

Question Booklet No. ....

(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 – 2013

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. One Horse Power (HP) is expressed in term of watt which is .....  
(1) 720                      (2) 786                      (3) 746                      (4) None of these
2. Number of segments present in insect head is :  
(1) Two                      (2) Four                      (3) Six                      (4) Seven
3. Deficiency symptom of sulphur first appears an :  
(1) Younger leaves                      (2) Older leaves  
(3) Middle leaves                      (4) None of these
4. Protein content in lentil is :  
(1) 18%                      (2) 25%                      (3) 16%                      (4) 20%
5. Demonstration showing how to do things is called :  
(1) Method demonstration                      (2) Result demonstration  
(3) Training                      (4) Frontline demonstration
6. Dithane M-45 is a :  
(1) Bactericide                      (2) Insecticide  
(3) Fungicide                      (4) Nematicide
7. Jamunapari is a breed of :  
(1) Cow                      (2) Goat  
(3) Buffalo                      (4) None of the above
8. Select the correct formula of urea :  
(1)  $H_2NCO_2NH_2$                       (2)  $HNCONH$   
(3)  $H_2NCONH_2$                       (4)  $H_4NCONH_4$
9. The measure of central tendency is :  
(1) Median                      (2) Mode  
(3) Mean                      (4) All of the above
10. On which of the following plant Gregor Mendal perform his classical experiment ?  
(1) Gram                      (2) Maize                      (3) Pea                      (4) Rice

11. One of the principal possible orientation of a ring of four chromosomes at metaphase-I of translocation heterozygotes producing viable gametes :
- (1) Alternate orientation
  - (2) Adjacent-I orientation
  - (3) Adjacent-II orientation
  - (4) Non orientation of the centromeres of two chromosomes in alternate positions in the ring
12. The oxidation of one molecule of NADH in mitochondria results in formation of :
- (1) Two molecules of ATP
  - (2) Five molecules of ATP
  - (3) Three molecules of ATP
  - (4) One molecule of ATP
13. In RAPD, the primer consists of :
- (1) Ten nucleotides
  - (2) Six nucleotides
  - (3) Twenty two nucleotides
  - (4) Single nucleotide
14. The Dolly sheep was cloned at :
- (1) University of California
  - (2) Roslin Institute, Scotland
  - (3) Indian Agricultural Research Institute
  - (4) Cambridge University
15. Golden rice is rich in :
- |                   |                 |
|-------------------|-----------------|
| (1) Beta Carotene | (2) Vitamin C   |
| (3) Protein       | (4) Antioxidant |
16. If 'q' is the selected number of individuals and 'n' is the total number of individuals in a population, the ratio  $q/n$  offers the estimate of :
- |                            |                        |
|----------------------------|------------------------|
| (1) Selection differential | (2) Selection response |
| (3) Selection intensity    | (4) Selection pressure |

17. Significant deviation of regression coefficient 'b' from unity in Vr-Wr graph, indicates :
- (1) Presence of epistasis
  - (2) Absence of epistasis
  - (3) Presence of G x E interaction
  - (4) Presence of dominance
18. In Line x Tester analysis, tester should have :
- (1) Narrow genetic base
  - (2) Broad genetic base
  - (3) No maternal effect
  - (4) Low heritability
19. Six parameter model of generations mean analysis is employed when :
- (1) Epistasis is present
  - (2) Epistasis is absent
  - (3) Dominance is present
  - (4) Dominance is absent
20. Heritability of a character within a pure line is :
- (1) Zero
  - (2) 100%
  - (3) 75%
  - (4) 50%
21. The probability that two genes at any locus in an individual are identical by descent refers to :
- (1) Selection coefficient
  - (2) Inbreeding coefficient
  - (3) Regression coefficient
  - (4) Correlation coefficient
22. Half sibs individuals are related by commonness of :
- (1) One parent
  - (2) Two parents
  - (3) Three parents
  - (4) Four parents
23. Sears (1956) firstly transferred a segment of a chromosome with rust resistance gene through radiation induced translocation in wheat from :
- (1) *Aegilops umbellulata*
  - (2) *Aegilops speltoides*
  - (3) *Agropyron intermedium*
  - (4) *Aegilops bicornis*

24. The term addition decay was coined by :
- (1) Riley and Kimber (2) E.R. Sears  
(3) Unrau et al (4) Driscoll
25. Who demonstrated that genes are located in the chromosomes ?
- (1) Morgan (2) Meselson and Stahl  
(3) Chargaff (4) Franklin
26. Who had conducted the X-ray diffraction studies to the discovery of the structure of DNA ?
- (1) McClintock  
(2) R. Franklin  
(3) Meselson and Stahl  
(4) Chargaff
27. 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
28. For correcting of defects in a popular variety, the most commonly used breeding method is :
- (1) Bulk method (2) Pedigree method  
(3) Backcross method (4) Pure line method
29. Highest expression of heterosis is observed in :
- (1) Single cross hybrid (2) Double cross hybrid  
(3) Open pollinated variety (4) Composite
30. Commercial hybrid rice seed production in India is mostly done through :
- (1) One line system (2) Two line system  
(3) Three line system (4) None of these
31. Hardy-Weinberg Law is applicable for maintenance of genetic purity in :
- (1) Inbreds (2) Composites  
(3) Hybrids (4) Pure lines

- 32.** Sporophytic self-incompatibility is found in :
- (1) Wheat (2) Mustard  
(3) Pea (4) Sunflower
- 33.** Under PPVFR Act 2001 farmers may sell their produce as :
- (1) Certified Seed (2) Breeder Seed  
(3) Unbranded Seed (4) Nucleus Seed
- 34.** The technique used to reduce period of breeding generations is :
- (1) Single seed descent (2) Double haploid  
(3) Transgressive Breeding (4) Test Cross
- 35.** Distant hybridization may be done through :
- (1) Ovule culture (2) Embryo rescue  
(3) Anther culture (4) Pollen culture
- 36.** Transgressive segregants are the outcome of :
- (1) Segregation & recombination  
(2) Heterosis  
(3) Mutation  
(4) Pleiotropy
- 37.** A particular allele can have different effects if it was inherited from a male rather than a female. This phenomenon is known as :
- (1) Extranuclear inheritance  
(2) Genome imprinting  
(3) Sex-linkage  
(4) Prader-Willi syndrome
- 38.** Double trisomics is denoted as :
- (1)  $2n+1$  (2)  $2n+1+1$  (3)  $2n+2$  (4)  $2n-1-1$
- 39.** Both chloroplasts and mitochondria :
- (1) are found within the nucleus  
(2) have linear DNA  
(3) carry extranuclear genes  
(4) display a Mendelian pattern of inheritance



40. Which of the following is not needed for DNA replication ?

- |                 |             |
|-----------------|-------------|
| (1) Ribosomes   | (2) DNA     |
| (3) Nucleotides | (4) Enzymes |

**Attempt any five questions. Write answer in 150-200 words. Each question carries 6 marks. Answer each question on separate page, after writing Question Number.**

1. Alfred Hershey and Martha Chase gave additional evidence that DNA is the genetic material. With the help of suitable diagram, describe the experiment conducted by them to demonstrate that DNA is the genetic material.
2. Write about Sanger and Coulson (di-deoxy) technique of DNA sequencing.
3. Enlist the assumptions of diallel analysis and briefly describe the graphical analysis.
4. Briefly describe the constraints and opportunities of wide crosses in crop improvement.
5. Enlist the methods for identification of chromosomes involved in translocation heterozygotes and describe one of them in detail.
6. Briefly describe the genetic basis of heterosis alongwith objections and explanations.
7. Discuss Transgenic Genetic Male sterility, its mechanisms and uses.
8. Describe the mechanism for regulation of lactose operon in *Escherichia coli*. Discuss the inducible and repressible system operating in it.
9. Differentiate between macro-mutations & micro-mutations. Describe the mutation breeding for crop improvement.
10. What is marker assisted selection ? Describe QTL Mapping.

*Roll No.* : .....

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**Q. No. :**

Roll No. : .....

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Q. No. :

*Roll No. :* .....

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**Q. No. :**

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**Q. No. :**

*Roll No. :* .....

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**Q. No. :**

**FOR ROUGH WORK**

