Roll No. .....

Question Booklet Number

O. M. R. Serial No.

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

(Third Semester) EXAMINATION, 2021-22

BREEDING CEREALS, MILLETS AND SUGARCANE

Paper Code				
GP	5	0	1	1

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. What is the source of D-genome in hexaploid wheat ?

(A) *Triticum turgidum*

(B) *Triticum tauschii*

(C) *Triticum dicoccum*

(D) *Triticum urartu*

2. Which among the following species of sugarcane is/are cultivated ?

(A) *Saccharum officinarum* Jesweit

(B) *S. sinense* Roax

(C) *S. barberi*

(D) All of the above

3. In which crop, approximate 25,000 pollengrains are produced by single arrow/tassel ?

(A) Sugarcane

(B) Sorghum

(C) Maize

(D) Pearl millet

4. First semi-dwarf variety of rice "Taichung Native 1" was developed by hybridization between :

(A) DGWG × Tsai-Yuan-Chung

(B) Peta × DGWG

(C) IR8 × Peta

(D) None of the above

5. Which of the following crops is genetically modified for improved nutritional value of food ?

(A) Maize

(B) Wheat

(C) Rice

(D) Sorghum

6. The most probable wild progenitor of *Saccharum officinarum* is :

(A) *S. robustum*

(B) *S. sinense*

(C) *S. barberi*

(D) *S. spontaneum*

7. The uppermost leaf before the panicle in cereal crops is known as :

(A) Leaf sheath

(B) Leaf blade

(C) Flag leaf

(D) Auricle

8. What is the source of high lysine content in maize ?

(A) Opaque-2

(B) Opaque-20

(C) Proteina

(D) Teosinte

9. Dwarfing genes in Norin 10 are :

(A) Rht-3 and Rht-4

(B) Rht-l and Rht-B1

(C) Rht-2 and Rht-B2

(D) Rht-B1 and Rht-D1

10. Occurrence of cross-pollination in maize is mainly due to :

(A) Protogyny

(B) Protandry

(C) Herkogamy

(D) Homogamy

11. A mutant gene which responsible for high sugar content in maize :

(A) Opaque-1

(B) Opaque-2

(C) Shrunken-I

(D) Shrunken-2

12. Which place is considered as the place of origin of sorghum ?

(A) Western Asia

(B) India

(C) Ethiopia

(D) Northern America

13. What is the ploidy level of durum wheat ?

(A) Monoploid

(B) Diploid

(C) Tetraploid

(D) Hexaploid

14. The botanical name of club wheat is :

(A) *T. dicoccum*

(B) *T. turgidum*

(C) *T. compactum*

(D) *T. durum*

15. On 29th December, 2018, International Rice Research Institute South Asia Regional Centre (ISARC) was established at :

(A) Pusa, New Delhi

(B) Pantnagar, Uttarakhand

(C) Varanasi, U.P.

(D) Hyderabad, Telangana

16. Which of the following is mismatched ?

(A) DGWG—Spontaneous dwarf mutant of rice

(B) Tsai-Yan-Chung—Taiwanese tall variety

(C) IR 8—Cross between Peta and DGWG

(D) Taichung Native 1—Chinese Tall variety

17. Which species is used as bridging species for transfer of rust resistance gene from *Aegilops umbellulata* to common wheat (*T. aestivum*) by Sears in 1956 ?

(A) *T. monococcum*

(B) *T. dicoccoides*

(C) *T. durum*

(D) *T. tauschaii*

18. Which eco-geographic race of Asian cultivated rice is extensively grown in India, Sri Lanka, Thailand, Malaysia and adjacent countries ?

(A) Indica

(B) Japonica

(C) Javanica

(D) All of the above

19. Some wheat flours take plenty of water to make dough of correct consistency for making good quality bread. Such flours are termed as :

(A) Strong

(B) Medium

(C) Weak

(D) None of the above

20. What is marcotting in sugarcane ?

(A) A technique of isolating canes for subsequent crossing purposes through artificial rooting of standing cane.

(B) Clones are grown in small containers that can be readily manipulated for crossing.

(C) The suiphurous acid technique for preservation of flowering stalks.

(D) None of the above

21. Who developed a "Norin 10–Brevor 14" line which became main source of the two dwarfing genes in wheat ?

(A) N. E. Borlaug

(B) O. Vogel

(C) E. R. Sears

(D) M. S. Swaminathan

22. *Striga hermonthica* is a serious obligate root parasite of :

(A) Cotton

(B) Wheat

(C) Sorghum

(D) Pigeonpea

23. The protein found in the endosperm of maize kernel is referred to as :

(A) Opaque

(B) Zein

(C) Protein

(D) None of the above

24. The water insoluble fraction of flour protein in wheat is referred to as :

(A) Lysine

(B) Gluten

(C) Both (A) and (B)

(D) None of the above

25. What are the various parameters for evaluation of cooking quality of rice ?

(A) Kernel elongation, volume expansion and water absorption

(B) Aroma and amylose content

(C) Gel consistency and gelatinization temperature

(D) All of the above

26. Which of the following statements is correct about bicolor race of sorghum ?

(A) Grain elongate, giumes clasping the grain, which may be completely covered or 1/4 exposed.

(B) Grains flattened dorso-ventrally.

(C) Grains asymmetrical, glumes 1/2 the length of the grain.

(D) Grains symmetrical (spherical), glumes clasping in varying length.

27. Which of the following is the cultivated species of African rice ?

(A) *Oryza granulate*

(B) *Oryza rufipogan*

(C) *Oryza glaberrima*

(D) *Oryza breviligulata*

28. The semi-dwarf varieties of rice are characterized by :

(A) Non-lodging habit

(B) Responsive to higher doses of fertilizers

(C) Photo-insensitivity coupled with earliness

(D) All of the above

29. Which of the following is incorrect statement about male sterile line Tift 23 A of pearl millet ?

(A) It was first discovered at Tifton, Georgia U.S.A. in 1955.

(B) It was introduced in India in 1962.

(C) Using Tift 23 A, five pear millet hybrids were released during 1966-72.

(D) It is tall, having long ears and highly resistant to downey mildew.

30. Which of the following statements is correct ?

(A) Supplementing pollination by rope pulling during flowering to promote cross-pollination for hybrid seed production in rice.

(B) Planting across the wind direction to increase pollen dispersal on A line.

(C) Both (A) and (B)

(D) None of the above

31. What is the function of silk in maize crop ?

(A) It functions as stigma.

(B) To produce numerous pollen-grains.

(C) Functions as both stigma and style.

(D) None of the above

32. The pioneering work on single cross hybrids in maize was done by :

(A) G. H. Shull

(B) D. F. Jones

(C) E. M. East

(D) M. T. Jenkins

33. As of today, about 90% of dwarf varieties of rice under cultivation in tropical Asia are based on dwarfing gene from :

(A) Taichung Native 1

(B) IR 8

(C) DGWG

(D) Tsai-Yuan-Chung

34. Which one is correct statement ?

(A) The growing season of sugarcane varies from 10–12 months.

(B) The average cane yield ranges from 60–120 tonnes/ha./year.

(C) Average sugar recovery may range between 8–14%.

(D) All of the above

35. What is the proportion of protein in endosperm and embryo of maize kernels ?

(A) 100% and 0%

(B) 80% and 20%

(C) 60% and 40%

(D) 50% and 50%

36. By which method, CSUAT, Kanpur developed a stem rust resistant variety "Bithoor" of wheat ?

(A) Pedigree method

(B) Back cross method

(C) Multiline approach

(D) Mutation breeding

37. Which is not true in relation to Bajra ?

(A) Originated in Africa

(B) Somatic chromosomes number is 20

(C) Belongs to family Poaceae

(D) Botanical name is *Pennisetum typhoides*

38. Pusa RH 10 is a world's first hybrid variety of :

(A) Golden rice

(B) Basmati rice

(C) Quality protein maize

(D) Rape seed

39. Which one of the following is chief component for determination of cooking quality of rice ?

(A) Water absorption

(B) Aroma

(C) Kernel dimension

(D) Amylose content

40. In maize, the hair like structures emerging from the top of husks are referred to as :

(A) Thread

(B) Silk

(C) Husks

(D) All of the above

41. What is the cause of fragrance in rice?

(A) An alkaloid pandamarilactone.

(B) An amylose and amylopectin

(C) An amino acid tryptophan

(D) An oleic acid present in rice bran oil

42. Sugarcane is a :

(A) Perennial tropical grass

(B) Grown for the sugar stored in its stem

(C) Propagated through stem cuttings

(D) All of the above

43. What is/are the initial male sterile line/lines used in hybrid sorghum programme ?

(A) MS Combine Kafir

(B) Kafir 60

(C) Both (A) and (B)

(D) None of the above

44. Which crop is considered the *Drosophila* of crop plants because of extensive genetical, cytogenetical and breeding investigations ?

(A) Rice

(B) Wheat

(C) Sorghum

(D) Maize

45. An eminent India's Agriculture scientist who served on the post of Director General of IRRI, Philippines is :

(A) M. S. Swaminathan

(B) G. S. Khush

(C) N. M. Nayar

(D) E. A. Siddiqi

46. An octaploid cultivated sugarcane species *Saccharum officinarum* is supposed to be originated in :

(A) China

(B) North India

(C) New Guinea

(D) Argentina

47. In pearl millet, production of foundation seed needs an isolation distance of :

(A) 2000 metres

(B) 1000 metres

(C) 500 metres

(D) 200 metres

48. In sorghum, induced mutant Ethiopian lines with high lysine and protein content are :

(A) IS 11167 and IS 11758

(B) EC 92792 and EC 92794

(C) CSV 4 and CSV 5

(D) All of the above

49. Who is the father of hybrid rice ?

(A) M. S. Swaminathan

(B) G. S. Khush

(C) Donald J. Lee

(D) Longping Yuan

50. The unhusked rice grain is known as :

(A) Pure Rice

(B) Rough Rice

(C) Fine Rice

(D) All of the above

51. The famous thin-stalked *Saccharum* species mostly used for jaggery making and originated in North India is :

(A) *S. barberi*

(B) *S. spontaneum*

(C) *S. robustum*

(D) *S. officinarum*

52. Why is golden rice pale yellow in colour ?

(A) Rich in anthocyanins

(B) Rich in chlorophylls

(C) Rich in beta carotene

(D) None of the above

53. The desirable character(s) of forage Bajra is/are :

(A) High sugar content in the stem juice and digestibility.

(B) Increased leaf number with more breadth.

(C) A short day plant with photo-sensitiveness.

(D) All of the above

54. In India, mobilization of local *S. spontaneum* was begun at SBI, Coimbatore in 1912 by :

(A) Barber and Venkata Raman

(B) Duff and Hussainy

(C) Naidu and Nair

(D) Kapoor and Srivastava

55. The female influorescence in maize is :

(A) A modified lateral branch

(B) Originating from auxillary bud on the main stem

(C) Both (A) and (B)

(D) None of the above

56. The varieties of rice with low amylose content are :

(A) Sticky, moist and tender when cooked

(B) Cooked dry, fluffy and become hard upon cooling

(C) Cooked fluffy and soft

(D) None of the above

57. Temperature/photoperiod sensitive genetic male sterility system is also being used for the production of hybrids in :

(A) Wheat

(B) Rice

(C) Sorghum

(D) Groundnut

58. Which of the following crop(s) has/have C_4 photosynthetic pathway ?

(A) Maize

(B) Sorghum

(C) Sugarcane

(D) All of the above

59. United States based multinational company "Rice Tech International" released an aromatic strain of rice by which name ?

(A) Bansmathi

(B) Texamathi

(C) Golden Rice

(D) Super Rice

60. Which statement is incorrect about maize hybrids ?

(A) Instead of using CGMS lines, detasseling the female inbred line is followed in India.

(B) Use of CGMS line is costlier as compared to detasseling.

(C) Crossing the inbreds of indigenous × exotic origin resulted in release of best hybrids.

(D) Use of CGMS line is cheaper as compared to detasseling.

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।