Roll No. .....

Question Booklet Number

O. M. R. Serial No. | | | | | | | | |

M. Sc. (Ag.) Genetics and Plant Breeding

(First Semester) EXAMINATION, 2021-22

PRINCIPLES OF PLANT BREEDING

Paper Code				
GP	5	0	0	3

Questions Booklet Series
A

Time : 1:30 Hours] [*Maximum Marks : 100*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 60 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 50 questions are attempted by student, then the first attempted 50 questions will be considered for evaluation. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 60 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 50 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 50 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page) (शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. A form of recurrent selection which is used to improve both gca and sca of a population for a character using two heterozygous testers is referred to as :

(A) Simple Recurrent Selection

(B) Recurrent Selection for gca

(C) Recurrent Selection for sca

(D) Reciprocal Recurrent Selection

2. Which method appears to be the most dependable, most rapid and the least expensive method for obtaining homozygous lines from crosses of self-pollinated crops ?

(A) Back cross method

(B) Single Seed Descent method

(C) Bulk method

(D) Pedigree method

3. The gradual loss of variability from cultivated species, wild forms and wild relatives is called :

(A) Phenotypic erosion

(B) Genetic erosion

(C) Gene pool

(D) All of the above

4. When self-incompatibility is controlled by the genotype of pollen producing plant, it is known as :

(A) Sporophytic

(B) Gametophytic

(C) Distyly

(D) Monoallelic

5. An individual with two copies of the same allele is :

(A) Homozygous for that allele

(B) Heterozygous for that allele

(C) Both (A) and (B)

(D) None of the above

6. In bisexual flowers when gynoecium mature earlier than anther, the phenomenon is called :

(A) Protogyny

(B) Protandry

(C) Heterostyly

(D) Herkogamy

7. Resistance governed by polygenes and non-specific to particular is known as :

(A) Vertical Resistance

(B) Horizontal Resistance

(C) Oligogenic Resistance

(D) Superiority of hybrids over its parents

8. Polyploidy can be induced artificial by using chemical :

(A) Colchicine

(B) Colcemid

(C) Both (A) and (B)

(D) None of the above

9. Average performance of a strain in a series of cross combinations is called as :

(A) General combining ability

(B) Specific combining ability

(C) Both (A) and (B)

(D) None of the above

10. Hexaploid triticale was developed by crossing between :

(A) *Triticum aestivum* × *Secale cereale*

(B) *T. dicoccum* × *Secale cereale*

(C) *T. durum* × *Secale cereale*

(D) *T. monococcum* × *Secale cereale*

11. Which gene pool is referring to gene-ocean ?

(A) GP1

(B) GP2

(C) GP3

(D) GP4

12. How many single, three-way and double crosses are possible with ten inbred lines ?

(A) 10, 30, 60

(B) 45, 180, 360

(C) 45, 360, 210

(D) 45, 360, 630

13. Importing better varieties and plants from outside and acclimatising them to local environment is called as :

(A) Pure line selection

(B) Mass selection

(C) Introduction

(D) Recurrent selection

14. The determination of genotype or genotypic value of a plant by studying the progeny produced by it, is known as :

(A) Parent Performance Test

(B) Vilmorin Isolation Principle

(C) Both (A) and (B)

(D) None of the above

15. During sporogenesis, meiosis occurs in :

(A) Megaspore Mother Cell and Pollen Mother Cell

(B) Microspore and Megaspore

(C) Both (A) and (B)

(D) None of the above

16. How many meiotic divisions are required to produce 2000 pollengrains in flowering plants ?

(A) 100

(B) 250

(C) 500

(D) 1000

17. Improvement in the mean genotypic value of the selected families over that of the base population is known as :

(A) Selection Differential

(B) Genetic Advance under Selection

(C) Board Sense Heritability

(D) Selection Response

18. Genes that affect the expression of non-allelic gene/genes are known as :

(A) Dominant genes

(B) Recessive genes

(C) Modifying genes

(D) Oligogenes

19. In which method F_2 and subsequent generations are harvested in bulk to raise the next generation ? At the end, individual plants are selected and evaluated :

(A) Mass Selection

(B) Pedigree Method

(C) Bulk Method

(D) Multiline Approach

20. When the host is attacked by the pathogen in the same manner as the susceptible variety, but there is little or no loss in biomass production or yield, it is called as :

(A) Resistance

(B) Tolerance

(C) Susceptible

(D) Immune reaction

21. Partially homologous chromosomes are known as :

(A) Homologous chromosomes

(B) Homoeologous chromosomes

(C) Non-homologous chromosomes

(D) All of the above

22. Who coined the term "Recurrent Selection and Overdominance" ?

(A) Sewal Wright (1921)

(B) Jensen (1952)

(C) F. H. Hull (1945)

(D) Roads (1932)

23. The ability of a gene to express itself uniformly in all the individuals that carry it in the appropriate genotype is referred to as :

(A) Expressivity

(B) Epistasis

(C) Dominance

(D) None of the above

24. The occurrence of differences among individuals due to genetic cause or environmental reasons is referred to as :

(A) Heredity

(B) Mutation

(C) Variation

(D) Segregation

25. Overdominance hypothesis of heterosis was independently proposed by :

(A) G. H. Shull and E. M. East (1908)

(B) Devenport and Bruce (1908)

(C) Keeble and Pellew (1910)

(D) Jones (1917) and Collins (1921)

26. A parent which is repeatedly used in back crossing programme is known as :

(A) Recipient parent

(B) Non-recurrent parent

(C) Donor parent

(D) All of the above

27. Conservation of germplasm away from its natural habitat is known as :

(A) *In-situ* conservation

(B) *Ex-situ* conservation

(C) Both (A) and (B)

(D) None of the above

28. An individual with basic chromosome number (*x*) is known as :

(A) Monoploid

(B) Haploid

(C) Aneuploid

(D) Euploid

29. A generative nucleus in the male gametophyte divide ..... to form two male gametes.

(A) Mitotically

(B) Meiotically

(C) Amitosis

(D) None of the above

30. Seeds which show very drastic loss in viability with decrease in moisture content below 12-30% are known as :

(A) Orthodox

(B) Recalcitrant

(C) Both (A) and (B)

(D) None of the above

31. Self-pollination is promoted by :

(A) Bisexuality

(B) Bisexuality and Homogamy

(C) Bisexuality, Homogamy and Cleistogamy

(D) Bisexuality, Homogamy, Cleistogamy and Chasmogamy

32. The superiority of F_1 over its better parents is known as :

(A) Inbreeding depression

(B) Heterosis

(C) Heterobeltiosis

(D) None of the above

33. Choose the correct example of artificial allohexapolyploid :

(A) Raphanobrassica

(B) Triticale

(C) Both (A) and (B)

(D) None of the above

34. Which cross among the following is expected to produce 50% heterozygotes and 50% homozygotes ?

(A) AA × Aa

(B) AA × aa

(C) Aa × Aa

(D) aa × aa

35. Mixture of several isogenic lines having different genes for disease resistance are referred to as :

(A) Pure line variety

(B) Multiline variety

(C) High yielding variety

(D) All of the above

36. The phenomenon of a single major gene affecting more than one character is known as :

(A) Penetrance

(B) Variability

(C) Dominance

(D) Pleiotropy

37. Who proposed the gene-for-gene hypothesis ?

(A) Flor (1956)

(B) Van der Planck (1968)

(C) Brain and Garrett (1972)

(D) Robinson (1971)

38. Who coined the term "Heterosis" and known as father of hybrid corn ?

(A) G. H. Shull (1914)

(B) E. M. East (1908)

(C) Devenport (1908)

(D) D. F. Jones (1917)

39. Occurrence of style and stamens of different lengths in flowers from different plants on a single species is called as :

(A) Herkogamy

(B) Dichogamy

(C) Heterostyly

(D) All of the above

40. Triple fusion involves :

(A) Fusion of one of the male gametes with female gamete

(B) Fusion of remaining male gamete with secondary nucleus

(C) Fusion of two polar nuclei

(D) None of the above

41. At the time of gamete formation, the two alleles present in the F_1 separate and pass into different gametes, this is known as :

(A) Synapsis

(B) Segregation

(C) Mutation

(D) None of the above

42. The sum total of deleterious alleles present in a Mendelian population are referred to as :

(A) Genetic Erosion

(B) Genetic Advance

(C) Genetic Load

(D) Gene Pool

43. Deviation in performance of a cross combination from that predicted on the basis of general combining abilities of the parents involved in the cross is known as :

(A) Specific combining ability

(B) Standard deviation

(C) Random drift

(D) All of the above

44. In a random mating population, the stage in which gene and genotypic frequencies do not change from one generation to another, it is known as :

(A) Genetic equilibrium

(B) Genetic disequilibrium

(C) Hardy-Weinberg's law

(D) None of the above

45. Who first reported role of sex in plants ?

(A) Camerarius (1694)

(B) Thomas Fairchild (1717)

(C) Koelreuter (1763)

(D) De Vilmorin (1856)

46. The chief objective of hybridization is to :

(A) Enhance homozygosity

(B) Create genetic variability

(C) Develop pure line

(D) Develop inbred line

47. A cross involving more than two parents is called as :

(A) Monohybrid cross

(B) Distant cross

(C) Dihybrid cross

(D) Complex cross

48. Most of the asexually propagated crops have characteristics :

(A) Majority of these are perennial.

(B) These are highly heterozygous.

(C) These are largely cross-pollinated.

(D) All of the above

49. The proportion of completely homozygous plants after '*m*' generations of continuous self-fertilization is equal to :

(A) $[(2^m - 1) / (2^{m+1})]$

(B) $[1 / (2^m)]$

(C) $[(1 / 2)^m] \times 100$

(D) $[1 - (1 / 2)^m] \times 100$

50. Character whose development depends upon a specific environment are known as :

(A) Threshold characters

(B) Oligogenic characters

(C) Polygenic characters

(D) All of the above

51. The fusion of one of the two male gametes with egg cell is called as :

(A) Fertilization

(B) Triple fusion

(C) Double fertilization

(D) Apomixis

52. Breeding for disease resistant variety requires :

(A) Source of resistance

(B) Planned hybridization

(C) Disease test

(D) All of the above

53. Crossing between different species of the same genus is referred to as :

(A) Intervarietal hybridization

(B) Intergeneric hybridization

(C) Interspecific hybridization

(D) All of the above

54. Male sterility in flowering plants was first reported by :

(A) T. A. Knight (1840)

(B) Vilmorin (1850)

(C) Le Couteur (1843)

(D) Koelreuter (1763)

55. The individuals with two sets of chromosomes (2*x*) in its somatic cells are referred to as :

(A) Monoploid

(B) Haploid

(C) Diploid

(D) Polyploid

56. The most appropriate application(s) of Pedigree method is/are :

(A) Defect correction

(B) Recovery of transgressive segregants

(C) Both (A) and (B)

(D) None of the above

57. Megagametophyte consists of :

(A) Egg cell

(B) Antipodals

(C) Synergids

(D) All of the above

58. Double monosomics is denoted as :

(A) $2n + 1 + 1$

(B) $2n + 2$

(C) $2n - 1 - 1$

(D) $2n - 2$

59. Quantity of hybrid seed produced per unit area is higher by using :

(A) Self-incompatibility

(B) Cytoplasmic Genetic Male Sterility

(C) Genetic Male Sterility

(D) Cytoplasmic Male Sterility

60. The predicted performance of the double-cross [(A × B) × (C × D)] will be :

(A) [(A × B) + (C × D) + (A × C) + (B × D)]

(B) [(A × B) + (B × D) + (A × C) + (C × D)]

(C) [(A × B) + (B × C) + (B × C) + (C × D)]

(D) [(A × C) + (A × D) + (B × C) + (B × D)]

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ● (C) (D)
Q. 2 (A) (B) ● (D)
Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.

6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.

7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.

8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.

9. There will be no negative marking.

10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.

11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.

12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is ny discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर— A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सबसे सही अथवा सबसे उपयुक्त उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)
प्रश्न 2 (A) (B) ● (D)
प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।

6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।

7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।

8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।

9. निगेटिव मार्किंग नहीं है।

10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।

11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।

12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।