



Paper : II

Subject : LIFE SCIENCES

Subject Code : 28

Roll No.

Roll No. form with 8 empty boxes

(Figures as per admission card)

OMR Sheet No. : \_\_\_\_\_

BOOKLET SERIAL NO.

Name & Signature of Invigilator/s

Signature : \_\_\_\_\_

Name : \_\_\_\_\_

Time : 2 Hours

Maximum Marks : 200

Number of Pages in this Booklet : 16

Number of Questions in this Booklet : 100

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

- 1. ಈ ಪುಟದ ಮೇಲ್ಭಾಗದಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
2. ಈ ಪತ್ರಿಕೆಯು ಬಹು ಆಯ್ಕೆ ವಿಧದ ನೂರು (100) ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
3. ಪರೀಕ್ಷೆಯ ಪ್ರಾರಂಭದಲ್ಲಿ ಪ್ರಶ್ನೆ ಪುಸ್ತಿಕೆಯನ್ನು ನಿಮಗೆ ನೀಡಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನೀವು ಪುಸ್ತಿಕೆಯನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರೀಕ್ಷಿಸಲು ಕೋರಲಾಗಿದೆ.
(i) ಪ್ರಶ್ನೆಪುಸ್ತಿಕೆಗೆ ಪ್ರವೇಶವನ್ನು ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ವಿಕ್ಚರ್ ಸೀಲ್ ಇಲ್ಲದ ಅಥವಾ ತೆರೆದ ಪುಸ್ತಿಕೆಯನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.
(ii) ಪುಸ್ತಿಕೆಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳಿ ನೋಡಿರಿ. ಪುಟಗಳು/ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿದ್ದು ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪುಸ್ತಿಕೆಯನ್ನು ಕೂಡಲೆ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವಿವೇಕದಿಂದ ಸರಿ ಇರುವ ಪುಸ್ತಿಕೆಗೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ, ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.
4. ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನೀವು ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂಡಾಕೃತಿಯನ್ನು ಕಪ್ಪಾಗಿಸಬೇಕು.
ಉದಾಹರಣೆ : (A) (B) (C) (D)
(C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
5. ಈ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯ ಜೊತೆಯಲ್ಲಿ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ನಿಮ್ಮ ಉತ್ತರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು. OMR ಹಾಳೆಯಲ್ಲಿ ಅಂಡಾಕೃತಿಯಿಲ್ಲದ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿದರೆ, ಅದರ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ.
6. OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಕೊಟ್ಟ ಸೂಚನೆಗಳನ್ನು ಜಾಗರೂಕತೆಯಿಂದ ಓದಿರಿ.
7. ಎಲ್ಲಾ ಕರಡು ಕೆಲಸವನ್ನು ಪುಸ್ತಿಕೆಯ ಕೊನೆಯಲ್ಲಿ ಮಾಡತಕ್ಕದ್ದು.
8. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಬಹುದಾದ ನಿಮ್ಮ ಹೆಸರು ಅಥವಾ ಯಾವುದೇ ಚಿಹ್ನೆಯನ್ನು, ಸಂಗತವಾದ ಸ್ಥಳ ಹೊರತು ಪಡಿಸಿ, OMR ಉತ್ತರ ಹಾಳೆಯ ಯಾವುದೇ ಭಾಗದಲ್ಲಿ ಬರೆದರೆ, ನೀವು ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗುತ್ತೀರಿ.
9. ಪರೀಕ್ಷೆಯು ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವಿವೇಕದಿಂದ ನೀವು ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರೀಕ್ಷಾ ಕೊಠಡಿಯ ಹೊರಗೆ OMRನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯಕೂಡದು.
10. ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
11. ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.
12. ಕ್ಯಾಲ್ಕುಲೇಟರ್, ಎದ್ದುನಾಣ ಉಪಕರಣ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.
13. ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.
14. ಕನ್ನಡ ಮತ್ತು ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳ ಪ್ರಶ್ನೆಪತ್ರಿಕೆಗಳಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ವ್ಯತ್ಯಾಸಗಳ ಕಂಡುಬಂದಲ್ಲಿ, ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳಲ್ಲಿರುವುದೇ ಅಂತಿಮವೆಂದು ಪರಿಗಣಿಸಬೇಕು.

Instructions for the Candidates

- 1. Write your roll number in the space provided on the top of this page.
2. This paper consists of Hundred multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
(i) To have access to the Question Booklet, tear off the paper seal on the edge of the 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 pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
4. Each item 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 : (A) (B) (C) (D)
where (C) is the correct response.
5. Your responses to the questions are to be indicated in the OMR Sheet kept inside this Booklet. If you mark at any place other than in the circles in the OMR Sheet, it will not be evaluated.
6. Read the instructions given in OMR carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must NOT carry it with you outside the Examination Hall.
10. You can take away question booklet and carbon copy of OMR Answer Sheet after the examination.
11. Use only Blue/Black Ball point pen.
12. Use of any calculator, electronic gadgets or log table etc., is prohibited.
13. There is no negative marks for incorrect answers.
14. In case of any discrepancy found in the Kannada translation of a question booklet the question in English version shall be taken as final.



## LIFE SCIENCES

## Paper – II

**Note :** This paper contains **Hundred (100)** objective type questions. **Each** question carries **two (2)** marks. **All** questions are **compulsory**.

- The constituent monosaccharide in chitin is
  - D-Glucose
  - D-Xylose
  - N-acetyl D-glucosamine
  - D-Galactose
- An example for aromatic amino acid is
  - Methionine
  - Valine
  - Alanine
  - Tyrosine
- Which functional group is never found in alpha amino acids ?
  - $\text{NH}_2$
  - $\text{COOH}$
  - $\text{CHO}$
  - $\text{S-CH}_3$
- Ramachandran plot displays
  - Allowed angles of Phi and Psi for polypeptide backbone
  - Preferred amino acids in a helix
  - The hydropathy of amino acids
  - Angles of rotation of R-group of amino acids
- Left-handed helix is found in
  - B-DNA
  - A-DNA
  - C-DNA
  - Z-DNA
- $\text{pH} = \text{pK}$ , when
  - $[\text{Proton acceptor}] = 1/2[\text{Proton donor}]$
  - $[\text{Proton acceptor}] = [\text{Proton donor}]$
  - $[\text{Proton acceptor}] = 2[\text{Proton donor}]$
  - $2[\text{Proton acceptor}] = [\text{Proton donor}]$
- Match the following with reference to protein structure and modifying reagents.

Column A	Column B
i. Mercapto ethanol	a. Peptide bond
ii. Guanidine hydrochloride	b. Disulphide bridge
iii. Urea	c. Hydrogen bond
iv. Dithiothreitol	d. Ionic bond

  - i - a, ii - d, iii - b, iv - c
  - i - b, ii - c, iii - c, iv - b
  - i - c, ii - b, iii - a, iv - d
  - i - d, ii - a, iii - c, iv - a



8. Match the Column A consisting of different vitamins with their names in Column B

**Column A****Column B**

- |                           |                 |
|---------------------------|-----------------|
| a. Vitamin D              | i. Tocopherol   |
| b. Vitamin E              | ii. Thiamine    |
| c. Vitamin B <sub>6</sub> | iii. Pyridoxine |
| d. Vitamin B <sub>1</sub> | iv. Calciferol  |

- (A) a - (i), b - (ii), c - (iii), d - (iv)  
(B) a - (i), b - (ii), c - (iv), d - (iii)  
(C) a - (iv), b - (i), c - (iii), d - (ii)  
(D) a - (iv), b - (i), c - (ii), d - (iii)

9. Where are the ion carriers located in a cell ?

- (A) Cell membranes  
(B) Intercellular spaces  
(C) Cell wall  
(D) Nucleus

10. Which of the following cell organelle contain DNA ?

- (A) Golgi complex  
(B) Endoplasmic reticulum  
(C) Ribosome  
(D) Mitochondria

11. In which of the following organelles  $\beta$ -oxidation of long chain fatty acids is initiated with an object of shortening the chain length ?

- (A) Lysosomes  
(B) Peroxisomes  
(C) Microsomes  
(D) Golgi

12. The cell division, which consists of nuclear division (mitosis) followed by cytoplasmic division (cytokinesis) occurs during

- (A) G<sub>1</sub> phase (B) S phase  
(C) G<sub>2</sub> phase (D) M phase

13. Which of the following pair matches with membrane transport process and its primary function ?

- (A) Exocytosis – the movement of macromolecules into the cell  
(B) Pinocytosis – the uptake of water and solutes into the cell  
(C) Osmosis – passive diffusion of small solutes  
(D) Phagocytosis - secretion of large particles from the cell

14. The core of the nucleosome consists of

- (A) H<sub>1</sub>, H<sub>2</sub>A, H<sub>2</sub>B, H<sub>4</sub>  
(B) H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub>, H<sub>4</sub>  
(C) H<sub>1</sub>, H<sub>2</sub>A, H<sub>2</sub>B, H<sub>3</sub>  
(D) H<sub>1</sub>, H<sub>2</sub>A, H<sub>3</sub>, H<sub>4</sub>

15. The concept of pH homeostasis is

- (A) The ability of the microbe to control its internal pH  
(B) The ability of the microbe to control its external pH  
(C) The ability of the microbe to grow on acidic pH  
(D) The ability of the microbe to grow on alkaline pH



16. A metabolic pathway that involves part of the Krebs's cycle plus two unique enzymes, malate synthetase and isocitrate lyase is
- (A) Glyoxylate cycle
  - (B) Glycolate pathway
  - (C) Calvin cycle
  - (D) TCA cycle
17. The maximum coiling of the chromosomes is observed during
- (A) Pachytene of meiosis
  - (B) Metaphase of mitosis
  - (C) Anaphase of meiosis I
  - (D) Telophase of meiosis II
18. During replication, the long strands of DNA in a cell's nucleus get tangled making it harder for a cell to read genes. But \_\_\_\_\_ enzyme can prevent tangling.
- (A) DNA ligase
  - (B) DNA replicase
  - (C) DNA topoisomerase
  - (D) DNA isomerase
19. Which of the following are the non-coding RNAs ?
- (A) rRNA, miRNA and mRNA
  - (B) rRNA, tRNA and mRNA
  - (C) miRNA, tRNA and mRNA
  - (D) rRNA, miRNA and tRNA
20. In the final step of protein synthesis, the folding of many proteins is made more efficient by a special class of protein called
- (A) Gag-Pol fusion protein
  - (B) Protease
  - (C) Chaperone
  - (D) Ubiquitin
21. Which of the following process takes place in the 3' – 5' direction ?
- (A) RNA editing
  - (B) RNA replication
  - (C) DNA replication
  - (D) RNA splicing
22. In eukaryotic cells, the tRNA genes 5s, rRNA genes, some snRNA genes and genes for other small RNAs are transcribed by
- (A) RNA polymerase I
  - (B) RNA polymerase II
  - (C) RNA polymerase III
  - (D) Reverse Transcriptase
23. The role of gRNA is
- (A) Chemical modification of rRNA
  - (B) Self splicing
  - (C) Polyadenylation
  - (D) RNA editing



24. DNA repair pathway that can repair the damage caused by large change in the structure of the DNA double helix is called
- (A) Mismatch repair
  - (B) Base excision repair
  - (C) DNA interstand cross-link repair
  - (D) Nucleotide excision repair
25. Fermentation of one molecule of glucose to ethanol and  $\text{CO}_2$  require \_\_\_\_\_  $\text{O}_2$  molecule(s).
- (A) 36
  - (B) 24
  - (C) 0
  - (D) 1
26. Which of the following signalling molecule does NOT bind to nuclear receptor ?
- (A) Cortisol
  - (B) Acetyl choline
  - (C) Testosterone
  - (D) Vitamin  $\text{D}_3$
27. Which of the following describes cell-cell junction ?
- (A) Occluding and claudin mediate cell-cell contact
  - (B) Adherence junctions occur as continuous bands
  - (C) Occluding junctions are abundant in cell under stress
  - (D) Inorganic ions are able to pass through anchoring junction to permit cell coupling
28. Gram-negative bacteria produces which of the following as their signalling molecule in quorum sensing ?
- (A) N-acyl homoserine lactones (AHL)
  - (B) Autoinducing peptide (AIP)
  - (C) Salicylic acid
  - (D) Histidine kinase
29. Which of the following is the tumour suppressor gene ?
- (A) Neuroblastoma
  - (B) p53
  - (C) SRY
  - (D) Retinoblastoma
30. *Rous sarcoma* virus was first discovered in
- (A) Monkey
  - (B) Rat
  - (C) Rabbit
  - (D) Chicken
31. MHC molecule on antigen-presenting cells which presents foreign peptides to helper cells is
- (A) Class I MHC molecule
  - (B) Class II MHC molecule
  - (C) Class III MHC molecule
  - (D) Class I and Class III MHC molecule
32. The correct sequence of events in producing an antibody response to an antigen is
- (A) Antigen  $\rightarrow$  APC  $\rightarrow$  Th  $\rightarrow$  B  $\rightarrow$  Plasma cell  $\rightarrow$  Ab
  - (B) Antigen  $\rightarrow$  Th  $\rightarrow$  APC  $\rightarrow$  B  $\rightarrow$  Plasma cell  $\rightarrow$  Ab
  - (C) Antigen  $\rightarrow$  B  $\rightarrow$  Th  $\rightarrow$  Plasma cell  $\rightarrow$  APC  $\rightarrow$  Ab
  - (D) Antigen  $\rightarrow$  APC  $\rightarrow$  Th  $\rightarrow$  B  $\rightarrow$  Cytokine  $\rightarrow$  Ab



33. A living microbe whose virulence is destroyed and used for vaccination is considered
- (A) A toxoid      (B) A toxin  
(C) Virulent      (D) Attenuated
34. Which of the following is an autoimmune disease ?
- (A) Cystic fibrosis  
(B) Multiple sclerosis  
(C) Sickle cell anaemia  
(D) Dyslexia
35. Which of the following is not the portal of entry for bacterial pathogens in the plant host ?
- (A) Stomata  
(B) Hydathode  
(C) Lenticel  
(D) Plasmodesmata
36. Choose the correct match :
- | Category I | Category II             |
|------------|-------------------------|
| i. IgA     | 1. Basophils            |
| ii. IgE    | 2. $\delta$ heavy chain |
| iii. IgG   | 3. Secretory component  |
| iv. IgM    | 4. Pentamer             |
|            | 5. Cross placenta       |
- (A) i - 2,    ii - 1,    iii - 3,    iv - 5  
(B) i - 3,    ii - 5,    iii - 2,    iv - 1  
(C) i - 2,    ii - 3,    iii - 5,    iv - 4  
(D) i - 3,    ii - 1,    iii - 5,    iv - 4
37. During morphogenesis, the formation of anterior structure in the *Drosophila* embryo requires the product of \_\_\_\_\_ gene.
- (A) *Hunchback*    (B) *Pax-6*  
(C) *Bicoid*      (D) *Nanos*
38. During microsporogenesis the tapetum is formed from
- (A) Sporogenous cells  
(B) Parietal cells  
(C) Epithelial cells  
(D) Endogenous cells
39. Floral development in *Arabidopsis* and *Antirrhinum* is under genetic control of \_\_\_\_\_ genes.
- (A) *Gurke*      (B) *Homeotic*  
(C) *Hobbit*      (D) *Fackel*
40. Which of the following is the master gene involved in sex determination in *Drosophila* ?
- (A) *Sxl*      (B) *Sdc*  
(C) *Xol*      (D) *Nanos*
41. Products of maternal genome molecules that are placed in the *Drosophila* egg are
- (A) DNA      (B) Proteins  
(C) RNA      (D) Enzymes



42. Shinya Yamanaka received his Nobel Prize for discovery of
- (A) Induced pluripotent stem cells
  - (B) Oncogene
  - (C) Okazaki fragments
  - (D) Cancer stem cells
43. Caspases are involved in the process of
- (A) DNA replication
  - (B) Recombination
  - (C) Apoptosis
  - (D) Antibody synthesis
44. Q cycle occurs in the mitochondria as well as in the chloroplast. Its main function is
- (A) Coupling  $2e$  transfer with  $1e$  transfer
  - (B) It is a part of complex III in the respiratory chain as well as in Z scheme of photosynthetic electron transfer
  - (C) It acts a buffer of protons
  - (D) It is involved in thermogenesis in animals and in plants growing in low temperatures
45.  $C_4$  plants are photosynthetically more efficient than that of  $C_3$  plants, because of the absence of \_\_\_\_\_ in  $C_4$  plants.
- (A) Cyclic electron transport
  - (B) Non-cyclic electron transport
  - (C) Photorespiration
  - (D) Photoperiodism
46. Which of the following is not a plant growth hormone ?
- (A) Jasmonic acid
  - (B) Gibberellin
  - (C) Auxin
  - (D) Ethylene
47. The fixation of  $CO_2$  in  $C_4$  cycle takes place by
- (A)  $\alpha$ -Ketoglutarate
  - (B) Oxaloacetate
  - (C) Phospho-phenol pyruvate
  - (D) Dihydroxy acetone phosphate
48. Which of the following bacteria is a non-heterocystous and non-symbiotic nitrogen fixing bacteria ?
- (A) *Anabaena*
  - (B) *Rhizobium*
  - (C) *E. coli*
  - (D) *Azotobacter*
49. During electron transport, the extra energy carried by the electron is utilized in the formation of
- (A) ATP
  - (B) ADP
  - (C) NADP
  - (D)  $NADPH_2$
50. Which of the following is not a secondary metabolite ?
- (A) Alkaloids
  - (B) Phenols
  - (C) Flavonoids
  - (D)  $\alpha$ -Ketoglutaric acid



51. Number of ATP molecules required to fix one molecule of  $N_2$  is
- (A) 12                      (B) 16  
(C) 20                      (D) 24
52. Hair cells are components of \_\_\_\_\_ sensory organ.
- (A) Vision                  (B) Taste  
(C) Smell                    (D) Hearing
53. Match the hormones to the glands producing them.
- | Group A         | Group B      |
|-----------------|--------------|
| i. Oxytocin     | 1. Ovary     |
| ii. Insulin     | 2. Pituitary |
| iii. Calcitonin | 3. Pineal    |
| iv. Estrogen    | 4. Pancreas  |
|                 | 5. Thyroid   |
- (A) i - 5,    ii - 4,    iii - 2,    iv - 1  
(B) i - 4,    ii - 2,    iii - 5,    iv - 3  
(C) i - 2,    ii - 4,    iii - 5,    iv - 1  
(D) i - 1,    ii - 4    iii - 2,    iv - 3
54. Myogenic heart contraction is initiated by
- (A) Myocytes  
(B) Endothelial cells  
(C) Purkinje cells  
(D) Transitional cells
55. Blood pressure is the pressure of blood on the walls of
- (A) Arteries  
(B) Veins  
(C) Myocardium  
(D) Ventricle
56. Which one of the following nerve centre is NOT involved in the regulation of excreting urine from the urinary bladder (Micturition) ?
- (A) Spinal cord  
(B) Brain stem  
(C) Cerebral cortex  
(D) Dura matter
57. Which of the following organ regulates the ionic balance in man ?
- (A) Liver                      (B) Kidney  
(C) Heart                      (D) Pancreas
58. The pituitary gland stimulates the adrenal glands to make cortisol. Cortisol is increased during all of the following situation except
- (A) Morning hours  
(B) Stress  
(C) Illness  
(D) Night time



59. Which of the following is the functional unit of vertebrate excretory system ?

- (A) Kidney
- (B) Henle's loop
- (C) Neuron
- (D) Nephron

60. A couple has a female child with disease and two unaffected children. Neither parent nor any of the four biological grandparents of the affected child has had this disease. Which one of the following is the most likely genetic explanation?

- (A) Autosomal recessive
- (B) X-linked dominant
- (C) X-linked recessive
- (D) Autosomal dominant

61. Which one of the following is correct for the linkage in *Drosophila* ?

- (A) Complete in both males and females
- (B) Incomplete in both males and females
- (C) Complete in males and incomplete in females
- (D) Complete in females and incomplete in males

62. Match the following definition and their nomenclature.

Definition	Nomenclature
a. Normal appearance of genetically controlled traits in the phenotype	i. Pleiotropy
b. Genes having more than one primary effect	ii. Codominance
c. Phenotype produced by environmental effect is same as the phenotype produced by a genotype	iii. Phenocopy
d. Both alleles of a gene express themselves in the heterozygotes	iv. Penetrance
	v. Expressivity

- (A) a - iv, b - i, c - iii, d - ii
- (B) a - v, b - iii, c - i, d - iv
- (C) a - iii, b - iv, c - ii, d - v
- (D) a - i, b - v, c - iv, d - iii

63. Which of the following combination is the components of genetic variance ?

- (A) Additive genetic variance + Recessive variance + Interaction variance
- (B) Additive genetic variance + Dominance variance + Interaction variance
- (C) Additive genetic variance + Dominance variance + Inversion variance
- (D) Additive genetic variance + Dominance variance + Independent



64. A unit of distance in linkage map is

- (A) Nano meter
- (B) Milli micron
- (C) Centimorgan
- (D) Milli meter

65. Which of the following is the value of lod score for two-point mapping in human system ?

- (A) + 3 and - 2
- (B) - 3 and + 2
- (C) + 3 and - 3
- (D) - 3 and + 3

66. Which of the following chromosomal aberration is crossing over suppressor ?

- (A) Translocation
- (B) Inversion
- (C) Deletion
- (D) Duplication

67. The gene is the basic unit of

- (A) function, mutation and coding
- (B) function, recombination and coding
- (C) function, mutation and noncoding
- (D) function, recombination and mutation

68. Match the following processes with their nomenclature :

Processes	Nomenclature
a. Genes are transferred by cell to cell contact	i. Transformation
b. Genes are transferred inside virus particles	ii. Transduction
c. Genes are transferred into cells as free molecules	iii. Sexduction
d. Bacterial cell gains access to foreign DNA through modified F-factor	iv. Conjugation

- (A) a - iv, b - iii, c - ii, d - i
- (B) a - iv, b - i, c - iii, d - ii
- (C) a - iv, b - ii, c - i, d - iii
- (D) a - iii, b - iv, c - i, d - ii

69. Classification system for prokaryotic species based on the 16s rRNA was proposed by

- (A) Carl Woese
- (B) John Hutchinson
- (C) Alexopoulos and Mims
- (D) Kary Mullis



70. Which of the following is NOT a phylogenetic system of plant classification ?
- (A) Takhtajan's system
  - (B) Hutchinson's system
  - (C) Engler and Prantl's system
  - (D) Bentham and Hooker's system
71. In taxonomic hierarchy, the "Phylum" was introduced by
- (A) Linnaeus
  - (B) Haeckel
  - (C) Fabricius
  - (D) John Ray
72. Which one of the following organisms belong to Kingdom Protista ?
- (A) Slime molds
  - (B) Blue Green Bacteria
  - (C) Mosses
  - (D) Sponges
73. \_\_\_\_\_ does NOT belong to Gram positive Bacteria.
- (A) *Lactobacillus*
  - (B) *Azotobacter*
  - (C) *Staphylococcus*
  - (D) *Bacillus*
74. Cell walls of prokaryotes are rigid and contain \_\_\_\_\_ as the main strengthening compound.
- (A) Chitin
  - (B) Gelatine
  - (C) Murein
  - (D) Lignin
75. Goblet cells are found interspersed in the \_\_\_\_\_ epithelial tissue.
- (A) Columnar
  - (B) Cuboidal
  - (C) Squamous
  - (D) Ciliated
76. \_\_\_\_\_ is the example for "Dead-end Phylum".
- (A) Porifera
  - (B) Cnidaria
  - (C) Annelida
  - (D) Nematoda
77. Which of the following is the State bird of Karnataka ?
- (A) House Sparrow
  - (B) Indian Roller
  - (C) Koel
  - (D) Peacock



78. Biodiversity-rich Western Ghats traverse through how many States in India ?
- (A) 5                      (B) 4  
(C) 6                      (D) 7
79. In an ecosystem, the number of deer was counted as 2500 in one year. In the following year, the number increased to 2750. If the birth rate of the deer is 0.3 what will be the death rate ?
- (A) 0.5                      (B) 0.3  
(C) 0.2                      (D) 0.1
80. In an ecosystem, there was a large lake with plenty of fish. A human settlement grew in the vicinity of the lake and the fish population began to decline. Identify the possible sequence of events leading to the decline in fish population
- (A) Increased human population – increased light pollution – fish unable to breed – decline in fish population  
(B) Lake polluted with sewage – algal bloom – decline in dissolved oxygen – increased fish death  
(C) Increase in human population – increased use of lake water – fish spawn decrease  
(D) Increased human population – environmental pollution – acid rain – decrease in lake pH – fish died
81. A psychrotrophic bacteria can grow at a temperature range of
- (A) 60 – 80°C                      (B) 40 – 50°C  
(C) 30 – 40°C                      (D) –20 – 10°C
82. A situation of ecological niche where similar species can exist in the same area but use resources at different times is
- (A) Competitive exclusion  
(B) Resource partitioning  
(C) Fundamental niche  
(D) Interspecies competition
83. The artificial chromosome is used to clone \_\_\_\_\_ DNA segment.
- (A) 1 kb  
(B) 10 kb  
(C) 20 kb  
(D) 200 kb and above
84. \_\_\_\_\_ is an area that acts as a boundary or a transition between two ecosystems.
- (A) Ecocline  
(B) Ecotone  
(C) Edge effect  
(D) Ecological niche
85. Which of the following statement about *K*-selected species is FALSE ?
- (A) minimal parental care  
(B) fewer offspring  
(C) large body size  
(D) long life expectancy



86. Miller's experiment on abiotic synthesis showed that
- (A) Life can be created in the lab
  - (B) If all the components of life are provided, a primordial cell will be formed in the lab
  - (C) Simple molecules can give rise to complex molecules
  - (D) Atoms can combine to give molecules
87. FISH technique is used for the localization of \_\_\_\_\_ on a chromosome.
- (A) Protein      (B) Gene
  - (C) Enzyme      (D) Haplotype
88. In a population, the frequencies of genes 'A' and 'a' have reached a steady state. Which of the following frequencies indicate that the population is in Hardy-Weinberg equilibrium ?
- (A) 0.064, 0.48, 0.09
  - (B) 0.49, 0.42, 0.09
  - (C) 0.36, 0.36, 0.09
  - (D) 0.49, 0.48, 0.36
89. A random change in the frequencies of alleles within a small population is
- (A) Genetic load
  - (B) Heterosis
  - (C) Genetic drift
  - (D) Homeostasis
90. In the evolutionary time scale, monkeys, apes and other mammals evolved during \_\_\_\_\_ period.
- (A) Quaternary
  - (B) Tertiary
  - (C) Cambrian
  - (D) Cretaceous
91. Existence of two or more genotypes for a given trait in a population is called
- (A) Pleiotropism
  - (B) Monomorphism
  - (C) Mutualism
  - (D) Polymorphism
92. Female wasps have a choice of being a single foundress, she builds a nest and lays eggs. Alternately she can join a colony of wasps and help in the colony activities, but cannot breed. Although there is no "Fitness" advantage for the wasp, this behaviour has evolved as an evolutionarily stable strategy. Which of the following is probably one of the reasons for this ?
- (A) She is taken care off in the colony
  - (B) She has a chance of taking over as the queen and then breed
  - (C) She can lay her eggs in the colony even though she is not supposed to do so
  - (D) She has less work to do since other members share the work



93. Which one of the following is responsible for evolution of multigene families ?
- (A) Gene duplication and Inversion
  - (B) Unequal crossing-over and Translocation
  - (C) Random mutation and Deletion
  - (D) Both Duplication and Unequal crossing
94. Who proposed the “Great chain of being” in the field of evolution ?
- (A) Wallace
  - (B) Linnaeus
  - (C) Aristotle
  - (D) Anaximander
95. Which part of the brain is mainly involved in special memory ?
- (A) Amygdala
  - (B) Hippocampus
  - (C) Cerebellum
  - (D) Temporal lobe
96. Of the several methods used for construction of phylogenetic tree which one of the following uses character-based method ?
- (A) Bootstrap method
  - (B) Neighbour joining
  - (C) Maximum likelihood
  - (D) Linkage

Read the following passage and answer the questions (97-100) based on the passage:

Humans share the planet with as many as  $8.7 \pm 1.3$  million different forms of life. Linnaeus, in his day, was confident he had captured the entire world of living things. He named about 10,000 species, most of which were confined to Europe. Current estimates range from 3 million(m) to 100 m. Many of those species will be extinct before scientists have even registered their presence.

Researchers who have analysed the hierarchical categorisation of life on earth to estimate how many undiscovered species exist, say the diversity of life is not equally divided between land and ocean. Three-quarters of the 8.7 m species – the majority of which are insects – are on land; only one-quarter, 2.2 m are in the deep, even though 70% of the earth’s surface is water. We know we are losing species because of human activity, but we can’t really appreciate the magnitude of species lost until we know what species are there. An astonishing 86% of all plants and animals on land and 91% of those in the seas have yet to be named and catalogued.

The Swedish biologist devised a hierarchical, tree-like structure where each individual species was classed in a series of progressively larger groups, culminating at the kingdom level. Thus, a single species of hermit crab is classified in the order Decapoda, which belongs to the subphylum of Crustacea, phylum of Arthropoda, and finally the animal kingdom.



The scientists, in their analysis of existing data on 1.2 m species, detected patterns between those hierarchical groupings which they could use to infer the existence of missing species that have not yet been described. They estimate that the various forms of life on the planet included 7.8 million species of animal, 298,000 species of plant and 611,000 species of mushrooms, mould and other fungi along with 36,400 species of Protozoa, single-celled organisms and 27,500 species of algae. The researchers did not venture to put an estimate on the number of bacteria.

In 1979, Terry Erwin, a beetle expert at the Smithsonian Institution in Washington, went out into the jungles of Panama, rolled some sheeting on the ground and sprayed several trees with pesticide. He discovered the bodies of more than 1,100 new species of beetle from the canopy of a single type of tree. There could be as many as 30 m species of insects in tropical rain forests alone, calculated Erwin. The scientists note that identifying and describing new life forms is expensive and slow, especially when set against the magnitude of species yet to be found or catalogued.

Barely 14% of creatures on earth have been logged in central databases – just 9% of those are in the seas, the study noted. Most of those species waiting to be discovered will be small and they are likely to be concentrated in remote areas or the ocean depths.

97. How did researchers estimate the number of undiscovered species ?
- (A) Researchers estimated the bacterial species from the DNA data
  - (B) Infer existence of missing species from existing data on 1.2 million species
  - (C) By constructing hierarchical tree-like structure where each individual species was classed in a series of progressively larger groups, culminating at the kingdom
  - (D) A beetle expert calculated the insect species based on his experiment of collecting 1100 new species of beetle from a single type of tree in the forest of Panama
98. The number of species on planet earth have been estimated by different methods. Which of the following is NOT the total number of estimated species ?
- (A)  $8.7 \pm 1.3$  million
  - (B) 3 to 100 million
  - (C) 1.2 million
  - (D) 7.8 million animal species
99. What is the estimated number of mushrooms, moulds and other fungi ?
- (A) 36,400                      (B) 611,000
  - (C) 298,000                    (D) 27,500
100. \_\_\_\_\_ percent of organisms have been entered in the central data base.
- (A) 14%                      (B) 91%
  - (C) 86%                      (D) 9%



**Space for Rough Work**