

No. of Printed Pages : 8

PHDLS

Entrance Test for

00171

**Ph.D. (LIFE SCIENCE) Programme - 2016**

*Time : 3 hours*

*Maximum Marks : 100*

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**Note :** *There are two sections in this paper Section 'A' and Section 'B'. Section 'A' comprises Research Methodology. It is of 50 marks. Section 'B' comprises Life Sciences. It is of 50 marks.*

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**SECTION - A**  
**RESEARCH METHODOLOGY**

(50 marks)

*Note :* Question No. 1 to 4 carry 10 marks each.  
Question No. 5 to 14 are Multiple Choice Questions. Each question carries one mark.  
There is no negative marking for wrong answer.

1. "Reliability, validity and usability are characteristics of a good research tool". Comment. 10
2. Differentiate between a questionnaire and a schedule. Discuss various types of questionnaires used in research. Also write the significance of a questionnaire in research. 10
3. (a) Write short notes on the following : 2x2½=5
  - (i) Sample size and its Determination
  - (ii) Interview Techniques
- (b) Draw histogram from the following data in which frequency distribution of the scores of 50 students is given. Label the X and Y axis : 5

Exact Units of Class Intervals	Mid-Point	Frequency
9.5 - 14.5	12	4
14.5 - 19.5	14	8
19.5 - 24.5	22	10
24.5 - 29.5	27	14
29.5 - 34.5	32	9
34.5 - 39.5	37	5
N=50		

4. Write two-three lines on each of the following : 2x5=10
  - (a) Parametric Data
  - (b) Hypothesis
  - (c) Research Design
  - (d) Z-Score
  - (e) Interpretation
5. Which of the following is a non-parametric test ?  
(1) ANOVA            (2) Chi-square test            (3) t-test            (4) F-test
6. Suppose a researcher is using the nominal scale that identifies diabetics versus non-diabetics. The measure of central tendency appropriate to this scale is the :  
(1) Median            (2) Mode            (3) Average            (4) Range

7. Rating scale in which a straight line is drawn vertically or horizontally with various clues to help the rater is called as :
- (1) Standard scale (2) Graphic scale  
(3) Numerical scale (4) Forced choice rating
8. Which of these is not a method of data collection ?
- (1) Questionnaires (2) Experiments (3) Interviews (4) Observations
9. Which of the following is an important criterion for a good research problem ?
- (1) Verifiable evidence (2) Subjectivity  
(3) Inaccuracy (4) Randomization
10. What does 5% level of significance mean ?
- (1) It means that the researcher is willing to take more than 5% risk rejecting the null hypothesis when it happens to be true.  
(2) It means that the researcher is willing to take as much as 5% risk rejecting the null hypothesis when it happens to be true.  
(3) It means that the researcher is willing to take about 5% risk rejecting the null hypothesis when it happens to be true.  
(4) It means that the researcher is willing to take less than 5% risk rejecting the null hypothesis when it happens to be true.
11. Which of the following is not a form of non-random sampling ?
- (1) Snowball sampling (2) Convenience sampling  
(3) Quota sampling (4) All of the above
12. What is the aim of the environment related case-study method ?
- (1) Identification of environmental properties  
(2) Location and identification of persons who are involved in several cases  
(3) Location and identification of the factors that account for the behaviour patterns of a given unit, and its relationship with the environment  
(4) Location and identification of properties of an environmental variable
13. Which of the following terms best describes data that were originally collected at an earlier time by a different person for a different purpose ?
- (1) Primary data (2) Secondary data  
(3) Experimental data (4) Field notes
14. The process of transforming qualitative research data from written interviews or field notes into typed text is called as :
- (1) Re segmenting (2) De coding  
(3) Transcription (4) Memorizing

**SECTION - B**  
**LIFE SCIENCES**

**Note :** There are 40 Multiple Choice Questions in this Section. Each question carries **one** mark. There is no **negative** marking for **wrong** answer. Questions No. 41 and 42 carry 5 marks each. **(50 marks)**

1. Which of the following is r-strategist ?  
(1) Human                      (2) Insect                      (3) Rhinoceros                      (4) Whale
  
2. Bohr's effect is related with :  
(1) reduced carbon level in lymph  
(2) reduced oxygen level in haemoglobin  
(3) oxidized phosphorus level in blood  
(4) reduced carbon dioxide level in blood
  
3. Given below are four statements (i) - (iv) regarding geological time scale. Read them carefully.  
(i) Palaeozoic era is the era of ancient life.  
(ii) Ordovician period is the age of amphibians.  
(iii) Carboniferous period is the age of reptiles.  
(iv) Proterozoic era is the era of early life.  
Which of the above two statements are **incorrect** ?  
(1) (i) and (iv)                      (2) (ii) and (iii)                      (3) (ii) and (iv)                      (4) (i) and (iii)
  
4. Which of the following statements is **correct** ?  
(1) Argentaffin cells produce serotonin.  
(2) Villikin is secreted by large intestine.  
(3) In cheilosis, deficient nutrient is nicotinamide.  
(4) Bleeding diseases occurs due to deficiency of vitamin A.
  
5. Hybridoma biotechnology involves fusion of :  
(1) B-cell with T-cell                      (2) T-cell with spleen cell  
(3) spleen cell with myeloma cell                      (4) myeloma cell with B-cell
  
6. Microtubules, motor proteins, and actin filaments are all part of :  
(1) the mechanism of photosynthesis that occurs in chloroplasts  
(2) the rough ER (endoplasmic reticulum) in prokaryotic cells  
(3) the cytoskeleton of eukaryotic cells  
(4) the process that moves small molecules across cell membranes
  
7. Which species lack immunoglobulin light chains ?  
(1) Camels                      (2) Humans                      (3) Cows                      (4) Buffalo

8. Nitroglycerin has long been administered to human patients suffering from chronic chest pain (angina). This medication works because it :
- (1) mimics the action of signal receptors
  - (2) is broken down into hormones that affect the heart
  - (3) interferes with chemical cascades that trigger contractions of heart muscle
  - (4) breaks down into nitric oxide, which increases blood flow to the heart
9. Sickle cell disease is due to :
- (1) a mutation in the beta chain of Hb
  - (2) a mutation in the alpha chain of Hb
  - (3) infection with a parasite
  - (4) none of the above
10. Reverse transcriptase from HIV does not :
- (1) use RNA as a template
  - (2) have a 5' to 3' polymerase activity
  - (3) have a 3' - 5' exonuclease activity
  - (4) requires a primer
11. Which of the following is the cause for drug resistance in tuberculosis ?
- |                    |                  |
|--------------------|------------------|
| (1) Mutation       | (2) Transduction |
| (3) Transformation | (4) Conjugation  |
12. In order to insert a foreign gene into a plasmid, both must :
- (1) have identical DNA sequences
  - (2) originate from the same type of cell
  - (3) be cut by the same restriction enzyme
  - (4) be of the same length
13. In a foetus, lymphocytes are produced in the :
- |            |                 |           |           |
|------------|-----------------|-----------|-----------|
| (1) spleen | (2) bone marrow | (3) liver | (4) heart |
|------------|-----------------|-----------|-----------|
14. Saliva contains all of the following except :
- |                              |                |
|------------------------------|----------------|
| (1) hormones                 | (2) amylase    |
| (3) bacteria-killing enzymes | (4) antibodies |
15. The kind of climax community in an area depends most on the area's ?
- |                                 |                    |
|---------------------------------|--------------------|
| (1) climate                     | (2) soil organisms |
| (3) pool of available colonists | (4) bed rock       |
16. Negative staining is a technique used in :
- |                         |                         |
|-------------------------|-------------------------|
| (1) electron microscopy | (2) gel electrophoresis |
| (3) immunocytochemistry | (4) light microscopy    |

17. Porins are located in :
- (1) the outer membrane of gram-negative bacteria
  - (2) the peptidoglycan layer of gram-positive bacteria
  - (3) the cytoplasmic membrane of both gram-negative and gram-positive bacteria
  - (4) the periplasmic space of gram-negative bacteria
18. Which of the following types of mouth parts are present in cockroach ?
- (1) Biting and chewing
  - (2) Chewing and lapping
  - (3) Piercing and sucking
  - (4) Siphoning
19. The total biomass of an organism will be determined by the nutrient present in the lowest concentration relative to the organism's requirements is a statement of :
- (1) Liebig's law of the minimum
  - (2) Shelford's law of tolerance
  - (3) Quorum sensing
  - (4) Heisenberg's principle of uncertainty
20. Which of the following has more tolerance for acidic pH ?
- (1) Yeast and moulds
  - (2) Bacteria
  - (3) *E.coli*
  - (4) None of these
21. The Shine-Dalgarno sequence is :
- (1) trailer sequence
  - (2) a stop codon
  - (3) the reading frame of a gene
  - (4) a short sequence that acts as a ribosomal binding site
22. Lysozyme is present in :
- (1) sweat
  - (2) cerebro spinal fluid (CSF)
  - (3) urine
  - (4) saliva
23. The class of immunoglobulins which can cross the placenta is :
- (1) IgM
  - (2) IgG
  - (3) IgA
  - (4) IgD
24. Which of the following is **not** true of virions ?
- (1) Reproduce independently
  - (2) Contain DNA
  - (3) Contain RNA
  - (4) Are extracellular

25. Nitrogen fixation :
- (1) changes the free nitrogen ( $N_2$ ) to a form usable by plants
  - (2) especially changes nitrogen compounds, mostly amines such as  $NH_2$
  - (3) both (1) and (2)
  - (4) fixes the free nitrogen ( $N_2$ ) so that it should not be usable by plants
26. Which of the following diseases is caused by DNA viruses ?
- (1) Poliomyelitis
  - (2) Yellow fever
  - (3) Measles
  - (4) Small pox
27. The influenza vaccine is administered each year because :
- (1) mutations in the viral hemagglutinin may allow the virus to evade the immune response elicited by previous vaccines
  - (2) it is a polysaccharide vaccine that does not confer long-term protection
  - (3) the vaccine is sufficiently toxic so as to make it necessary to administer only a small amount at any one time
  - (4) none of the above
28. The agent responsible for causing mad cow disease is thought to be a :
- (1) fungus
  - (2) protozoan
  - (3) prion
  - (4) virus
29. In which of the following insects wings are present in the form of halteres ?
- (1) silverfish
  - (2) ant
  - (3) mosquito
  - (4) honey bee
30. *Peripatus* is known as connecting link, because it has the characters of both :
- (1) fishes and amphibians
  - (2) reptiles and birds
  - (3) aves and fishes
  - (4) arthropoda and annelids
31. The hormone which acts on Sertoli cells and stimulates the process of spermiogenesis is :
- (1) GnRH
  - (2) androgen
  - (3) FSH
  - (4) LH
32. A colour blind man marries a woman with normal sight who has no history of colour blindness in her family. What is the probability of their grandson being colour blind ?
- (1) Nil
  - (2) 0.25
  - (3) 0.5
  - (4) 1
33. Keber's organ is the excretory organ of :
- (1) *Pila*
  - (2) *Unio*
  - (3) *Neopilina*
  - (4) *Doris*

34. Turnover of species between adjacent habitats is :
- (1) within community diversity      (2) gamma diversity  
 (3) alpha diversity                      (4) beta diversity
35. The Aristotle's lantern is an apparatus that has \_\_\_\_\_ functions.
- (1) respiratory      (2) excretory      (3) masticatory      (4) accessory
36. True coelom in *Herdmania* is greatly reduced due to the development of :
- (1) body wall                              (2) intestine  
 (3) atrium                                  (4) mesenteries
37. The average volume of blood pumped out by each ventricle during a cardiac cycle is :
- (1) 70 mL                      (2) 500 mL                      (3) 7 L                      (4) 120 mL
38. If a cross between two individuals produces offspring with 50% dominant character (A) and 50% recessive character (a) the genotype of parents are :
- (1) Aa × Aa                      (2) Aa × aa                      (3) AA × aa                      (4) AA × Aa
39. Which one of the following hormones also produces anti-inflammatory reactions in man and suppresses the immune response in addition to its primary functions ?
- (1) Thyrocalcitonin                      (2) Cortisol  
 (3) Erythropoietin                      (4) Thymosin
40. The rate at which light energy is converted to the chemical energy of organic molecules is the ecosystem's :
- (1) net primary productivity                      (2) gross secondary productivity  
 (3) net secondary productivity                      (4) gross primary productivity
41. (a) Describe ionic basis of action potential and neuromuscular transmission.      2½  
 (b) Diagrammatically depict the life cycle of *Plasmodium* in mosquito and human.      2½
42. (a) Explain parental care in fishes or amphibians.      2½  
 (b) Describe two basic mechanisms of recombination in bacteria.      2½

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