2016.

Set No. : 1

Question Booklet No.

RET/16/TEST-B

884 | Zoology

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

Roll No. | | | | | | | | | | |

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

64.

SEAL

ROUGH WORK

रफ़ कार्य

Research Entrance Test-2016

No. of Questions : 50

प्रश्नों की संख्या : 50

Time : 2 Hours ***Full Marks : 200***

समय : 2 घण्टे ***पूर्णांक : 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. Which is not true for reactions by the S_N2 mechanism ?

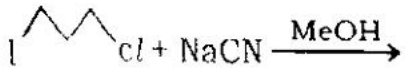
(1) proceeds through a backside attack and results in inversion

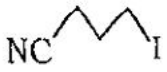
(2) tends to proceed with weak nucleophiles solvents like CH_3OH, H_2O, CH_3CH_2OH.

(3) rate of reaction proceeds from primary (fastest) > secondary >> tertiary (slowest)

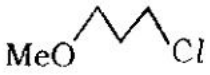
(4) occurs in one step

2. Which is the main product of the following reaction ?



(1) 

(2) 

(3) 

(4) 

3. Which of the following conditions is necessary for a reaction to be spontaneous ?

(1) $\Delta S_{sur} > 0$

(2) $\Delta S_{sys} > 0$

(3) $\Delta S_{sur} + \Delta S_{sys} > 0$

(4) $\Delta S_{sur} + \Delta S_{sys} < 0$

4. Dead organs are generally stored in formalin. Formalin is :

(1) aqueous formaldehyde

(2) aqueous ferrous sulphate

(3) aqueous formic acid

(4) aqueous ferric alum

5. Regarding "carbon credits", which one of the following statement is **not** correct :
   (1) The carbon credit system was ratified in conjunction with the Kyoto Protocol.
   (2) Carbon credits are awarded to countires or groups that have reduced greenhouse gases below their emission quota.
   (3) The goal of the carbon credit system is to limit the increase of carbon dioxide emission.
   (4) Carbon credits are traded at a price fixed from time to time by the United Nations Environment Progrmme.

6. Ball bearings are used in bicycles, cars, etc., because :
   (1) the actual area of contact between the wheel and axle is increased.
   (2) the effective area of contact between the wheel and axle is increased
   (3) the effective area of contact between the wheel and axle is reduced
   (4) the actual area of contact between the wheel and axle is reduced.

7. During respiration, energy is released. It is stored in the form of :
   (1) ADP (2) ATP (3) NADP (4) APP

8. Which of the following is known as Royal disease :
   (1) Sickle cell anemia (2) Haemophilia
   (3) Alzheimers disease (4) Colour blindness

9. The xylem in plants is responsible for :
   (1) transport of water (2) transport of food
   (3) transport of oxygen (4) transport of amino acids

10. Two wires, of the same material, have their lenghts in the ratio 1:2 and their diameters in the ratio 2:1. If both are stretched separately by equal weights, the ratio of increase in their lengths, $L_1 : L_2$ would be :
   (1) 1:2 (2) 2:1 (3) 1:8 (4) 8:1

11. Which of the multimeric proteins listed below represents a heteromeric composition :

(1) $\alpha_2\beta_2$ (2) H_4

(3) $\alpha_2\beta\beta\omega$ (4) Both 1 & 3

12. An enzyme extracted from liver shows Km value of 5 mM and the same enzyme from the lung shows Km value of 8 mM. Select the correct statement about catalytic efficiency of this enzyme from the following :

(1) Enzyme from lung is greater than the liver enzyme

(2) Enzyme from liver is greater than the lung enzyme

(3) It will remain unchanged for both the enzyme

(4) None of the above is true

13. Power of memory and learning in birds resides in :

(1) Cerebral cortex (2) Hyperstriatum

(3) Corpus Striatum (4) Lateral ventricle

14. Lymphatic nodes are the hemopoeitic tissue in :

(1) Fish and Bird (2) Amphibia and Bird

(3) Reptile and Bird (4) Mammal and Bird

15. Which of the polymerases synthesize a polynucleotide chain in a template independent manner ?

(1) DNA Pol I (2) DNA Pol III

(3) RNA polymerase (4) Poly-A polymerase

16. Which one is a precursor for prostaglandin synthesis ?

(1) Cholesterol (2) Acetyl-Co-A

(3) A phospholipid (4) A fatty acid

17. Which of the following muscle is ectodermal (retinal) in origin ?
(1) Small dorsal muscle that forward the anuran eye lens
(2) Retractor lentis muscle of teleost eye lens
(3) Small ventral muscle that pulls forward the amphibian eye lens
(4) The protractor muscle, attached to ventral rim of the elasmobranch eye lens

18. In developing amniotic testis, connecting tubules connect :
(1) Central canal and Lateral kidney canal
(2) Kidney tubules and archinephric duct
(3) Lateral kidney canals and archinephric duct
(4) Seminiferous tubules and central canal

19. Catadromous migration is shown by with fishes moving form :
(1) Salt water to fresh water (2) Salt water to salt water
(3) Fresh water to salt water (4) Fresh water to fresh water

20. *Identify* a TCA cycle enzyme which also acts as a de-carboxylase :
(1) Malate dehydrogenase
(2) Succinate dehydrogenase
(3) α– ketoglutarate dehydrogenase
(4) Succinic Co-A carboxylase

21. Puberty is accelerated by :
(1) Growth factors (2) Semio-chemicals
(3) Chemokines (4) Immunoglobulins

22. Identify the non-carbohydrate compound from the options given below :
(1) Dihydroxy acetone (2) Glyceraldehyde
(3) Lactate (4) Inulin

23. Which of the following is **not** a free redical ?

(1) $OH^{\cdot}$ (2) $ONOO^{-}$ (3) NH^{4+} (4) H_2O_2

24. Remchandran plot is used to :

(1) Determine Tm value of DNA

(2) Kcat of an enzyme

(3) Predict whether DNA is single strand or double strand

(4) Predict protein structure

25. When a purified nucleosomal fraction is digested *with DNaseI*, after electrophoretic separation, it is likely to show the DNA fragments as a :

(1) Ladder of 10-200 bp (2) Single band of 10 bp

(3) Two bands of 10 & 80 bp (4) DNA smear

26. A cell in culture is treated with 2,4-dinitrophenol, a respiratory blocker. Which of the cell functions is affected the most :

(1) Electron transport chain (2) ATP synthesis

(3) Oxygen consumption (4) TCA cycle

27. During gastrulation the movement of ectodermal cells to cover the entire embryo is known as :

(1) Epiboly (2) Delamination

(3) Ingression (4) Invagination

28. The ability of cells to achieve their respective fate during development by interactions with other cell is known as :

(1) Autonomous specification (2) Conditional specification

(3) Syncytial specification (4) Altered specification

29. If a Drosophila species has 3 pairs of metacentric chromosomes and 1 pair of telocentric chromosome, then this species will have :
(1) 5 arms is polytene chromosomes
(2) 6 arms is polytene chromosomes
(3) 7 arms is polytene chromosomes
(4) 9 arms is polytene chromosomes

30. What will happen if a lysosome is ruptured inside a cell ?
(1) The lysosomal enzymes will get inactivated due to non acidic pH of cytoplasm
(2) All organelle of the cell get digested
(3) The lysosomal proteins will get transported back to other lysosomes
(4) The individual will get inclusion cell disease

31. The fuels for Krebs cycle occurring in mitochondria are :
(1) Pyruvate and lactate
(2) Fatty acid and palmitic acid
(3) Pyruvate and fatty acids
(4) Succinate and NADH

32. In the term 'C-value paradox', C-value refers to :
(1) Lavel of complexity of an organism
(2) Amount of DNA which is being expressed
(3) Amount of DNA in haploid cell
(4) Amount of repetitive DNA

33. *Distyostelium* is a model organism for developmental studies. The special feature of this organism is :
(1) Aggregation of cells occur upon starvation finally differentiating into stalk and fruiting bodies
(2) Haploid amoebae aggregate by cAMP stimulation
(3) The fruiting body gives rise to haploid gametes
(4) cAMP acts as intracellular messenger molecule for cell aggregation

34. Segregation of the two alleles takes place at which phase of cell cycle ?

(A) At anaphase I during gamete formation

(B) After fertilization at mitotic formation

(C) At anaphase II if crossing over between maternal and parternal chromosomes has taken place involving the given allele

(D) At diplotene when crossing over is completed

Which of the above statement/s can answer the question most appropriately ?

(1) A and C (2) A,C and D

(3) A and B (4) C

35. The proteins synthesized on rough endoplasmic reticulum :

(1) are generally lysosomal, secretary or transmembrane proteins

(2) enters directly in the nucleus

(3) remains free in cytoplasm

(4) generally undergoes proteasomal degradation

36. Resting position of lens for far-vision is found in :

(1) Lamprey (2) Teleosts

(3) Amphibians (4) Reptiles

37. Which one of the following is a greenhouse gas ?

(1) N_2O_5 (2) NO (3) N_2O (4) N_2

38. Sexually dimorphic nuclei in the brain are known to express :

(1) Oxytocin receptor (2) ACTH receptor

(3) Corcticosterone receptor (4) Thyroid receptor

39. Which of the following Caspases is the executor molecule in both extrinsic and intrinsic pathway of apoptosis ?

(1) Caspase-3 (2) Caspase-8

(3) Pro-caspase-9 (4) Caspase-6

40. Renin is secreted by :

(1) Juxtamedullary cells (2) Parietal cells

(3) Chief cells (4) Follicular cells

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. Present an outline protocol for protein sequencing.

02. What is the role of neuro-peptides it regulation of hypophysial secretion ?

03. Represent an outline protocol for constructing a recombinant cDNA.

04. Describe the signalling module of G-protein couple receptors.

05. Provide an experimental plan to justify that 'EST is coupled to oxidative phosphorylation via a proton gradient across the membrane'.

06. Illustrate molecular understanding of Dorso ventral axis formation in *Drosophila* during embryogenesis.

07. Write about the basic principles of tissue fixation. Name some of the common fixatives and their mode of action.

08. With the help of a labeled diagram depict the consequence of meiotic recombination at a single point in an individual heterozygous for a pericentric inversion.

09. Illustrate the steps of Oogenesis and Spermatogenesis and their hormonal regulation.

10. Discuss the significance of G- and C- banding on karyotyping and how the nomenclature is given for chromosome subdivisions ?

Question No. प्रश्न संख्या	Page for Short Answer लघु उत्तरीय के लिए पृष्ठ

Question No. प्रश्न संख्या	Page for Short Answer लघु उत्तरीय के लिए पृष्ठ

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Question No. प्रश्न संख्या	Page for Short Answer लघु उत्तरीय के लिए पृष्ठ

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 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. 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।