigen
(C) cells displaying cognate antibodies differentially proliferate in response to antigen binding
(D) Helper T cells produce antibodies specific to antigens
9. If the C₁ carbon of glucose were labelled with ¹⁴C. which of the carbon atoms in pyruvate would be labelled in glycolysis ?
(A) carboxylate carbon
(B) carbonyl carbon
(C) methyl carbon
(D) both the carboxylate and methyl carbon
10. β amylase cleaves
(A) α (1 - 4) glycosidic bond (B) β (1 - 4) glycosidic bond
(C) α (1 - 6) glycosidic bond (D) β (1 - 6) glycosidic bond
11. A non-reducing disaccharide with the similar sugar units is
(A) lactose (B) trehalose
(C) sucrose (D) isomaltose
12. The charge on aspartic acid at pH 12.0 is
(A) - 1 (B) - 2
(C) + 1 (D) 0
13. RNA is more alkalilabile because of
(A) single stranded nature of RNA
(B) uridine residues in RNA
(C) 2' hydroxyl group in RNA
(D) extensive stem loop structure assumed by RNA

14. Which of the following is not a translation stop codon ?
(A) UAG (B) UAA
(C) UGA (D) AUG
15. In the Meselson and Stahl experiment cells with heavy DNA (labelled with a heavy isotope of nitrogen) were allowed to replicate their DNA in the presence of a light isotope.
When this happened the heavy DNA stand
(A) was lost and replaced by light DNA stand while new light DNA strand appeared
(B) remained as heavy DNA stand while new light DNA stand appeared
(C) was converted to a medium density DNA
(D) was transcribed into heavy DNA
16. Error during DNA replication are minimized by
(A) the absolute specificity of base pairing
(B) the exonucleolytic proof reading abilities of the DNA polymerase
(C) the strand directed mismatch repair mechanisms of the cell
(D) all of the above.
17. Prokaryotic m-RNAs are synthesized by
(A) RNA polymerase I (B) RNA polymerase II
(C) RNA polymerase III (D) none of the above
18. Which of the following is not a membrane lipid ?
(A) cholesterol (B) triacyl glycerol
(C) phosphatidyl glycerol (D) sphingomyelin
19. Which of the following does not require a transport protein ?
(A) steroid hormone (B) thyroid hormone
(C) retinoic acid (D) insulin
20. Nitrobacter bacteria use carbon dioxide as carbon source and nitrite ion as energy source. This organism is
(A) chemoautotroph (B) chemoheterotroph
(C) photoautotroph (D) photoheterotroph

21. Halophiles grow only in media containing at least
(A) 1.5% sodium chloride
(B) 15% sodium chloride
(C) 2.5% sodium chloride
(D) 25% sodium chloride
22. Which of the following substrates is utilized by *leptospirillum* ?
(A) sulphur
(B) ferrous iron
(C) thiosulphate
(D) ferric iron
23. Pernicious anaemia occurs in absence of
(A) Vitamin C
(B) Vitamin K
(C) Vitamin B₆
(D) Vitamin B₁₂
24. During the process of photosynthesis light energy is captured directly by
(A) protons from NADPH
(B) electron from chlorophyll
(C) phosphate from ATP
(D) carbons from carbon dioxide molecules
25. Double fertilization results in
(A) a pollen tube development
(B) triploid embryos
(C) a zygote and an endosperm
(D) a zygote and a pollen tube
26. Which one of the following is not a second messenger ?
(A) cAMP
(B) Ca⁺⁺ ion
(C) AMP
(D) inositol triphosphate
27. Luria-Delbruck fluctuation test suggests that
(A) Frequency of mutations can be assessed
(B) selective pressure enhance mutation frequency
(C) mutation occur only from non-selectable to selectable alleles
(D) mutations are low frequency events occurring randomly in population of cells.

28. Which of the following sequence elements is an essential constituents of natural DNA replicon ?
- (A) Origin of replication
 - (B) Drug resistance gene
 - (C) Phage resistance gene
 - (D) unique restriction enzyme cleavage site
29. Assuming that the level of glucose is low, a mutation in the lac repressor (*lac i*) in *E. coli*, preventing binding of the repressor to the operator, should result in
- (A) constitutive expression of the *lac* operon genes
 - (B) lack of expression or reduced expression of the *lac* operon genes under all circumstance
 - (C) expression of the genes only when lactose is present
 - (D) expression of the genes only when lactose is absent
30. A bacterial protein coding gene contains a termination codon in the middle of the coding region, yet the expression of gene in the bacterium produces, a functional protein. The translation of the mRNA probably involved
- (A) splicing of an intron
 - (B) a suppresser tRNA
 - (C) unfolding of mRNA
 - (D) ribosome stalling
31. Which of the formula is used to calculate map distances between genes in centimorgans in a diploid organism ?
- (A) $(\text{recombinant type offspring} / \text{parent type offspring}) \times 100$
 - (B) $(\text{parental type offspring} / \text{total offspring}) \times 100$
 - (C) $(\text{recombinant type offspring} / \text{total offspring}) \times 100$
 - (D) all of the above.
32. A pregnant woman, who has undergone an amniocentesis test, finds an extra barr body in her embryo. The syndrome which is likely to be associated with embryo is
- (A) Edward's syndrome
 - (B) Patau's syndrome
 - (C) Klinefelter's syndrome
 - (D) Down's syndrome

33. The genome of *E. coli* is approximately
- (A) 4.6 Mb linear DNA (B) 4.6 Mb circular DNA
(C) 3 Gb linear DNA (D) 400 kb circular DNA
34. Which of the following genetic disorders is known to result from translocation?
- (A) Haemophilia
(B) B cell lymphoma
(C) Cystic fibrosis
(D) chronic myeloid leukemia
35. Which one of the following nucleotide sequences is most likely affected by UV-light ?
- (A) AGTTTC (B) GAAACC
(C) TATATA (D) GATCAA
36. Miller who created primordial molecules in laboratory flask was a student of
- (A) T.H. Morgan (B) Jacques Monod
(C) E. Sutherland (D) Harlold Urey
37. The extant bacterial group that is most closely related to the ancestor from which mitochondria evolved is
- (A) Archebacteria (B) Cyanobacteria
(C) Purple photosynthetic bacteria (D) Methanogens
38. The most probable substrate for the most primitive organisms is
- (A) Ferrous sulphide (B) Carbohydrates
(C) Ammonia (D) Lipids
39. RNA is considered to have preceded DNA in a cellular evolution since
- (A) It is single stranded
(B) It can carry informations and can also catalyse certain reactions
(C) It is more easily degraded than DNA
(D) DNA dependent RNA polymerases are commonly found in biological systems

40. Which of the following statement is true about nucleic acid biosynthesis ?
- (A) DNA replication invariably depends upon RNA
 - (B) DNA replication is independent of RNA
 - (C) RNA synthesis cannot take place without DNA template
 - (D) RNA synthesis is never dependent on DNA template
41. To which trophic level do photo planktons belong ?
- (A) Consumers
 - (B) Herbivores
 - (C) Primary Producer
 - (D) Decomposers
42. The most important ingredient in green house effect allegedly responsible for global warming is
- (A) carbon dioxide
 - (B) ozone
 - (C) oxygen
 - (D) ammonia
43. Which of the following represents a biodegradable polymer ?
- (A) Poly B-hydroxybutyrate
 - (B) Poly vinyl chloride
 - (C) Polyethylene
 - (D) Polypropylene
44. The concentration of recalcitrant pesticide is applied in crops passing through successive trophic levels will
- (A) increase in all the entire series
 - (B) increase till herbivores
 - (C) not vary
 - (D) increase continuously through the food chain till top carnivores.
45. Energy in a ecosystem flows from
- (A) producers to decomposers to composers
 - (B) decomposers to consumers to primary producers
 - (C) producers to consumers to decomposers
 - (D) consumers to producers to decomposers

46. The best method to study bacterial molecular biodiversity is by
- (A) cultivation of these on solid media
 - (B) studying them under microscope
 - (C) Pure culture studies
 - (D) none of the these.
47. Floral formula is a method of
- (A) stylized representation of the flower structure
 - (B) knowing family
 - (C) identifying species
 - (D) recording floral structure by symbols, letters and numbers
48. Universal phylogenetic tree is determined by
- (A) ribosomal RNA sequencing
 - (B) substrate utilization profile
 - (C) DNA-DNA hybridization
 - (D) phospholipid analysis
49. Which of the following is not an example of racemose inflorescence ?
- (A) capitulum
 - (B) panicle
 - (C) spadix
 - (D) cyathium
50. Which of the following substances is added in preservation media to prevent crystal formation during low temperature preservation ?
- (A) glycerol
 - (B) glucose
 - (C) sodium chloride
 - (D) calcium chloride
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ROUGH WORK

ROUGH WORK