

27

Question Booklet No. ....130.....

(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 changes 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 page 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.

**FOR ROUGH WORK**

# Research Entrance Test – 2015

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.

(ii) 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.

(iii) 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. "Fluid mosaic model" relates to the structure of :  
(1) Cell wall (2) Protoplasm  
(3) Plasma membrane (4) Nucleic acid
2. Spongy tissue of mango is a :  
(1) Bacterial disease (2) Physiological disease  
(3) Viral disease (4) Fungal disease
3. A purpose of initiating a conscious and purposeful action is called :  
(1) Education (2) Motivation (3) Action (4) Coordination
4. Yellow colour of egg is due to :  
(1) Carotene (2) Xanthophyll (3) Anthocyanin (4) Vitamin B
5. During prophase-I of meiosis crossing over occurs at :  
(1) Zygotene (2) Pachytene (3) Diplotene (4) Diakinesis
6. In which crop the use of Blue-Green Algae as a bio-fertilizer will be most useful ?  
(1) Maize (2) Potato (3) Rice (4) Sugarcane
7. Lycopene pigment is present in :  
(1) Beetroot (2) Tomato (3) Radish (4) Chilli
8. Ooze test is done to detect :  
(1) Bacterial disease (2) Fungal disease  
(3) Viral disease (4) All of these
9. Number of chromosome in wheat endosperm is :  
(1) 21 (2) 42 (3) 63 (4) 14
10. Acridine orange is used for inducing :  
(1) DNA denaturation (2) Mutagenesis  
(3) Chiasma formation (4) Bacterial transduction

11. Substrate for the action of first Tryptophan biosynthetic gene is :
- (1) Anthranilate (2) Shikimate  
(3) Chorismate (4) Indole glycerol phosphate
12. As compared to main bacterial chromosome, the size of an episome is :
- (1) 1/10 (2) 1/20 (3) 1/30 (4) 1/40
13. For self-pollinated crops, non-additive genetic variance in line  $\times$  tester analysis is equal to :
- (1)  $2 \sigma^2_{sca}$  (2)  $\sigma^2_{sca}$  (3)  $4 \sigma^2_{sca}$  (4)  $\sigma^2_{sca}/2$
14. Breeding value of an individual is :
- (1) Sum of average effect of genes  
(2) Difference of average effect of genes  
(3) Difference of additive and dominance effects of genes  
(4) Sum of additive and dominance effects of genes
15. The scientists who demonstrated sexuality in bacteria:
- (1) Leeuwenhock and Kola (2) Lederberg and Tatum  
(3) Kircher and Koch (4) Louis Pasteur and Nicholas
16. Joint Scaling test is performed to detect:
- (1) Presence of **dominance** (2) Presence of **non-additiveness**  
(3) Presence of additiveness (4) Presence of **epistasis**
17. Inbred lines can be improved by :
- (1) Transgressive breeding (2) Mutation breeding  
(3) Back cross method (4) All of these

18. The term mutation breeding was given by :
- (1) Hugo de Vries (2) Jones  
(3) Muller (4) Nilson-Ehle
19. Cell wall of Gram<sup>+</sup> bacteria has a larger component of :
- (1) Lipoproteins (2) Phospholipids  
(3) Methylamine (4) Peptidoglycan
20. For exploitation of both additive and non-additive gene effects in crosspollinated crops, the most effective method is :
- (1) Simple Recurrent Selection (2) Recurrent selection for SCA  
(3) Recurrent selection for GCA (4) Reciprocal Recurrent Selection
21. In India, hybrid rice seed production is done through :
- (1) One line system (2) Two line system  
(3) Three line system (4) All of these
22. If  $n$  = number of parents and  $s$  = sample size of the cross, the number of crosses required for partial diallel analysis can be obtained by the formula :
- (1)  $ns/2$  (2)  $n(ns)/2$  (3)  $ns$  (4)  $2ns$
23. Hardy-Weinberg law is applicable for maintenance of genetic purity of :
- (1) Inbred lines (2) Open Pollinated Variety  
(3) Hybrids (4) Pureline
24. The most effective mutagen for cytoplasmic genes is :
- (1) Ethidium Bromide (2) EMS  
(3) MMS (4) Sodium Azide

25. Presence of reverse transcriptase was discovered from AMV virus by :
- (1) H. Temin and D. Baltimore      (2) H.G. Khorana  
 (3) Zaenen *et al.*                      (4) Maxam & Gilbert
26. If partial dominance is present at an inhibitory locus the expected phenotypic ratio is :
- (1) 13 : 3                      (2) 12 : 3 : 1                      (3) 9 : 6 : 1                      (4) 7 : 6 : 3
27. pBR322 is a:
- (1) Degradation plasmid                      (2) Toxin producing plasmid  
 (3) Walking plasmid                      (4) Reconstructed plasmid
28. Which one of these does not obey Mendel's law?
- (1) Linkage                      (2) Independent assortment  
 (3) Dominance                      (4) Purity of gametes
29. In a DNA sequence, if 'A' and T' comprise of 60%, the percentage of C will be :
- (1) 30%                      (2) 20%                      (3) 45%                      (4) 15%
30. Which of the following is not true of DNA ?
- (1) 'A' pairs with 'T' and 'G' pairs with 'C'  
 (2) Nitrogen bases are 0.34 nm apart on a DNA strand  
 (3) The double helix is 2.0 nm wide  
 (4) The double helix is 3.4 nm wide
31. Regression coefficient 'b' in diallel analysis for valid interpretation of Vr-Wr graph should be:
- (1) Zero                      (2) Close to unity  
 (3) Away from unity                      (4) Greater than unity

32. Which of the following is not needed for DNA transcription?
- (1) Ribosomes (2) Nucleotides  
(3) DNA (4) Enzymes
33. Which of the following is also known as chromosome painting?
- (1) FISH (2) GISH  
(3) Micro-arraying (4) Staining
34. Recombinant Inbred Lines are developed through
- (1) Pedigree method (2) Mass selection  
(3) Recurrent selection (4) Single seed descent method
35. The geometrical device that helps to find out all possible combinations of male and female gametes is called :
- (1) Punnet square (2) Bateson square  
(3) Mendel square (4) Morgan square
36. Mitochondria are self-replicating organelles because they have:
- (1) Thylakoids (2) Oxysomes  
(3) Ribosomes (4) DNA
37. The major portion of proton-motive force in mitochondria is generated by :
- (1) Manganese concentration (2) Proton concentration  
(3) Electric potential (4) Zinc concentration
38. The most accepted theory of crossing over put forth by Darlington (1932) was:
- (1) Classical theory (2) Chiasma type  
(3) Breakage and reunion theory (4) None of the above



39. Restriction enzyme was discovered by :

- (1) Meselson      (2) Watson      (3) Arber      (4) Cohen

40. The first recombinant DNA was produced by :

- (1) Sanger      (2) Pauling      (3) Paul Berg      (4) Khorana

*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. Describe in brief the stepwise procedure to clone a eukaryotic gene of interest employing the recombinant DNA technology with the help of suitable diagram.
2. Give the various techniques employed for obtaining virus free plants.
3. Briefly describe the advantages and limitations of partial diallel analysis.
4. How can you convert a Non-Restorer line into Restorer line ?
5. Give an illustrative account of the most commonly used breeding method in self-pollinated crops.
6. Outline a procedure for developing alien substitution line.
7. What are unique and repetitive sequences ?
8. Explain the schematic procedure of QTL mapping.
9. Brief describe the role of different F<sup>+</sup> genes in bacterial conjugation.
10. With help of a suitable diagram explain briefly the transcription mechanism in eukaryotes.

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(12)

**FOR ROUGH WORK**

