### Life Science

**Paper II**

**Time Allowed : 75 Minutes**

**Note :** This Paper contains Fifty (50) multiple choice questions, each question carries Two (2) marks. Attempt All questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Statement</th>
<th>Options</th>
</tr>
</thead>
</table>
| 1. | Which one of the following is *not* a modification of a compound light microscope ? | (A) Phase contrast microscope  
(B) Fluorescence microscope  
(C) Electron microscope  
(D) Dark-field microscope |
| 2. | In *Drosophila melanogaster*, sex is determined by : | (A) X and Y chromosomes  
(B) X/A ratio  
(C) Ploidy  
(D) Z and W chromosomes |
| 3. | Organelle found in plant seeds that oxidise stored lipids as source of carbon and energy for growth are : | (A) peroxisomes  
(B) chloroplasts  
(C) glyoxysomes  
(D) lysosomes |
| 4. | Which of the following represents mammalian mitotic cyclins ? | (A) Cyclins A and D  
(B) Cyclins B and D  
(C) Cyclins E and B  
(D) Cyclins A and B |
5. The valency of Immunoglobulin M molecule is :
   (A) 8
   (B) 10
   (C) 12
   (D) 14

6. Bivalent formation and crossing over take place during :
   (A) Zygotene
   (B) Pachytene
   (C) Diplotene
   (D) Leptotene

7. Induction of new blood vessels that invade the tumor and nourish it is known as :
   (A) metastasis
   (B) neogenesis
   (C) angiogenesis
   (D) extravasation

8. GIUT 1 is a well studied example of a protein that mediates :
   (A) active transport
   (B) facilitated diffusion
   (C) osmosis
   (D) differentiation

9. Cadherins are a family of cell adhesion molecules dependent on :
   (A) Ca$^{2+}$
   (B) K$^{1+}$
   (C) Na$^{1+}$
   (D) Mg$^{2+}$

10. Cellulose is formed by repeated units of :
    (A) glucose and galactose
     (B) galactose
     (C) glucose
     (D) fructose
11. The acetyl groups required for cytoplasmic fatty acid biosynthesis generated due to activity of:
   (A) citrate lyase
   (B) citrate synthase
   (C) isocitrate lyase
   (D) isocitrate dehydrogenase

12. A non-competitive inhibitor:
   (A) increases $K_m$ and $V_{max}$ both
   (B) decreases $K_m$ and increases $V_{max}$
   (C) decreases $K_m$ and $V_{max}$ both
   (D) $K_m$ remains unaltered, $V_{max}$ decreases

13. Which one of the following is not a proton pump?
   (A) NADH-Q reductase
   (B) Succinate-Q reductase
   (C) Cytochrome C reductase
   (D) Cytochrome oxidase

14. Two molecules of double stranded DNA have same length (1000 basepairs) but differ in base composition. Molecule 1 contains 20% A + T, molecule 2 contains 60% A + T. Which molecule has a higher $T_m$ and how many C residues are there in molecule 2?
   (A) 1 ; 400
   (B) 1 ; 200
   (C) 2 ; 400
   (D) 2 ; 40
15. Which of the following is NOT involved in the lagging strand synthesis?

(A) RNaseA
(B) Primase
(C) Reverse Transcriptase
(D) DNA Pol I

16. There are three kinds of RNA polymerases (I, II, III) in eukaryotic cells, each specific for one class of RNA molecule (mRNA, tRNA and rRNA). Which of the following is a correct match?

(A) I-rRNA, II-tRNA
(B) II-mRNA, III-rRNA
(C) I-rRNA, II-mRNA
(D) I-tRNA, III-rRNA

17. Which of the following does not inhibit translation?

(A) chloramphenicol
(B) streptomycin
(C) tetracycline
(D) rifampicin

18. For a spontaneous reaction $\Delta G$ should be:

(A) positive
(B) negative
(C) equal to zero
(D) may be negative or zero
19. Cold stress—induced increase in membrane fluidity is caused due to:
   (A) increase in cholesterol
   (B) increase in long chain fatty acids
   (C) increase in unsaturated fatty acids
   (D) increase in sphingolipids

20. Which of the following statements is true?
   (A) Intestinal cells have Na⁺/glucose antiporters
   (B) Intestinal cells have Na⁺/amino acid symporters
   (C) Maintenance of low Ca²⁺ concentration in cytosol is due to primary active transport of Na⁺ and Ca⁺⁺
   (D) Cells have Na⁺/H⁺ symporters.

21. Which of the following is an osmoregulatory hormone in lower vertebrates?
   (A) Thyroxine
   (B) Malatonin
   (C) Prolactin
   (D) Epinephrine

22. “Mottled enamel” a condition which makes teeth particularly more resistant to decay is due to:
   (A) vitamin A excess
   (B) fluoride excess
   (C) vitamin B₁₂ deficiency
   (D) selenium excess
23. Blue-light receptors in the plant
are:
(A) Cryptochromes
(B) Carotenoids
(C) Cytochromes
(D) Phytochromes

24. Echo location is characteristic of:
(A) Bats
(B) Whales
(C) Birds
(D) Birds, whales and bats

25. Genes that are located at identical
loci of homologous chromosomes are
called:
(A) alleles
(B) polygenes
(C) homozygous
(D) pseudogenes

26. The Okazaki fragments of the
lagging strand of DNA template are
joined by:
(A) DNA gyrase
(B) DNA ligase
(C) DNA polymerase
(D) RNA primer

27. The name of chromosome map unit
is:
(A) Inter locus distance
(B) Cytomorgan
(C) Chromomere
(D) Centimorgan
28. The basic unit of chromatin nucleosome consists of:
   (A) H₁A, H₂B, H₃, H₄ histones and 200 bp of DNA
   (B) H₁, H₂, H₃, H₄ histones and 180 bp of DNA
   (C) H₂A, H₂B, H₃, H₄ histones and 140 bp of DNA
   (D) DNA polymerase, DNA helicase and histones

29. The human hereditary disease associated with DNA repair is:
   (A) Kleinfelter's syndrome
   (B) Haemophilia
   (C) Thalassemia
   (D) Bloom's syndrome

30. A molecular technique that can be used to isolate contiguous regions of genomic DNA beginning with previously cloned DNA fragments that map near a gene of interest is called:
   (A) chromosome walking
   (B) chromosome painting
   (C) chromosome scanning
   (D) chromosome mapping

31. Renewability, pluripotency and ability to differentiate are properties of:
   (A) endocrine cells
   (B) endodermal cells
   (C) oocytes
   (D) stem cells
32. Exception to universal genetic code is seen in:

(A) plasmids
(B) viruses
(C) mitochondria
(D) transposons

33. Characteristics that have arisen as a result of common evolutionary descent are said to be:

(A) analogous
(B) homologous
(C) heterologous
(D) heterogamous

34. The effect of natural selection may be countered by:

(A) gene flow
(B) genetic drift
(C) mutation
(D) inbreeding

35. In a population of 100 persons, there are 30 persons with M blood group and 20 persons with N blood group. The gene frequency for M and N blood groups is:

(A) 0.20, 0.80
(B) 0.60, 0.40
(C) 0.20, 0.30
(D) 0.65, 0.45
36. Which of the following definitions correctly depicts “biological species” concept?

(A) A species is the most inclusive population of organisms that share a common fertilization system

(B) A species is a single lineage of population that maintains an identity separate from other such lineages

(C) Species are groups of actually or potentially interbreeding natural populations that are reproductively isolated from other such groups

(D) A species is the smallest unit of group of individuals sharing common ancestry

37. During the early stages of development, embryos of reptiles, birds and mammals look very similar. This suggests that reptiles, birds and mammals:

(A) have a common ancestor

(B) live in the same type of environment

(C) have undergone parallel evolution

(D) are no longer undergoing evolution

38. Speciation is more likely to occur in cases of:

(A) sympatry

(B) allopatry

(C) antipatry

(D) panmixis
39. The ecosystem without stress is:
   (A) highly productive
   (B) highly diverse and stable
   (C) highly unstable
   (D) less productive and unstable

40. A sustainable development practice involves:
   (A) control of pathogens using biopesticides
   (B) reclamation of soils using chemical fertilizers
   (C) use of chemicals for control of pathogens
   (D) use of fossil fuels

41. Which of the following ecosystems is represented by inverted pyramid of biomass?
   (A) Forest
   (B) Grass land
   (C) Pond
   (D) Rhizosphere

42. The organism used for large scale production of vit B₂ is:
   (A) *Penicillium chrysogenum*
   (B) *Aspergillus niger*
   (C) *Ashbya gossypii*
   (D) *Trichoderma harzianum*
<table>
<thead>
<tr>
<th>43. Assimilatory microbial $\text{SO}_4$ reduction occurs in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) flowing water</td>
</tr>
<tr>
<td>(B) surface water</td>
</tr>
<tr>
<td>(C) atmosphere</td>
</tr>
<tr>
<td>(D) water sediments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>44. Bt toxin is active in the gut environment having:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) alkaline pH</td>
</tr>
<tr>
<td>(B) alkaline protease</td>
</tr>
<tr>
<td>(C) alkaline pH and alkaline protease</td>
</tr>
<tr>
<td>(D) neutral pH and protease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>45. Bentham and Hooker's system classifies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) all tracheophytes</td>
</tr>
<tr>
<td>(B) all seed plants</td>
</tr>
<tr>
<td>(C) all embryophytes</td>
</tr>
<tr>
<td>(D) thallophytes, bryophytes and pteridophytes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>46. Botanical gradens serve the purpose of conservation of plants.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) ex situ, ex vitro</td>
</tr>
<tr>
<td>(B) in situ, ex vitro</td>
</tr>
<tr>
<td>(C) ex situ, in vitro</td>
</tr>
<tr>
<td>(D) in situ, in vitro</td>
</tr>
</tbody>
</table>
47. The common mushroom puffballs and truffles belong to the class of fungi:

(A) Ascomycetes
(B) Basidiomycetes
(C) Oomycetes
(D) Deuteromycetes

48. The biological name of common brewing and baking yeast is:

(A) Candida albicans
(B) Escherichia coli
(C) Cryptococcus neoformans
(D) Saccharomyces cerevisiae

49. A pair of halteres is seen in:

(A) Damsel fly
(B) May fly
(C) Butterfly
(D) Fruit fly

50. The group which contains all Cnidaria is:

(A) Obelia, Acetabularia, Hydra, Coral
(B) Hydra, Jellyfish, Rotifer, Coral
(C) Obelia, Hydra, Jellyfish, Sea Anemone
(D) Jellyfish, Ascon, Physalia, Sea Anemone
ROUGH WORK
प्रश्नपत्रका क्र.

पीएससी

LIFE SCIENCE

साइनचर्या और नाम की विवेचक

1. (साइनचर्या) ________________________________
2. (साइनचर्या) ________________________________

फीब - 34213

समय प्रदान : 1¼ घंटे

पापर-2

लिफ वाय साइंस

रीढ़ टीकेल के सेट नं. और ऑएमएस शीट नं. दोनों वाले के स्पेस प्रदान की जाती है तथा इस पेज परीक्षा के निर्देशों से अनुसार इस पेज परीक्षा के निर्देशों से अनुसार पूर्व 5 मिनट के लिए प्रतियोगी है।

प्रश्नों का प्रयोक्ता सीमा 50 दृष्टिकोणीय ब्याबंधों होगी। प्रत्येक प्रश्न का एको स्व-विवेचक बैनर होगा। अंततः, प्रत्येक प्रश्न को अंतिम का स्व-विवेचक बैनर होगा।

भावना की सीमा 100

प्रश्नों की संख्या यह बुद्धिमत्ता के प्रश्नों की संख्या यह बुद्धिमत्ता के प्रश्नों की संख्या

विवेचनात्मक परीक्षा यह बुद्धिमत्ता के प्रश्नों की संख्या

1. लिख जिसका सीट नं. और ऑएमएस शीट नं. वाले के स्पेस प्रदान की जाती है
2. इस पेज विशेषता 50 दृष्टिकोणीय प्रश्नों होगी। प्रत्येक प्रश्न का एको स्व-विवेचक बैनर होगा। अंततः, प्रत्येक प्रश्न को अंतिम का स्व-विवेचक बैनर होगा।
3. अंतिम आर्थिक विवेचना के प्रश्नों की संख्या
4. प्रत्येक प्रश्न का एक नीचे विवेचना वाले के स्पेस प्रदान की जाती है
5. अंतिम आर्थिक विवेचना के प्रश्नों की संख्या

Number of Pages in this Booklet: 16

Number of Questions in this Booklet: 50