Set No. : 1

Question Booklet No.

RET/17/TEST-B

987 | Human & Clinical, Genetics

(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 fesh 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
समय : 2 घण्टे

Full Marks : 200
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. Vision of cockroach is :

(1) Monocular (2) Binocular

(3) Mosaic (4) Superposed

12. Formation of platelets is known as :

(1) Haemopoiesis (2) Thrombopoiesis

(3) Haemolysis (4) Haemodialysis

13. Scanning electron microscope is important for its image which are :

(1) Very large sharp image (2) Three-dimensional

(3) Fluorescent (4) Two-dimensional

14. A dominant trait is expressed in :

(1) Homozygous state only

(2) Heterozygous state only

(3) Neither homozygous nor heterozygous states

(4) Both homozygous and heterozygous states

15. Chromatid is :

(1) One half of chromosome (2) Haploid chromosome

(3) Complete chromosome (4) Duplicate chromosome

16. A normal woman is married to a colour blind man. The children are expected to be :
    (1) All normal
    (2) 50% sons are colour blind
    (3) All daughters are normal but carrier whereas all sons are normal phenotypically as well genotypically
    (4) 50% daughters are colour blind

17. Process of genetic mutation is :
    (1) Reversible (2) Irreversible
    (3) Partially reversible (4) Continous

18. Map distance of genes is calculatcd by :
    (1) Number of mutant genes
    (2) Cross over percentage
    (3) Non cross-over percentage
    (4) Recombination frequency of each gene locus

19. Philadelphia chromosome occurs in patients suffering from :
    (1) Leukemia (2) Rickets
    (3) Hepatitis (4) Albinism

20. Person with Klinefelter's syndrome have chromosome :
    (1) XX (2) XY (3) XXY (4) XYY

21. The microtubules attached to the kinetochore are polymers of
    (1) Tubulin molecules (2) Actin molecules
    (3) Myosin molecules (4) Centrin molecules

22. Mutations are :

(1) Caused by genetic recombination

(2) Heritable changes in genetic information

(3) Caused by faulty transcription of the genetic code

(4) Usually but not always, beneficial to the development of the individuals in which they occur

23. Trisomy of human chromosome 18 results in :

(1) Turner syndrome (2) Down syndrome

(3) Patau syndrome (4) Edward syndrome

24. Chromatids joined together by a centromere are called :

(1) Sister chromatids (2) Homologs

(3) Alleles (4) Bivalents

25. Mitosis and meiosis always differ in regard to the presence of :

(1) Chromatids (2) Spindles

(3) Bivalents (4) Centromeres

26. All of the following events happen in prophase I of meiosis, except :

(1) Chromosome condensation (2) Pairing of homologues

(3) Chiasma formation (4) Segregation

27. An XXY individual with Klinefelter syndrome would be expected to have how many Barr bodies in the majority of cells ?

(1) One (2) Two

(3) Three (4) No Barr body

28. Plasmids are :

(1) Small circular DNA molecules that are free in the cytosol

(2) Small linear DNA molecules that are free in the cytosol

(3) Small circular DNA molecules that remain incorporated in the genomic DNA

(4) Large linear RNA molecules that are free in the cytosol

29. The lenght of DNA wrapped around a nucleosome core is :

(1) 146 base pairs (2) 200 base pairs

(3) 203 base pairs (4) 20 to 100 base pairs

30. In a karyorype the chromosomes are ordered by :

(1) Size of the chromosomes

(2) Size of the chromosomes and position of the centromere

(3) Position of the centromere and long arm to short arm ratio

(4) Size of the chromosomes and long arm to short arm ratio

31. Aneuploidy is defined as :

(1) Any deviation from the complete chromosome complement

(2) Only the loss of one set of chromosomes complement

(3) Only gain of a full set chromosome complement

(4) Only loss or gain of one chromosome

32. Operon occur in :

(1) Only prokaryotes

(2) Primarily in prokaryotes and in some eukaryotes including nematodes

(3) All prokaryotes and all eukaryotes

(4) Primarily in eukaryotes and also in many prokaryotes

33. Allelic heterogeneity is :

(1) The existence of many different mutations, but all in the same gene, in unrelated people with same phenotype

(2) The existence of many different mutations, but all in the different genes, in unrelated people with same phenotype

(3) The existence of a single mutation, in different unrelated people with different phenotype

(4) Combined effect of many different mutations, but all in different genes, for a phenotype in an individual

34. The back cross is :

(1) A cross between F1 individual and F2 individual

(2) A cross between an F1 individual with another F1 individual

(3) Cross between F1 and one of the two parents

(4) Cross between F2 with one of the parents

35. A haploid set of all the genes present in a gamete is called :

(1) Genotype (2) Phenotype

(3) Genome (4) Linkage group

36. Crossing over occurs during :

(1) Pachytene (2) Diplotene

(3) Diakinesis (4) Leptotene

37. Which one can reverse the harmful effect of previous mutation ?

(1) Intergenic mutation (2) Intragenic mutation

(3) Suppressor mutation (4) Indirect suppression

38. Map distance of genes is calculated by :

(1) Number of mutant genes

(2) Cross over percentage

(3) Non cross-over percentage

(4) Recombination frequency of each gene locus

39. Crossing over in diploid organism is responsible for

(1) Dominance of genes (2) Segregation of alleles

(3) Recombination of linked genes (4) Linkage between genes

40. Positional cloning refers to :

(1) Using a selection procedure to clone a cDNA

(2) Cloning a portion of a gene using PCR

(3) Isolating a gene by PCR using primers from another species

(4) Mapping a gene to a chromosomal region and then identifying and cloning a genomic copy of the gene from the region

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 is pedigree ? Why it becomes an important tool in human genetic studies ? 16

02. Write notes on human genome project. 16

03. Describe the method of fluorescence in situ hybridization (FISH) and its application in clinical cytogenetics. 16

04. Write the principle of the following techniques and give their application in diagnosis of genetic disorders 8×2=16

(a) Multiplex - PCR

(b) PCR - RFLP

05. Write notes on Transcriptomes and their use in disease diagnosis

06. Give a brief account of the following : 8×2=16

(a) Preimplantation diagnosis

(b) What are invasive methods of prenatal diagnosis ?

07. Write notes on : 8×2=16

(a) Antigen-Antibody interaction

(b) Western Blotting

08. Answer the following : 8×2=16

(a) Draw a diagram and label different basic components of a vector used in recombinant DNA technology.

(b) How is a cloning vector different from an expression vector ?

09. Describe the method of human lymphocyte culture for chromosome preparation, explain the role of fetal calf serum and phytohemagglutinin in the cultures. 16

10. Write short note on Pharmacogenomics. 16

Question No.	Page for Short Answer

Question No.	Page for Short Answer

Question No.	Page for Short Answer

Question No.	Page for Short Answer

Question No.	Page for Short Answer

Question No. 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 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।