Roll No. .....

Question Booklet Number

O. M. R. Serial No.

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

(Third Semester) EXAMINATION, 2021-22

BIOTECHNOLOGY FOR CROP IMPROVEMENT

Paper Code				
GP	5	0	0	9

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. Restriction endonuclease enzymes were discovered by :

(A) W. Arber

(B) O. Smith

(C) Nathans

(D) All of the above

2. Which type of restriction enzymes are generally used in gene cloning and restriction mapping ?

(A) Type-II

(B) Type-I

(C) Type-III

(D) None of the above

3. Restriction endonuclease is also known as :

(A) Restriction enzyme

(B) Molecular knives

(C) Molecular scissors

(D) All of the above

4. Which of the following chemicals is used for the weakening of the cell wall of bacteria ?

(A) Isopropanol

(B) Lysozyme

(C) Restriction enzyme

(D) Ribonuclease

5. Which enzyme degrades RNA in a solution ?

(A) Proteinase K

(B) Deoxyribonuclease

(C) Ribonuclease

(D) SDS

6. Ultraviolet absorbance can be used to check :

(A) Purity of DNA in a sample

(B) Quantity of DNA in a sample

(C) Both (A) and (B)

(D) None of the above

7. Enzymes used for joining two DNA molecules are :

(A) Nucleases

(B) Polymerases

(C) Topoisomerases

(D) Ligases

8. The process of joining together of the vector molecule and desired DNA molecule is called as :

(A) Ligation

(B) Methylation

(C) Splicing

(D) None of the above

9. Which one of the following increase the uptake of DNA molecule by *E. coli* cells ?

(A) NH_4Cl

(B) $CaCl_2$

(C) NH_4OH

(D) NaOH

10. Which one of the following is known as nature's smallest genetic engineer ?

(A) Yeast

(B) *Agrobacterium tumefaciens*

(C) *E. coli*

(D) Viruses

11. Crown gall disease in many species of dicotyledonous plants is caused by :

(A) *Agrobacterium rhizogens*

(B) *Neurospora crassa*

(C) *Agrobacterium tumefaciens*

(D) *Saccharomyces cerevisiae*

12. Ti plasmid is found in :

(A) *Agrobacterium tumefaciens*

(B) *Escherichia coli*

(C) *Bacillus globigii*

(D) *Proteus vulgaris*

13. Which of the following is an example of DNA virus ?

(A) TMV

(B) Caulimovirus

(C) Leaf curl virus

(D) Pepper mild mottle virus

14. In cDNA ‘c’ stands for :

(A) Circular DNA

(B) Complete DNA

(C) Complementary DNA

(D) Complex DNA

15. To locate exact position of a cloned gene within a recombinant DNA molecule is achieved by :

(A) Western blotting

(B) Northern blotting

(C) Southern blotting

(D) None of the above

16. The chain termination method of DNA sequencing was given by :

(A) F. Sanger and A. R. Coulson

(B) A. Maxam and W. Gilbert

(C) Messelson and Stahl

(D) Watson and Crick

17. Usually the denaturation temperature is :

(A) 90°C

(B) 100°C

(C) 94°C

(D) 110°C

18. In Bt cotton, Bt is related to :

(A) Fungi

(B) Bacteria

(C) Virus

(D) Nematodes

19. By using antisense RNA technology in tomato, slows down the process of :

(A) Flowering in plant

(B) Photosynthesis

(C) Fruit ripening

(D) Respiration

20. Plant Biotechnology involves :

(A) Production of valuable products in plants

(B) Rapid clonal multiplication

(C) Production of virus free plants

(D) All of the above

21. The most common solidifying agent used in micropropagation is :

(A) Dextran

(B) Agar

(C) Mannon

(D) Sorbitol

22. Culturing cells in agited liquid medium is called :

(A) Liquid culture

(B) Agar culture

(C) Suspension culture

(D) None of the above

23. Generally virus free plants can be obtained through :

(A) Embryo culture

(B) Ovule culture

(C) Anther culture

(D) Meristem culture

24. Variation found in *in vitro* cultured tissue is called as :

(A) Gametoclonal variation

(B) Somaclonal variation

(C) Environmental variation

(D) None of the above

25. Haploid plants are produced by :

(A) Meristem culture

(B) Nucellus culture

(C) Embryo culture

(D) Anther culture

26. A plant cell without cell wall is known as :

(A) Protoplast

(B) Protoplasm

(C) Tonoplast

(D) Cytoplast

27. Genome of an organism refers to its total :

(A) Number of genes

(B) Haploid DNA

(C) Number of proteins

(D) Number of chromosomes

28. High cytokinin and low auxin are used in combination for the culture of :

(A) Shoot

(B) Root

(C) Nodule

(D) Organ

29. Which of the following is most effective cytokinin used in shoot tip or meristem culture ?

(A) NAA

(B) Zeatin

(C) 2, 4-D

(D) BAP

30. Small excised portion used for the production of mass of cells is known as :

(A) Callus

(B) Explant

(C) Fragments

(D) None of the above

31. Who coined the term plasmid ?

(A) Herbert Boyer

(B) Lederberg

(C) Stanley

(D) Bentham

32. The production of adventitious roots and shoots from cells of tissue culture is termed as :

(A) Suspension culture

(B) Micropropagation

(C) Callus culture

(D) Organogenesis

33. Protoplast without nucleus is known as :

(A) Cytoplast

(B) Sub-protoplast

(C) Protoplasm

(D) None of the above

34. Post-fertilization barriers can be overcome by :

(A) Endosperm culture

(B) Ovary culture

(C) Ovule culture

(D) All of the above

35. Explant is sterilized by :

(A) Dry heat

(B) Flame sterilization

(C) Autoclaving

(D) Mercuric chloride

36. A short price of radioactive labelled single stranded DNA is called as :

(A) Probe

(B) Clone

(C) Vector

(D) *r*DNA

37. Introduction of *r*DNA into host cell is called as :

(A) Transcription

(B) Transformation

(C) Recombination

(D) Transcription

38. DNA fragments of different sizes is separated by :

(A) Spectrophotometry

(B) Gel electrophoresis

(C) Nanodrop method

(D) Gene cloning

39. Process of removal of tumour inducing gene from T-DNA of Ti-plasmid is called as :

(A) Disarming

(B) Splicing

(C) Gene silencing

(D) None of the above

40. Which of the following attracts *Agrobacterium tumefaciens* for injection in dictoyledonous plants ?

(A) Methyl-digitokin

(B) Anthyocyanin

(C) Acetosyringone

(D) Flavonoids

41. Which of the following is an indirect method of gene transfer ?

(A) Electroporation method

(B) Micro-injection method

(C) Particle gun method

(D) Agrobacterium mediated gene transfer

42. Molecular markers are based on :

(A) DNA

(B) RNA

(C) Proteins

(D) Amino acids

43. The first molecular marker developed :

(A) AFLP

(B) RFLP

(C) RAPD

(D) SNP

44. Molecular markers are used for :

(A) Linkage mapping

(B) Marker assisted selection

(C) QTL linkage mapping

(D) All of the above

45. Marker aided selection is also known as :

(A) Marker assisted selection

(B) Mass selection

(C) Pure line selection

(D) None of the above

46. Golden rice is rich in :

(A) Vitamin D

(B) Vitamin A

(C) Vitamin B

(D) Vitamin C

47. Flaur saur is the transgenic variety of :

(A) Potato

(B) Tobacco

(C) Tomato

(D) Brinjal

48. Male sterility in rape seed is transferred from :

(A) *Haemophilus influenzae*

(B) *Agrobacterium rhizogens*

(C) *Bacillus thuringiensis*

(D) *Bacillus amyloliquefaciens*

49. The crops engineered for glyphosate are resistant to :

(A) Herbicides

(B) Bactericides

(C) Fungicides

(D) Insecticides

50. GMOs stands for :

(A) Generally Modified Organisms

(B) Genetically Modified Organisms

(C) Both (A) and (B)

(D) None of the above

51. Simultaneous introduction of multiple genes into a genotype is called as :

(A) Multiple gene introduction

(B) Gene pyramiding

(C) Gene upgradation

(D) All of the above

52. Suitable temperature for incubation is :

(A) $28°C \pm 2$

(B) $45°C \pm 2$

(C) $25°C \pm 2$

(D) $60°C \pm 2$

53. Tetracyclin is a :

(A) Selectable marker

(B) Scorable marker

(C) Both (A) and (B)

(D) None of the above

54. Enzyme used in PCR :

(A) Ligase

(B) Nuclease

(C) Ribonuclease

(D) Taq polymerase

55. Callus is :

(A) Unorganized mass of cells

(B) Organized mass of cells

(C) Organized mass of tissue

(D) All of the above

56. The process of determining the order of nucleotides in DNA, is called as :

(A) Genotyping

(B) DNA sequencing

(C) Phenotyping

(D) Gene pyramiding

57. What is true about genomics ?

(A) Gemomics is the study of genomes or the complete set of genetic material of an organism.

(B) Genomics introduced by Tom Roderick.

(C) Genomics is the study of heredity.

(D) Both (A) and (B)

58. Opines are :

(A) Amino acids

(B) Lipids

(C) Proteins

(D) Nucleic acid

59. PCR was invented by :

(A) Kornberg

(B) Larkin

(C) Kary Mullis

(D) Nitch

60. The pH of nutrient medium suitable for cell growth is :

(A) 5.5-5.8

(B) 3.5-4.5

(C) 7.5-8.5

(D) 8.5-9.5

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।