

Set No. : I

Question Booklet No.

RET/16/TEST-B

746

Genetics & Plant Breeding

(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

7. A9.

ROUGH WORK

रफ़ कार्य

Research Entrance Test-2016

No. of Questions : 50

Time : 2 Hours

Full Marks : 200

- Note:** (1) This Question Booklet contains **40** Multiple Choice Questions followed by **10** Short Answer Questions.
- (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.
- (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.

01. Where is the International Rice Research Institute located ?

- | | |
|------------|-------------|
| (1) Manila | (2) Chicago |
| (3) Cairo | (4) Cuttack |

02. Trypsin is basically what ?

- | | |
|----------------------|-------------|
| (1) Fatty acid | (2) Sugar |
| (3) Oligo-nucleotide | (4) Protein |

03. GMO stands for what ?

- (1) Genetically Modified Organisms
- (2) Genetically Multiplied Organisms
- (3) Green Modified Organisms
- (4) Green Modified Orange

04. Which international treaty was documented in 1987 and implemented in 1989, to avoid deleterious effects of ultra- violet radiation owing to ozone layer depletion ?
- (1) Cartagene protocol
 - (2) Montreal protocol
 - (3) Geneva protocol
 - (4) Antartica Environmental protocol
05. The tissue bearing dead cells is ?
- (1) Collenchyma
 - (2) Parenchyma
 - (3) Xylem
 - (4) Phellogen
06. Sub-cellular components are separated by means of ?
- (1) Chromatography
 - (2) Autoradiography
 - (3) Electrophoresis
 - (4) Differential and density gradient centrifugation
07. Which these is a vertebrate animal ?
- (1) Prawn
 - (2) Snake
 - (3) Mosquito
 - (4) Octopus
08. Which of these is not a C_4 plant ?
- (1) Maize
 - (2) Rice
 - (3) Sorghum
 - (4) Sugarcane
09. Cell theory was first formulated by ?
- (1) Schleiden and Schwann
 - (2) Rudolf Vrichow
 - (3) A.V. Leeuwenhock
 - (4) Ruth Sagar

10. Apple is a ?
(1) True fruit (2) False fruit
(3) Vegetable (4) Parthenocarpic fruit
11. The range of percent DNA redundancy in bacteria is :
(1) 90-95 (2) 50-55
(3) 20-25 (4) 0-10
12. Of the three nodulin genes :
(1) Two are of plant origin
(2) Two are of bacterial origin
(3) All the three are of plant origin
(4) All the three are of bacterial origin
13. The gene for the first and foremost primary aminating enzyme that converts NH_4^+ ions into glutamine is known as :
(1) GS (2) GOGAT
(3) GDH (4) ADH
14. In *Klebsiella pneumoniae* the group of *Nif* genes is situated adjacent to the gene responsible for the biosynthesis of :
(1) Tryptophan (2) Glutamate
(3) Histidine (4) Arginine
15. In diallel analysis, which of the following is an important assumption ?
(1) Absence of Epistasis
(2) Absence of additive gene action
(3) Absence of dominant gene action
(4) Presence of Epistasis

16. Six parameter model of generation mean analysis is employed when :
- (1) Epistasis is present
 - (2) Epistasis is absent
 - (3) Additive and dominance types of gene actions are present
 - (4) Only additive type of gene action is present
17. The number of crosses required for Method II of diallel with 'n' number of parents is obtained by the formula :
- (1) $n(n-1)$
 - (2) $2n(n-1)$
 - (3) $n(n-1)/2$
 - (4) $n(n-1)(n-2)$
18. Partial dominance is indicated when :
- (1) $H/D = 1$
 - (2) $H/D > 1$
 - (3) $(H/D)^{1/2} < 1$
 - (4) $(H/D)^{1/2} > 1$
19. Significance of SCA effect of a cross indicates the important role of one of the following gene action in the actual performance of the cross :
- (1) Non-additive gene action
 - (2) Additive gene action
 - (3) $G \times E$ interaction
 - (4) None of the above
20. In Vr-Wr graph of diallel, parental points falling close to the origin possess :
- (1) Higher proportion of dominant genes
 - (2) Higher proportion of recessive genes
 - (3) Equal proportion of dominant and recessive genes
 - (4) Higher environmental influence
21. The extent of heterosis would be higher when :
- (1) Parents are geographically diverse
 - (2) Parents are geographically close
 - (3) Parents are genetically close
 - (4) Parents are genetically diverse

22. Mutations are generally :
(1) Deleterious (2) Recessive
(3) Occurring in low frequency (4) All of these
23. Tetrazolium test is recommended for :
(1) Purity test (2) Viability test
(3) Vigour test (4) Germination test
24. Sporophytic self incompatibility is found in :
(1) Toria (2) Mustard
(3) Pea (4) Wheat
25. Composite and synthetic varieties are developed in :
(1) Sugarcane (2) Maize
(3) Rice (4) Wheat
26. Sub-1 gene in rice has become boon in areas affected by :
(1) Saline soils (2) Acidic soils
(3) Drought (4) Flood
27. The addition of single chromosome of *Rye* to wheat was firstly accomplished by :
(1) Leighty and Taylor (2) O'mara
(3) E.R.Sears (4) Riley and Kimber
28. True replication of DNA is possible due to :
(1) Hydrogen bonding (2) Phosphate backbone
(3) Complementary base pairing (4) Denaturation
29. Recessive alleles are expressed in :
(1) Homozygous condition
(2) Hemizygous condition
(3) In both homozygous and hemizygous conditions
(4) In homozygous & heterozygous condition

30. The X-ray diffraction studies being the key to the discovery of the structure of DNA was conducted by :
- | | |
|------------------------|--------------|
| (1) Mc Clintock | (2) Franklin |
| (3) Meselson and Stahl | (4) Chargaff |
31. RIL, NIL and DH population are :
- | |
|---------------------------------|
| (1) Mortal mapping population |
| (2) Mendelian population |
| (3) Immortal mapping population |
| (4) Heterozygous population |
32. DNA based markers are called molecular markers because :
- | |
|---|
| (1) DNA is characterize by charge, molecular weight and iso-electric points |
| (2) DNA is characterized by specific negative charges |
| (3) DNA is characterized by molecular weight only |
| (4) DNA is characterized iso-electric point |
33. Proteins that assist the binding of RNA polymerase to the promoter region on DNA strand are called :
- | | |
|--------------------------|--------------------|
| (1) Transcription factor | (2) Sigma factor |
| (3) SSB Protein | (4) Pseudo Protein |
34. Primary antibody is the probe in :
- | | |
|----------------------------|----------------------------|
| (1) Southern hybridization | (2) Northern hybridization |
| (3) Western hybridization | (4) MALDI-TOF |
35. The presence of reverse transcriptase (a RNA directed DNA polymerase which has the ability to synthesize cDNA using mRNA as a template) was discovered from AMV virus by :
- | | |
|-----------------------------|---------------------|
| (1) H.G. Khorana | (2) Zaenen et al. |
| (3) H. Temin & D. Baltimore | (4) Maxam & Gilbert |

36. The title of Mendel's paper while presenting in Brunn Natural History Society in 1865 was :
- (1) Laws of inheritance
 - (2) Laws of heredity
 - (3) Hereditas fur pisum
 - (4) Experiments in plant hybridization
37. An individual deficient in one chromosome arm only is called :
- (1) Mono-isosomic
 - (2) Mono-telodisomic
 - (3) Mono-telosomic
 - (4) Ditelosomic
38. The length of single chromosome counting the loops may reach a millimeter in :
- (1) Salivary gland chromosome
 - (2) Lamp brush chromosome
 - (3) Bacteeial chromosome
 - (4) Supernumerary chromosome
39. In translocation heterozygote, fertile gametes are produced when there is segregation of :
- (1) Adjacent I
 - (2) Adjacent II
 - (3) Alternate
 - (4) Both adjacent I & II
40. In carnoy's fluid II, the proportion of glacial acetic acid, chloroform and absolute ethyl alcohol are :
- (1) 1:3:4
 - (2) 1:3:6
 - (3) 6:3:1
 - (4) 1:2:4

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.

1. What is A-T/G-C ratio based bacterial modern numerical classification? Does it correlate with morphological and nutritional specificities in nature?
2. Illustrate the structure and function of a DNA virus.
3. Briefly describe genetic basis of heterosis, its objections and explanations.
4. Discuss the constraints and opportunities of wide crosses in crop improvement.
5. Write briefly about Line x Tester analysis, its advantages and limitations.
6. Describe the procedure for developing improved version of a popular variety in a self pollinated crop using molecular approach.
7. Discuss about Transgenic Genetic Male Sterility with its advantages and limitations.
8. Define mapping population. Describe the procedure for developing recombinant inbred lines (RILs).
9. Define signal transduction. What are the types of carrier proteins involved in transport of ions? Illustrate Tyrosine kinase mediated signal transduction.
10. Discuss various types of chromosomal structural changes with suitable diagram.

Question No.

Page for Short Answer

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Question No.

Page for Short Answer

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 10 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।