

RET/17/Test B**746****Genetics & Plant Breeding**Question Booklet No. **10013**(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

(A9) 947

(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 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 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.

[उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गये हैं ।]

Total No. of Printed Pages : 16

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FOR ROUGH WORK

(Ag) 2017

Research Entrance Test – 2017

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. Which lime is referred to as quick lime ?
(1) CaO (2) Ca(OH)_2
(3) $\text{CaMg(CO}_3)_2$ (4) CaCO_3
2. Ooze test is done to detect :
(1) Bacterial disease (2) Fungal disease
(3) Viral disease (4) All of these
3. For test of goodness of fit, which statistical test is applied ?
(1) ' χ^2 ' test (2) 'F' test
(3) 'Z' test (4) 't' test
4. Farm management is an :
(1) Intra-farm science (2) Inter-farm science
(3) Inter-regional farm science (4) International farm science
5. The term "Ever Green Revolution" was given by :
(1) R. S. Paroda (2) V. L. Chopra
(3) Norman Borloug (4) M. S. Swaminathan
6. "Operation flood" is related to :
(1) Rice (2) Fish
(3) Milk (4) Oilseeds
7. During prophase-I of meiosis crossing over occurs at :
(1) Zygotene (2) Pachytene
(3) Diplotene (4) Diakinesis
8. Larva of butterfly is known as :
(1) Grub (2) Nymph
(3) Catterpillar (4) Maggot

9. Marginal product is ratio of :
- (1) Input-Output (2) Output-Input
(3) Cost-Income (4) Price-Income
10. Mendel did not work on which of the following ?
- (1) Plant height in pea (2) Seed colour in pea
(3) Pod number in pea (4) Pod size in pea
11. Cell wall of Gram⁺ bacteria has a larger component of :
- (1) Lipoproteins (2) Phospholipids
(3) Methylamine (4) Peptidoglycan
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. Numerical bacterial taxonomy involves the ratio of :
- (1) DNA : RNA (2) DNA : Protein
(3) A-T : C-G (4) RNA : Protein
14. DTY QTLs have become boon for the areas affected by :
- (1) Flood (2) Drought
(3) Acidic soil (4) Saline soil
15. Hary-Weinberg law is applicable in maintenance of genetic purity of :
- (1) OPV (2) Hybrids
(3) Pure lines (4) Inbreeds
16. Quantity of hybrid seed produced per unit area is higher by using :
- (1) Self incompatibility (2) CGMS
(3) GMS (4) CMS

17. The headquarter of IFPRI is situated at :
 (1) New Delhi (2) Mexico City
 (3) Washington DC (4) Manila
18. Which of the following is least penetrating ?
 (1) X-rays (2) Thermal neutrons
 (3) Fast Neutrons (4) Alpha - particles
19. Which of the following statements is incorrect about free radicals ?
 (1) They produce genetic effects
 (2) They are electrically charged
 (3) They have very short life (10^{-10} second)
 (4) They have unpaired electrons in the outer shell
20. Nullisomics are represented by which of the following ?
 (1) $2n + 2 - 1$ (2) $2n - 2$ (3) $2n - 1 + 1$ (4) $2n - 1 - 1$
21. Chromosome substitution is the easiest using of the following :
 (1) Monosomics (2) Tetrasomics (3) Nullisomics (4) Trisomics
22. The disomic number of an organism is 14. How many chromosomes would be in a double trisomic ?
 (1) 12 (2) 13 (3) 15 (4) 16
23. The Chemical name of thymine is :
 (1) 2-oxy-4-aminopyrimidine (2) 2,4-dioxy-5-methylpyrimidine
 (3) 2,4-dioxypyrimidine (4) None of the above
24. DNA is the genetic material can be evidenced by the fact that :
 (1) Chromosomes are made up of DNA
 (2) DNA is not present in cytoplasm
 (3) Transformation and transduction in bacteria are caused by DNA only
 (4) DNA is concentrated in nucleus

25. DNA sequencing by Sanger's method involves the use of :
- (1) Ribonucleotide (2) 3'-deoxyribonucleotide
(3) 2',3'-dideoxyribonucleotide (4) Luorodinitrobenzene
26. Which of the following enzymes do not occur in the lysosomes ?
- (1) Phosphatase (2) Lipase
(3) Proteases (4) Polymerase
27. Bacteria protect themselves from viruses by fragmenting viral DNA upon entry with :
- (1) Methylase (2) Endonucleases
(3) Migases (4) Exonucleases
28. A plant of genotype AB/ab is test crossed to ab/ab. If two loci are 10 map units apart what proportion of progeny will be AB/ab ?
- (1) 50% (2) 45% (3) 10% (4) 5%
29. Path coefficient provides information about :
- (1) Variability (2) Cause and effect
(3) Gene action (4) All of these
30. Who proposed the numerical approach of diallel cross analysis in 1956 ?
- (1) Mather (2) Hayman
(3) Griffing (4) Falconer
31. In $V_r - W_r$ graph, when regression line passes through below the origin, it indicated :
- (1) Complete dominance (2) Incomplete dominance
(3) Lack of dominance (4) Over dominance
32. Partial diallel does not provide information about :
- (1) Additive variance (2) Dominance variance
(3) GCA effect (4) SCA effect

- 33.** Difference between mean phenotypic value of the progeny of selected plants and original population is called :
- | | |
|----------------------------|-------------------------|
| (1) Genetic gain | (2) Genetic advance |
| (3) Selection differential | (4) Genetic improvement |
- 34.** The first type II restriction endonucleases to be isolated was :
- | | |
|--------------|-------------|
| (1) Bam H I | (2) Hind II |
| (3) Hind III | (4) Eco R I |
- 35.** Which of the following regions of Ti plasmid is essential for transfer of tDNA ?
- | | |
|----------------|----------------------|
| (1) Vir region | (2) Border sequence |
| (3) Ori region | (4) Both (1) and (2) |
- 36.** Among the given scorable markers which is the most commonly used ?
- | | |
|-----------------------|----------------------------|
| (1) Nopaline synthase | (2) β -glucorinidase |
| (3) Luciferase | (4) Octopine synthase |
- 37.** Target of cry II b gene is :
- | | |
|-----------------|----------------|
| (1) Lepidoptera | (2) Coleoptera |
| (3) Diptera | (4) Nematodes |
- 38.** Which of the enzyme is called molecular scissor ?
- | | |
|------------------------|-------------------|
| (1) DNA Ligase | (2) DNA gyrase |
| (3) Restriction enzyme | (4) Topoisomerase |
- 39.** Lipofaction is a method of :
- | | |
|------------------------------|--------------------------|
| (1) Agroinfection | (2) Direct gene transfer |
| (3) In-planta transformation | (4) None of the above |
- 40.** Programmed cell death is brought about by gene action :
- | | |
|----------------------|-----------------------|
| (1) Exogeneous | (2) Endogeneous |
| (3) Both (1) and (2) | (4) None of the above |

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. Illustrate the configuration of super-coiled DNA in *Escherichia coli* along with its enzymatic control.
2. Depict the location of episomal genes on F^+ plasmid with brief note on the function individual components.
3. Describe in detail about development of new CMS line in a self pollinated crop.
4. In case of rice, if a popular variety is non-aromatic but high yielder and another popular variety is aromatic but low yielder. If you wish to develop a new high yielding aromatic variety, then which method will be most suitable and how ? Describe in detail.
5. Discuss the effects of mutation on DNA and the repair mechanism operating at the DNA level.
6. Describe the Cis-Trans test for allelism. Explain the limitations of complementation test.
7. Explain the effect of multiple alleles at a locus and sex linkage on Hardy Weinberg Equilibrium in a Mendelian population.
8. Define combining ability ? Explain general and specific combining ability and give their significance in plant breeding.
9. Define mapping population. Discuss their types and merits in brief.
10. Define monosomics and its various types. Discuss origin cytology, breeding behaviour and uses of monosomics in genetical studies.

Roll No. :

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FOR ROUGH WORK

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 कृपया 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।
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, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक संख्या 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. इस पुस्तिका में 40 बहुविकल्पीय प्रश्नों के साथ 10 लघु उत्तरीय प्रश्न हैं। प्रत्येक बहुविकल्पीय प्रश्न के लिए, आपको उत्तर-पत्र के प्रथम पृष्ठ पर दी गयी गाइडलाइन के अनुसार सही विकल्प के लिए उत्तर-पत्र की संगत पंक्ति में उपयुक्त गोले को पेन द्वारा काला करना है। किन्हीं पाँच लघु उत्तरीय प्रश्नों के उत्तर देने के लिए प्रश्न-पुस्तिका के अन्त में संलग्न पाँच रिक्त पृष्ठों का प्रयोग कीजिए।
9. प्रत्येक प्रश्न के उत्तर के लिये 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 सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे (प्रश्नों पर शून्य अंक दिये जायेंगे।)
11. रफ़ कार्य के लिये इस पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा अंतिम खाली पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त ओ० एम० आर० उत्तर-पत्र एवं प्रश्न पुस्तिका दोनों परीक्षा भवन में जमा करें।
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।

SEAL