

5016/16

Set No. : 1

Question Booklet No.

M.Phil-Ph.D./17/TEST-B

997

Life Sciences

(To be filled up by the candidate by blue/black ball point pen)

Roll No.

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Roll No. (Write the digits in words)

Serial No. of OMR Answer Sheet

Day and Date

(Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)

1. Within 30 minutes of the issue of the Question Booklet, Please ensure that you have got the correct booklet and it contains all the pages in correct sequence and no page/question is missing. In case of faulty Question Booklet, Bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.
2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*
3. *A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided.*
4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.
5. *On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.*
6. *No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.*
7. *Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.*
8. *This Booklet contains 40 multiple choice questions followed by 10 short answer questions. For each MCQ, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet. For answering any five short Answer Questions use five Blank pages attached at the end of this Question Booklet.*
9. For each question, darken only **one** circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.
10. *Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks)*
11. For rough work, use the inner back pages of the title cover and the blank page at the end of this Booklet
12. **Deposit both OMR Answer Sheet and Question Booklet at the end of the Test.**
13. You are not permitted to leave the Examination Hall until the end of the Test.
14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 20

ROUGH WORK
रफ़ कार्य

Research Entrance Test-2017

No. of Questions : 50

प्रश्नों की संख्या : 50

Time : 2 Hours

Full Marks : 200

समय : 2 घण्टे

पूर्णाङ्क : 200

Note: (1) This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.

इस प्रश्न पुस्तिका में **40** वस्तुनिष्ठ व **10** लघु उत्तरीय प्रश्न हैं।

(2) Attempt as many MCQs as you can. Each MCQ carries **3 (Three)** marks. **1 (One)** mark will be deducted for each incorrect answer. **Zero** mark will be awarded for each unattempted question. If more than one alternative answers of MCQs seem to be approximate to the correct answer, choose the closest one.

अधिकाधिक वस्तुनिष्ठ प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक वस्तुनिष्ठ प्रश्न **3 (तीन)** अंकों का है। प्रत्येक गलत उत्तर के लिए **1 (एक)** अंक काटा जायेगा। प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा। यदि वस्तुनिष्ठ प्रश्नों के एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हों, तो निकटतम सही उत्तर दें।

(3) Answer only **5** Short Answer Questions. Each question carries **16 (Sixteen)** marks and should be answered in **150-200** words. Blank **5 (Five)** pages attached with this booklet shall only be used for the purpose. Answer each question on separate page, after writing Question No.

केवल **5 (पाँच)** लघुउत्तरीय प्रश्नों के उत्तर दें। प्रत्येक प्रश्न **16 (सोलह)** अंकों का है तथा उनका उत्तर **150-200** शब्दों के बीच होना चाहिए। इसके लिए इस पुस्तिका में लगे हुए सादे **5 (पाँच)** पृष्ठों का ही उपयोग आवश्यक है। प्रत्येक प्रश्न का उत्तर एक नए पृष्ठ से, प्रश्न संख्या लिखकर शुरू करें।

01. Organ of Bojanus refers to :
- | | |
|-----------|-------------------|
| (1) Heart | (2) Metanephridia |
| (3) Lung | (4) Gonads |
02. Hardest part of tooth is :
- | | |
|-------------|-----------|
| (1) Dentine | (2) Pulp |
| (3) Enamel | (4) Nerve |
03. The small green plant that live inside the body of Hydra as a symbiont is :
- | | |
|-------------|-------------------|
| (1) Volvox | (2) Chlamydomonas |
| (3) Euglena | (4) Zoochorellae |
04. Which of the following is steroid :
- | | |
|--------------|---------------|
| (1) Insulin | (2) Glucagon |
| (3) Androgen | (4) Thyroxine |
05. Deficiency of thyroid hormone causes :
- | | |
|---------------|-----------------------|
| (1) Cretinism | (2) Addison's Disease |
| (3) Gigantism | (4) Cryptorchidism |
06. During apoptosis which of the following protein level decreases :
- | | |
|-----------|---------------|
| (1) Bax | (2) p53 |
| (3) Bcl-2 | (4) Caspase-3 |
07. Reflex action is controlled by :
- | | |
|------------|-----------------|
| (1) Pineal | (2) Spinal cord |
| (3) Testes | (4) Follicles |
08. One of the following is not found in RNA :
- | | |
|-------------|--------------|
| (1) Thymine | (2) Uracil |
| (3) Guanine | (4) Cytosine |

09. The G1 phase of cell cycle is signified by :
- (1) Cell growth (2) Cytoplasmic division
(3) DNA replication (4) Cell plate formation
10. Trypanosomiasis disease is transmitted by :
- (1) Sand fly (2) May fly
(3) Tse-tse fly (4) Louse
11. The enzyme responsible for primay carboxylation in C3 plants is :
- (1) Pyruvate carboxylase
(2) Succinic dehydrogenase
(3) Hexokinase
(4) RuBP carboxylase oxygenase
12. Primary precursor of IAA is :
- (1) Methionine (2) Adenine
(3) Tryptophan (4) Alanine
13. With reference to enzymes, which one of the following statements is true ?
- (1) Apoenzyme = Holoenzyme + Coenzyme
(2) Holoenzyme = Apoenzyme + Coenzyme
(3) Coenzyme = Apoenzyme + Holoenzyme
(4) Holoenzyme = Coenzyme - Apoenzyme
14. A person with phenylketonuria is advised not to consume which of the following products ?
- (1) Glycine containing foods (2) Fat containing food
(3) Glucose (4) Aspartame

15. Three dimensional images of the surface of the cells and tissues could be visualized through :
- (1) Transmission electron microscope
 - (2) Scanning electron microscope
 - (3) Compound microscope
 - (4) Fluorescence microscope
16. The dipeptide Lys-Glu on an electrophoresis at pH 6.0 would :
- (1) Move towards anode (+)
 - (2) Move towards cathode (-)
 - (3) Remain stationary
 - (4) Get degraded
17. Protein binding regions of DNA are identified by one of following techniques :
- | | |
|-----------------------|----------------------|
| (1) Finger printing | (2) Foot printing |
| (3) Southern blotting | (4) Western blotting |
18. LINEs and SINEs are :
- | | |
|-------------------|----------------------------|
| (1) micro-RNA | (2) transposable elements |
| (3) ribosomal-RNA | (4) 3' untranslated region |
19. Yeast two hybrid :
- (1) Protein expression
 - (2) For cloning large pieces of DNA
 - (3) Identification of exons and intron
 - (4) Protein-protein interaction
20. From what cellular material is the cDNA library derived ?
- | | |
|----------|--------------|
| (1) tRNA | (2) mRNA |
| (3) DNA | (4) Pre mRNA |

21. Human genetic disease that is attributed to defects in DNA repair or replication :
- (1) Parkinson's disease (2) Xeroderma pigmentosum
(3) DMD (4) Huntington's chorea
22. Post transcriptional insertion **or** deletion of nucleotides is called as :
- (1) Trans splicing (2) RNA editing
(3) Alternate splicing (4) Cis splicing
23. Which is not a proto-oncogene ?
- (1) APC (2) c- myc
(3) ras (4) n-myc
24. Which of the following vitamins would most likely be deficient in a person who develops a completely carnivorous lifestyle ?
- (1) Thiamine (2) Niacin
(3) Cobalamine (4) Vitamin C
25. An enzymatic reaction has a standard free energy change (ΔG°) of - 7 kcal/mol, the equilibrium constant is :
- (1) greater than one
(2) less than one
(3) zero
(4) dependent upon enzyme concentration
26. Which of the following is an important intermediate in the biosynthesis of fatty acids ?
- (1) Malonyl -CoA (2) Cholesterol
(3) Glucose (4) Acetyl-CoA

27. The unit for Michaelis constant K_m is :
- (1) Time, in seconds or minutes (2) Moles/sec
(3) Moles/litre (4) Moles/liter-sec
28. Anaphase promoting complex degrades a protein called :
- (1) cohesion (2) separase
(3) securin (4) Cdk 1
29. Phosphatidylinositol 4,5-bisphosphate (PIP₂) is hydrolyzed by :
- (1) Protein kinase A (2) Phospholipase C
(3) PI 3-kinase (4) Protein kinase C
30. Enzyme used in PCR is from :
- (1) Extremophilic algae (2) Extremophilic fung
(3) Extremophilic bacteria (4) Extremophilic archaea
31. Cyanobacteria differs from bacteria :
- (1) Evolves oxygen
(2) Possess peptidoglycan in cell wall
(3) Possess nucleus
(4) Possess chloroplast
32. Zygotene is characterized by :
- (1) Synapsis, crossing over, tetrad formation
(2) Synapsis, bivalents, crossing over
(3) Recombination nodules, synapsis and bivalents
(4) Bivalents, synapsis, Tetrad formation
33. Which of the following is argining rich ?
- (1) H1 (2) H2A
(3) H2B (4) H3

34. Cytoskeleton term is applied to :
- (1) Golgi-bodies and Endoplasmic reticulum of the cells
 - (2) Golgi-bodies and microtubules of the cells
 - (3) Fabric of microtubules, microfilaments and golgi bodies
 - (4) Fabric of microtubules, microfilaments and intermediate filaments.
35. Anaphase II chromosome of Meiosis II differs from that of Anaphase I of Meiosis I by :
- (1) Presence of two chromatid in each chromosome
 - (2) Presence of one chromatid in each chromosome
 - (3) Presence of the chromosomes at the centre
 - (4) Presence of the chromosome at the periphery
36. Which of the following combinations is true as proponents of 'Synthetic theory of Evolution' ?
- (1) T.Dobzhansky, RA Fisher, Lamark, JBS Haldane, Ernst Myr
 - (2) T.Dobzhansky, RA Fisher, Darwin, JBS Haldane, Ernst Myr
 - (3) T.Dobzhansky, RA Fisher, Hugo De Vries, JBS Haldane, Ernst Myr
 - (4) T.Dobzhansky, RA Fisher, JBS Haldane, Ernst Myr, Sewall Wright.
37. Suicidal bags are associated with :
- | | |
|------------------------|------------------------|
| (1) Hydrolytic enzymes | (2) Parasitic activity |
| (3) Food vacuoles | (4) Catabolic enzymes |
38. The flow of energy in an ecosystem is :
- (1) Multidirectional
 - (2) Bidirectional
 - (3) Unidirectional
 - (4) No flow of energy in ecosystem

39. Nitrosomonas and Nitrobacter are the bacteria of :
- | | |
|---------------------|-------------------|
| (1) Deamination | (2) Nitrification |
| (3) Denitrification | (4) Decomposition |
40. PSII oxidizes water to O_2 in the ?
- | | |
|---------------------|------------------------|
| (1) Stroma | (2) Thylakoid membrane |
| (3) Thylakoid lumen | (4) Stroma lamellae |

Short Answer Questions

Note: Attempt any **five** questions. Write answer in **150-200** words. Each question carries **16** marks. Answer each question on separate page, after writing Question Number.

01. What are different methods of enzyme immobilization and its advantages ?
02. Explain the difference between tertiary and quaternary structure of proteins.
03. What are different steps and tools of proteome analysis ?
04. Differentiate between siRNA and miRNA.
05. A balanced chromosomal translocation can either activate an oncogene or inactivate a tumour suppressor gene. Discuss in support of the above statement with suitable examples.
06. Why minisatellites and microsatellites are the most useful sequences for DNA fingerprinting ?
07. Explain the Mendel's law of independent assortment with suitable examples (s).
08. Define linkage. Describe mechanism of crossing over in a cell.

- 09.** How photosystem I and II cooperate in photosynthesis ? Discuss with suitable illustration.
- 10.** Describe mechanism of gene transfer in bacteria.

Question No.

Page for Short Answer

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Page for Short Answer

ROUGH WORK

रफ़ कार्य

ROUGH WORK

रफ़ कार्य

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली-काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 30 मिनट के अन्दर ही देख ले कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में लिफाफा रहित प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।
3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।
9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. एक कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल ओ एम आर उत्तर-पत्र परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का कारा भागी होगा/होगी।