

(Science)

Set No. : 1

Question Booklet No.

RET/17/TEST-B

887 Biochemistry (Science)

(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

RET/17/TEST-B

887/Biochemistry (Science)

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।

1. Booklungs are found in :
(1) Amoeba (2) Polystomella
(3) Euglypha (4) Arachnids
2. Silk is obtained from :
(1) Adult moth (2) Caterpillar stage
(3) Egg (4) Cocoon
3. Neurogenic heart is found in :
(1) Human beings (2) Rat
(3) Rabbit (4) Invertebrates
4. Epiphysis is also known as :
(1) Pineal (2) Pituitary
(3) Thyroid (4) Hypothalamus
5. Simplest and smallest form of amino acid is :
(1) Glycine (2) Proline
(3) Lysine (4) Argenine
6. PCOS is related to :
(1) Ovary (2) Uterus
(3) Testes (4) Oviduct
7. Seminogelin is secreted by :
(1) Epididymis (2) Seminal Vesicle
(3) Thecal cells (4) Oviduct

8. First cleavage in frog is :

- (1) Horizontal (2) Meridional
(3) Equatorial (4) Latitudinal

9. Which of the following is nuclear receptor ?

- (1) AR (2) GPCR
(3) IR (4) MT1

10. Cryptorchidism is related to :

- (1) Testes (2) Thyroid
(3) Ovary (4) Pancreas

11. T_m of primers can be calculated as :

- (1) $T_m = 2(A+T) + 4(G+C)$ (2) $T_m = 4(A+T) + 2(G+C)$
(3) $T_m = 2(A+G) + 4(T+C)$ (4) $T_m = 4(A+G) + 2(T+C)$

12. The meaning of palindrome is :

- (1) Specific RNA sequences required for splicing
(2) Specific DNA sequences required for replication initiation
(3) DNA sequences which can be read forward and backward same
(4) Specific DNA sequences required for transcription

13. The genome size of E. coli is :

- (1) 4.2Mb (2) 5.5 Mb (3) 6.2Mb (4) 7.2Mb

14. Agarose is :

- | | |
|--------------------|------------------|
| (1) Polysaccharide | (2) Lipid |
| (3) Protein | (4) Nucleic acid |

15. In SDS/PAGE role of SDS is to provide :

- | | |
|--------------------------------|--------------------------------|
| (1) Negative charge to protein | (2) Positive charge to protein |
| (3) Ion to buffer | (4) Negative charge to buffer |

16. Enzymes used for degradation of RNA in RNA: DNA hybrid :

- | | |
|------------|-------------|
| (1) RNaseA | (2) RNaseH |
| (3) DNase | (4) RNaseV1 |

17. SYBR green bind with :

- | | |
|-------------------------|-------------------------|
| (1) Single stranded DNA | (2) Double stranded DNA |
| (3) Single Stranded RNA | (4) All |

18. Linker/ adapter is helpful for the :

- | | |
|---------------------------------|-------------------------|
| (1) Vector synthesis | (2) Insert synthesis |
| (3) Restriction site generation | (4) Polymerase activity |

19. Super-coiled plasmid DNA can be converted into relaxed plasmid with the help of :

- | | |
|----------------|-------------------|
| (1) DNA gyrase | (2) Endonuclease |
| (3) Ligase | (4) Topoisomerase |

- 20.** Edman degradation is used for :
- (1) DNA sequencing
 - (2) RNA sequencing
 - (3) Peptide and protein sequencing
 - (4) Not associated with sequencing
- 21.** In eukaryotes translation is initiated by binding of ribosome to the :
- (1) Pribnows box
 - (2) Hogness box
 - (3) 5'cap
 - (4) Poly A tail
- 22.** Tetracycline blocks protein synthesis by :
- (1) Inhibiting initiation of translation
 - (2) Inhibiting binding of aminoacyl t-RNA to ribosome
 - (3) Inhibiting translocase enzyme
 - (4) Inhibiting peptidyl transferase
- 23.** The smooth ER is especially abundant in cells that synthesize extensive amounts of :
- (1) Proteins
 - (2) Lipids
 - (3) Enzymes
 - (4) Toxins
- 24.** After four cycles of PCR reaction, each molecule of a duplex DNA will give rise to :
- (1) 16 double-stranded DNA
 - (2) 16 single strands of DNA
 - (3) 32 single strands of DNA
 - (4) 32 double-stranded DNA

25. Which of the following is true ?
- (1) A messenger RNA molecule has the form of a double helix
 - (2) Ribosomes contain RNA nucleotides and proteins
 - (3) The Uracil nucleotide consists of the uracil nitrogen base, a deoxyribose sugar and a phosphate group
 - (4) In eukaryotes, DNA manufactured in the nucleus and RNA is manufactured in the cytoplasm
26. The length of DNA molecule greatly exceeds the dimensions of the nucleus in eukaryotic cells. How is this DNA accommodated ?
- (1) Through elimination of repetitive DNA
 - (2) Deletion of non-essential genes
 - (3) Super-coiling in nucleosomes
 - (4) DNase digestion
27. In addition to ATP, what are the end products of glycolysis ?
- | | |
|--|--|
| (1) CO_2 and H_2O | (2) NADH and pyruvate |
| (3) CO_2 and ethyl alcohol | (4) H_2O and ethyl alcohol |
28. The optically inactive amino acid is :
- | | |
|----------------|-------------|
| (1) Serine | (2) Glycine |
| (3) Methionine | (4) Leucine |

29. For isopycnic density gradient centrifugation, the density of dispersion medium must be.....than the dispersed material.
- (1) Denser (2) Equal
(3) Lighter (4) Neutral
30. Maximum numbers of Hydrogen bonds interactions are possible in water molecule :
- (1) 4 (2) 3 (3) 1 (4) 2
31. A mixture of proteins can be separated by :
- (1) Precipitation (2) Centrifugation
(3) Circular dichorism (4) Optical rotatory dispersion
32. When the amino acid alanine (R-group is CH₃) is added to a solution with a pH of 7.3, alanine becomes ?
- (1) A cation (2) Nonpolar
(3) A zwitterions (4) An isotope
33. The isoelectric point of an amino acid is defined as the pH :
- (1) Where the molecule carries no electric charge
(2) Where the carboxyl group is uncharged
(3) Where the amino group is uncharged
(4) of maximum electrolytic mobility

34. Which of the following is an example of tertiary structure in a protein?
- (1) α -helix (2) β -pleated sheet
(3) Multimeric protein (4) Globular domain
35. If the egg white protein, ovalbumin, is denatured in a hard-boiled egg, then which of the following is least affected?
- (1) The primary structure of ovalbumin
(2) the secondary structure of ovalbumin
(3) The tertiary structure of ovalbumin
(4) The quaternary structure of ovalbumin
36. Salvia contains all of the following except :
- (1) Antibodies (2) amylase
(3) bacteria-killing enzymes (4) hormones
37. A purine with an amine (NH₂) group on the 6th carbon is :
- (1) Adenine (2) Cytosine
(3) Thymine (4) Guanine
38. Which cells of the brain are called first line of defence?
- (1) Bipolar cells (2) Purkinjee cells
(3) Glial cells (4) Pyramidal cells

39. Mylenation of Peripheral nervous system is done by which of the following ?
- (1) Oligodendrocytes (2) Astroglia
(3) Microglia (4) Schwan cells
40. If a plasmid (size=5kb) is having one BamH1 and one EcoR1 site 2kb apart and it is digested by the above two enzymes, then how many fragments will be generated and what will be their size ?
- (1) One fragment of 5kb (2) Two fragments of 2kb
(3) Two fragments of 2kb & 3kb (4) One fragments of 4kb

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 Transposable elements ? Discuss different mechanisms by which they propagate in the genome.
02. Discuss different methods of DNA sequencing.
03. Define magnification, wavelength, numerical aperture and resolution of light microscope. Discuss how fluorescence microscopy is sensitive over bright field microscopy ?
04. Explain the difference between non-competitive and uncompetitive enzyme inhibition with suitable example.
05. Discuss symptoms and affected pathway in Phenylketonuria and Alkaptonuria.
06. Explain the different types of RNA interference technology.
07. Describe the secondary, tertiary and quaternary structure of proteins.
08. What are the different types of phospholipids and their functions ?
09. Explain the C_3 and C_4 cycles with suitable example.
10. Describe Hybridoma technology and its use ?

Question No.

Page for Short Answer

Question No.

Page for Short Answer

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Page for Short Answer

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 लें 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 से 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. रफ 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/की, भागी होगा/होगी।