

Set No. : 1

RET/14/TEST-B

Question Booklet No.

686

Sahitya

(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 10 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 : 16

FOR ROUGH WORK

Research Entrance Test – 2014

No. of Questions : 50

Time : 2 Hours

Full Marks : 200

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

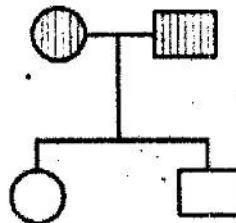
i) Attempt as many MCQs as you can. Each MCQ carries 3 (Three) marks. 1 (One) mark will be deducted for each incorrect answer. Zero mark will be awarded for each unattempted question. If more than one alternative answers of MCQs seem to be approximate to the correct answer, choose the closest one.

ii) 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.

1. Which of the following is *not* a greenhouse gas ?
(1) Carbon dioxide (2) Methane
(3) Sulphur dioxide (4) Nitrogen
2. The saliva of mammals contains starch splitting enzyme. The name of that enzyme is :
(1) Amylase (Ptyalin) (2) Secretin
(3) Lysozyme (4) Mucin
3. Cytosine in DNA combines with :
(1) Adenosine (2) Uracil (3) Guanine (4) Thiamine
4. If Vectors $2i - j + k$, $i + 2j - 3k$, $3i + \lambda j + 5k$ are coplanar, then the value of λ is :
(1) -2 (2) -3 (3) -4 (4) -5
5. The value of $(-1 + i\sqrt{3})^{3/2}$ is :
(1) $\sqrt{2}$ (2) $2\sqrt{2}$ (3) $2 + \sqrt{2}$ (4) $2 - \sqrt{2}$
6. The number of electrons contained in 1 Coulomb of charge equals to :
(1) 6.25×10^{17} (2) 6.25×10^{18} (3) 6.25×10^{19} (4) 1.6×10^{19}
7. A unit mass of solid is converted to liquid at its melting ; the heat required for this process is the :
(1) Specific heat (2) Latent heat of vaporization
(3) Latent heat of fusion (4) External latent heat
8. Granite is :
(1) a sedimentary rock (2) a metamorphic rock
(3) a volcanic rock (4) a plutonic igneous rock
9. Coal is a :
(1) Sedimentary rock (2) Hydrothermal deposit
(3) Low-grade metamorphic rock (4) High-grade metamorphic rock
10. Which one of the following gases is present in the stratosphere that filters out some of the sun's ultraviolet light and provides an effective shield against radiation damage to living things ?
(1) Oxygen (2) Methane (3) Ozone (4) Helium

11. The cells that maintain a steady current of water through a sponge body are known as :
- (1) choanocytes (2) amoebocytes (3) pinacocytes (4) archeocytes
12. The following are some of the group of animals :
- A. Prototheria B. Metatheria
C. Monotremata D. Eutheria
- Which of the above groups do not lay eggs ?
- (1) A and C (2) B and D (3) C (4) B, C and D
13. The poison fangs of a venomous snake are modified :
- (1) canine (2) mandibular teeth
(3) incisors (4) maxillary teeth
14. The lateral line system of bony fishes and sharks functions in :
- (1) osmoregulation (2) gas exchange
(3) hydrodynamics (4) sensory perception
15. Which one of the following insects belongs to subclass Apterigota ?
- (1) ants (2) silver fish (3) earwings (4) cicadas
16. If an object is viewed under a compound microscope in the following conditions :
- Wavelength of light used = 500 nm; Refractive index of medium = 1.0; Angular aperture $\sin 70^\circ = 0.94$, the limit of resolution will be approximately.
- (1) 150 nm (2) 275 nm (3) 325 nm (4) 400 nm
17. Beer-Lambert law is valid in all the conditions except :
- (1) the absorbance is measured at absorbance maxima
(2) the beam of the incident light is monochromatic
(3) the absorbance is measured below the crucial concentration
(4) there is intra-molecular change taking place in the solution
18. Three proteins, X, Y and Z having pI values 6.8, 4.5 and 1.0, respectively are loaded onto a cation exchange column. Under the increasing salt gradient in mobile phase, the order of elution of these proteins will be :
- (1) X, Z, Y (2) Z, Y, X (3) X, Y, Z (4) Y, Z, X

19. The discovery of NADP^+ by Warberg and observation that ^{14}C -1 labelled glucose :
undergoes oxidation laid the foundation to the discovery of
- (1) Embden-Mayerhoff's pathway (2) Krebs cycle
(3) Urea cycle (4) Phosphogluconate pathway
20. While studying folding of polypeptide chains, the term "conformation" refers to :
- (1) primary structure of the polypeptide
(2) secondary and tertiary structures of the polypeptide jointly
(3) tertiary structure of the polypeptide chain
(4) quaternary structure of the polypeptide
21. 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 will get digested
(3) The lysosomal proteins will get transported back to other lysosomes
(4) The individual will get inclusion cell disease
22. Following are four considerable modes of inheritance for the given pedigree :
- A. X-linked recessive B. X-linked dominant
C. Autosomal dominant D. Autosomal recessive



- Which of the above modes of inheritance can explain the pedigree shown below ?
- (1) A and C (2) B and D (3) D (4) C
23. 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 anaphase
C. At anaphase II if crossing over between maternal and paternal 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

24. If a *Drosophila* species has 3 pairs of metacentric chromosomes and 1 pair of telocentric chromosome, then this species will have :
- (1) 5 arms in polytene chromosomes (2) 6 arms in polytene chromosomes
 (3) 7 arms in polytene chromosomes (4) 9 arms in polytene chromosomes
25. The primary plexus of the hypothalamo-hypophysial portal system is located in :
- (1) Infundibulum (2) median eminence
 (3) mid brain (4) lateral hypothalamus
26. Androgen binding protein is secreted by :
- (1) Sertoli cells (2) Leydig cells (3) Peritubular cells (4) Germ cells
27. Growth hormone of pituitary gland stimulates the growth of cartilage and bone through :
- (1) somatostatin (2) somatocrinin (3) somatomedin (4) lipotrophin
28. In doing histochemistry for enzymes the tissue is :
- (1) fixed in Bouins prior to sectioning and staining
 (2) fixed in gluteraldehyde prior to sectioning and staining
 (3) frozen prior to sectioning and staining
 (4) stained prior to fixation
29. Hematoxyline is used to :
- (1) stain nuclei
 (2) stain cytoplasm
 (3) fix the tissue in non-alcoholic medium
 (4) fix the histological sections and give a contrast staining
30. Which one of the following is a resource for biological information ?
- (1) NCBI (2) BCI (3) NBCI (4) ASCII
31. Prosophenosia is characterized by inability to :
- (1) recognize faces (2) perform intellectual functions
 (3) name object (4) interpret the thought
32. Extrinsic pathway for initiating blood clotting begins by :
- (1) activation of factor VII (2) release of prothrombin activator
 (3) release of tissue thromboplastin (4) activation of factor XII

33. During conduction of nerve impulse, the action potential is developed by :
- (1) inward movement of K^+ and outward movement of Na^+
 - (2) inward movement of Na^+ and outward movement of K^+
 - (3) inward movement of Na^+ and K^+
 - (4) outward movement of Na^+ and K^+
34. The following statements are given for the gene products that help in body pattern formation during development :
- A. contain 180 bp homeodomain
 - B. act as transcription factors
 - C. have four paralogous groups
 - D. the genes are clustered in two complexes
- Which combination of above statements is best appropriate for *Drosophila* homeotic gene products ?
- (1) A, B and C
 - (2) A, B and D
 - (3) B and D
 - (4) B and C
35. The generic and specific name of an animal is written by the same word, e.g., *Naja naja*. This convention of naming is known as :
- (1) tautonym
 - (2) synonym
 - (3) homonym
 - (4) binomen
36. A chromosome locus is represented by two alleles 'A' and 'a'. The frequency of 'A' allele in a population of 200 individuals is 0.3. The expected number of heterozygotes in this population will be :
- (1) 98
 - (2) 84
 - (3) 18
 - (4) 42
37. The following terms are given for specific events towards developing adaptive immunity :
- | | |
|----------------------|--------------------|
| A. Allelic exclusion | B. Class switching |
| C. Clonal selection | D. Clonal deletion |
- Which of the above terms is/are associated with the generation of antibody diversity ?
- (1) A, B and C
 - (2) B, C and D
 - (3) B
 - (4) B and D
38. Which of the following best illustrates ecological succession ?
- (1) Imported pheasants increase in number while local quail disappear
 - (2) A mouse eats seed and an owl eats the mouse
 - (3) Grasses grow in a deserted field followed by shrubs and then trees
 - (4) Decomposition in soil releases nitrogen that plants can use

39. Which one of the following should receive the greatest attention for the goal of conserving biodiversity ?

- (1) A commercially important species
- (2) All endangered vertebrate species
- (3) All endangered plant species
- (4) A declining keystone species in a community

40. Mobbing behaviour is a type of :

- (1) territorial behaviour
- (2) predatory behaviour
- (3) parental behavior
- (4) anti-predatory behaviour

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.

1. Define the following giving one example of each :
(A) Acoelomate, (B) Pseudocoelomate, (C) Schizocoelomate,
(D) Hemocoelomate and (E) Enterocoelomate
2. Write a note on Systemic insecticides.
3. You have been given a protein for determining its molecular weight. Name the techniques suitable for the above. Discuss the principle underlying any one of them enlisting the steps for determining the molecular weight.
4. What do you understand by RNA interference ? Giving suitable example, explain the role of miRNA pathways in regulation of gene expression.
5. Discuss the significance of G- and C- banding on karyotyping and how the nomenclature is given for chromosome subdivisions ?
6. Define 'Two cell-Two gonadotropin' concept of estrogen synthesis.
7. Discuss the role of Sudan dyes in lipid histochemistry.
8. What is extra pyramidal neuronal system ? Draw a well labeled diagram of putamen circuit and briefly describe the role of various nuclei in précised motor activities of a subject.
9. Illustrate molecular understanding of antero-posterior axis formation in *Drosophila* during embryogenesis.
10. Explain Energy flow in an ecosystem considering the laws of thermodynamics.

Roll No. :

Q. No. :

Roll No. :

C No. :

RET/14/Test B/884

(9)

P.T.O.

Roll No. :

Q. No. :

Roll No. :

Q. No. :

Roll No. :

Q. No. :

FOR ROUGH WORK

