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(To be filled in the OMR Sheet)

प्रश्नपुस्तिका क्रमांक
Question Booklet No.

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

प्रश्नपुस्तिका सीरीज
Question Booklet Series
A

M.Sc (Biotechnology) Third Semester, Examination, February/March-2022
MBT-3003
Plant Biotechnology and Tissue Culture

Time : 1:30 Hours **Maximum Marks-100**

जब तक कहा न जाय, इस प्रश्नपुस्तिका को न खोलें

निर्देश : –

1. परीक्षार्थी अपने अनुक्रमांक, विषय एवं प्रश्नपुस्तिका की सीरीज का विवरण यथास्थान सही– सही भरें, अन्यथा मूल्यांकन में किसी भी प्रकार की विसंगति की दशा में उसकी जिम्मेदारी स्वयं परीक्षार्थी की होगी।
2. **इस प्रश्नपुस्तिका में 100 प्रश्न हैं, जिनमे से केवल 75 प्रश्नों के उत्तर परीक्षार्थियों द्वारा दिये जाने है। प्रत्येक प्रश्न के चार वैकल्पिक उत्तर प्रश्न के नीचे दिये गये हैं। इन चारों में से केवल एक ही उत्तर सही है। जिस उत्तर को आप सही या सबसे उचित समझते हैं, अपने उत्तर पत्रक (O.M.R. ANSWER SHEET)में उसके अक्षर वाले वृत्त को काले या नीले बाल प्वांइट पेन से पूरा भर दें। यदि किसी परीक्षार्थी द्वारा निर्धारित प्रश्नों से अधिक प्रश्नों के उत्तर दिये जाते हैं तो उसके द्वारा हल किये गये प्रथमतः यथा निर्दिष्ट प्रश्नोत्तरों का ही मूल्यांकन किया जायेगा।**
3. प्रत्येक प्रश्न के अंक समान हैं। आप के जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
4. सभी उत्तर केवल ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर ही दिये जाने हैं। उत्तर पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
5. ओ०एम०आर० उत्तर पत्रक **(O.M.R. ANSWER SHEET)** पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाय।
6. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी प्रश्नपुस्तिका बुकलेट एवं ओ०एम०आर० शीट पृथक–पृथक उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें।
7. निगेटिव मार्किंग नहीं है।

महत्वपूर्ण : – **प्रश्नपुस्तिका खोलने पर प्रथमतः जॉच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभॉति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्ष निरीक्षक को दिखाकर उसी सीरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।**

642

1. Production of haploids from anther culture was first reported by :

(A) Skoog and Miller

(B) G. Haberlandt

(C) E. C. Cocking

(D) Guha and Maheshwari

2. Select the incorrect statement :

(A) Callus is mass of cells

(B) Callus may be compact or friable

(C) Callus is formed by binary fission

(D) Callus can be used for establishing cell suspension culture

3. Totipotency refers to :

(A) Formation of somatic embryos

(B) Formation of complete organism from a cell

(C) Formation root from shoot

(D) Axillary bud breaking

4. Which of the following is not a fusogen?

(A) $NaNO_3$

(B) Polyethylene glycol

(C) $AgNO_3$

(D) $CaCl_2.2H_2O$

5. Which of the following is the main application of embryo culture?

(A) Clonal propagation

(B) Production of embryoids

(C) Induction of somaclonal variations

(D) Overcoming hybridisation barriers

6. Haploid plants can be obtained from :

(A) Anther culture

(B) Bud culture

(C) Leaf culture

(D) Root culture

7. In-plant tissue culture, the callus tissues are generated into a complete plantlet by altering the concentration of :

(A) Sugars

(B) Hormones

(C) Amino Acids

(D) Vitamins and minerals

8. Cybrids are produced by :

(A) The nucleus of one species but cytoplasm from both the parent species

(B) The fusion of two same nuclei from the same species

(C) The fusion of two different nuclei from different species

(D) None of the above

9. A clone is a group of organisms produced by :

(A) Asexual method and genetically similar

(B) Asexual method and genetically dissimilar

(C) Sexual method and genetically similar

(D) Sexual method and genetically dissimilar

10. Which of the following medium is composed of chemically defined compounds?

(A) Natural media

(B) Yeast abstract

(C) Synthetic media

(D) None of the above

11. Plant biotechnology involves :

(A) Production of valuable products in plants

(B) Rapid clonal multiplication of desired genotypes

(C) Production of virus free plants

(D) All of these

12. Synthetic seeds are produced by the encapsulation of somatic embryos with :

(A) Sodium acetate

(B) Sodium nitrate

(C) Sodium chloride

(D) Sodium alginate

13. DNA sequencing followed by genome annotation are steps of :

(A) Comparative genomics

(B) Structural genomics

(C) Functional genomics

(D) Transcriptomics

14. Which of the following is correct regarding genomics?

(A) It include mapping of genome

(B) It include genome sequencing

(C) It include genome analysis

(D) All of these

15. The plant whose genome was sequenced first :

(A) Arabidopsis thaliana

(B) Rice

(C) Wheat

(D) Tobacco

16. The most common carbon source of culture medium is :

(A) Glucose

(B) Fructose

(C) Sucrose

(D) Maltose

17. Direct DNA uptake by protoplasts can be stimulated by :

(A) Polyethylene glycol (PEG)

(B) Kinetin

(C) Cellulase

(D) Ligase

18. Which of the following is undefined supplement of culture medium?

(A) Agar

(B) Auxin

(C) Yeast extract

(D) Inositol

19. Which of the following is not a protoplast fusion method?

(A) Spontaneous fusion

(B) Elctroporation

(C) Elctrofusion

(D) Mechanical

20. Organogenesis is effected by :

(A) Explant Age

(B) Cytokinin concentration

(C) Genotype

(D) All of these

21. Triploid plants can be produced by culture of :

(A) Microspore

(B) Endosperm

(C) Female gametophyte

(D) None of these

22. Which of the following is not a type of cell suspension culture?

(A) Chemostat

(B) Batch culture

(C) Discrete culture

(D) Continuous culture

23. Which of the following is a scoreable marker?

(A) GFP

(B) Herbicide resistant gene

(C) Antibiotic resistant gene

(D) NPT II

24. Which of the following is not an application of tissue culture?

(A) Embryo rescue

(B) Cell division

(C) making somatic hybrid

(D) None of these

25. Cell culture is applicable in :

(A) Mutant selection

(B) Induction of polyploidy

(C) Production of metabolites

(D) All of these

26. Technique of single cell culture are :

(A) Micro chamber technique

(B) Filter paper raft nurse culture technique

(C) Both (A) & (B)

(D) None of these

27. Packed cell volume is :

(A) Method to measure growth of a cell suspension culture

(B) Used for metabolite production

(C) Used for protoplast fusion

(D) Both (A) & (B)

28. Evan's blue test :

(A) Is used in testing viability of protoplast

(B) Measuring growth of regenerating shoot

(C) Cannot differentiate living and dead cells

(D) Both (A) & (C)

29. Which of the following is bipolar structure?

(A) Protoplast

(B) Shoot bud

(C) Somatic embryos

(D) Callus

30. Growth regulator which is most commonly used for callus induction :

(A) 2,4- Dichlorophenoxy Acetic Acid

(B) Abscisic Acid

(C) Gebberellins

(D) Benzyl amino purine

31. Somatic embryogenesis was first reported in :

(A) 1958 in carrot

(B) 1958 in tobacco

(C) 1955 in carrot

(D) 1955 in tobacco

32. Which of the following does not play any role in the infection of plant cell by the Ti plasmid of A. tumefaciens ?

(A) T-DNA

(B) Virulence region

(C) Hostspecificityregion

(D) 25 base pair repeats

33. Disarming of Ti plasmid is :

(A) Removal of the Virulence region

(B) Removal of the 25 base pair repeats

(C) Removal of the T-DNA

(D) Removal of the Host specificity region

34. How the host specificity is achieved by the specificity gene of the Ti plasmid?

(A) Opine released by a wounded plant

(B) Acetosringone released by bacteria

(C) Acetosringone released by a wounded part of the plant

(D) Opine released by bacteria

35. Protoplast isolation is related with :

(A) Enzyme cellulase

(B) Osmoticum

(C) Plant material

(D) All of them

36. Somaclonal variation may occur due to :

(A) Pre-existing variations in source plant

(B) Culture conditions

(C) Both (A) & (B)

(D) None of the above

37. Biolistics (gene gun) is suitable for :

(A) Introducing rDNA into plant cells

(B) Introducing rDNA into animal cells

(C) Fusion of protoplast

(D) Both (A) & (B)

38. Which of the following is a growth regulator?

(A) 2,4-D

(B) Inositol

(C) Glycine

(D) Pyridoxine

39. Androgenesis is :

(A) Production of somatic embryos

(B) Production of haploids

(C) Production of multiple shoots

(D) Production of haploids

40. Factor which effect secondary metabolite production in culture :

(A) Methanol

(B) Immobilization of cells

(C) Reduction of phosphate level

(D) Both (B) & (C)

41. Protoplast fusion can be used to produce :

(A) Somatic hybrid

(B) Asymmetric hybrid

(C) Symmetric hybrid

(D) All of these

42. Introduction of DNA into cells via liposomes is known as :

(A) Protoplast fusion

(B) Lipofection

(C) Electroporation

(D) Electrophoresis

43. Northern blotting technique is used for the detection of :

(A) DNA

(B) RNA

(C) Proteins

(D) Amino acids

44. High Auxin/kinetin ratio in nutritional media for protoplast culture is preferred :

(A) To induce cell regeneration

(B) To induce cell growth

(C) To induce cell division

(D) All of these

45. Advantage of Micro-drop protoplast culture technique is :

(A) It requires large numbers of protoplasts

(B) It requires a Small number of protoplasts

(C) It requires a large amount of culture media

(D) It requires less amount of water

46. The advantage of somatic hybridization over sexual hybridization :

(A) It can be done in the same plant

(B) It can be done in the same plant species

(C) It can be done in different plant species

(D) All of these

47. Somatic embryogenesis is based on :

(A) Sexual reproduction

(B) Asexual reproduction

(C) Both

(D) None

48. The best plant material for induction of somatic embryogenesis is :

(A) Leaf tissue

(B) Zygotic embryo

(C) Node section

(D) Root tip

49. The various stages of development of Somatic embryos are :

(A) Globular, Heart, Torpido, cotyledonary

(B) Only Globular and cotyledonary

(C) Globular, Heart, Torpido

(D) Heart, Torpido, cotyledonary

50. The shape of the protoplast is :

(A) Hexagonal

(B) Spherical

(C) Round

(D) All of these

51. Autoclave is an instrument used for :

(A) Medium preparation

(B) Medium storage

(C) Medium sterilization

(D) All of these

52. First culture of single cell was reported in :

(A) 1902

(B) 1912

(C) 1906

(D) 1921

53. Microspore culture is used for :

(A) Haploid production

(B) Diploid production

(C) Triploid Production

(D) None of these

54. Somatic Embryo initiation is facilitated by :

(A) GA_3

(B) BAP

(C) ABA

(D) 2,4 D

55. Which of the following does not act as a fusogen in protoplast fusion?

(A) 2,4 D

(B) Polyethylene glycol

(C) Calcium chloride

(D) $NaNO_3$

56. Auxin in callus culture will promote which part of the plant tissue?

(A) Multilayer tissues

(B) Meristem

(C) Shoot

(D) Root

57. Which method is used to overcome cytoplasmic male sterility?

(A) Callus culture

(B) Artificial embryogengesis

(C) Somatic embryogenesis

(D) Cybrid

58. Which of the following is method of genome editing?

(A) Gene gun

(B) CRISPR- Cas9

(C) Zinc Finger Nuclease

(D) Both (B) & (C)

59. Name the strategy where two-plasmid system is used for the introduction of the gene in plant cells?

(A) Binary vector system

(B) Co-integration vector strategy

(C) Agrobacterium

(D) Selectable marker strategy

60. Which of the following is considered as a visual marker?

(A) Antibiotic marker

(B) Herbicide marker

(C) Scoreable marker

(D) Screenable marker

61. For developing herbicide resistance in transgenic plants which of the following approach is used?

(A) Target molecule is made insensitive to herbicide

(B) Target protein is overproduced

(C) A pathway should be introduced that detoxify the herbicide

(D) All of the above

62. Which of the following is not a characteristic of a transgenic crop?

(A) Herbicide resistance

(B) Bt insect resistance toxin

(C) Increased methionine content

(D) None of these

63. Phosphinothricin acetyl transferase is encoded by :

(A) Gene bxn in Klebsiellapneumonia

(B) Bar gene in Streptomyces spp

(C) Both (A) and (B)

(D) None of these

64. Expression of antisense RNA in transgenic plants is a general method used to :

(A) Activate the expression of all genes in a biochemical pathway

(B) Eliminate the expression of all genes in a biochemical pathway

(C) Block the expression of virus coat protein genes

(D) Reduce or eliminate the expression of individual genes

65. The "LONGT-TERM STORAGE" is the method used for :

(A) Transgenic plant multiplication

(B) Culture multiplication

(C) Germplasm conservation

(D) Embryo multiplication

66. The following are the Cryoprotectants except :

(A) Glycerol

(B) Mannitol

(C) DMSO

(D) Methanol

67. Cryogenic injuries are avoided by :

(A) Cryopreservation (freeze-drying)

(B) Cold storage

(C) Low pressure and low Oxygen Storage

(D) All of them

68. Conservation of germplasm under natural condition is called :

(A) Ex-situ conservation

(B) Gene bank

(C) In-situ conservation

(D) All of these

69. Virulence trait of *Agrobacterium tumefaciensis* is borne on :

(A) Chromosomal DNA

(B) Tumour inducing plasmid DNA

(C) Both chromosomal and plasmid DNA

(D) None of these

70. Which of the following are used as selection marker for the cells transformed with *Agrobacterium*?

(A) Neomycin phosphotransferase

(B) Streptomycin phosphotransferase

(C) Hygromycin phosphotransferase

(D) Any of the above

71. The approximate size of the DNA insert which can inserted through *Agrobacterium* mediated transformation is :

(A) < 50 kb

(B) < 100 kb

(C) < 70 kb

(D) < 80 kb

72. Advantage of micro projectile method over microinjection method for gene transfer in plants includes :

(A) Intact cells can be used

(B) Method is universal in its application irrespective of all shape, size, type and presence or absence of cell wall

(C) Gene can be transferred to many cells simultaneously

(D) All of the above

73. Application of haploids are :

(A) Shortening of breeding cycle

(B) In Mutagenesis

(C) Genetic transformation

(D) All of them

74. Culturing of cells in liquid agitated medium is called :

(A) Liquid culture

(B) Incubator Culture

(C) Cell suspension culture

(D) Semi solid culture

75. The method for producing virus free plant is :

(A) Transgenic plant

(B) Embryo culture

(C) Anther Culture

(D) Meristem Culture

76. Elicitors can :

(A) Induce cell division

(B) Induce hairy root formation

(C) Enhance secondary metabolite production

(D) Decrease secondary metabolite production

77. The term molecular farming refers to :

(A) Genetically modified food plants

(B) Drug synthesis from transgenic plants

(C) Recombinant drugs from bacteria

(D) Metabolite production from callus

78. Micro propagation involves :

(A) Vegetative multiplication of plants by using microorganism

(B) Vegetative multiplication of plants by using plant cells, tissues and organ

(C) Vegetative multiplication of plants by using microspores

(D) Asexual multiplication of plants by using microorganisms

79. The sum of total proteins produce by an organism :

(A) Metabolomics

(B) Proteome

(C) Genome

(D) All of these

80. A programme to identify complete gene structure in genomic study :

(A) GENSCAN

(B) BLAST

(C) SWISSPROT

(D) Phylip

81. Batch culture is a type of :

(A) Isolated cell culture

(B) Cell suspension culture

(C) Callus culture

(D) All of these

82. The most commonly used gelling agent of the culture medium is :

(A) Gelrite

(B) Agar

(C) Agarose

(D) Both (B) & (C)

83. Which of the following is a most extensively used Plant tissue culture medium?

(A) Murashige & Skoog's

(B) Gamborg et al

(C) Woody plant medium

(D) Nitsch's

84. Select the correct statement :

(A) Kinetin is a Fusogen

(B) Hybrid embryo can be protected by embryo rescue

(C) Vitrification promotes micro propagation

(D) Shoot multiplication is promoted by Auxin

85. Factors effecting somatic embryogenesis is :

(A) Glutamine

(B) Abscisic Acid

(C) Agar

(D) Both (A) & (B)

86. Select the incorrect statement :

(A) Micro propagation helps in clonal multiplication

(B) Protoplast fusion results in somatic hybrid formation

(C) Electroporation can be used to fuse protoplast

(D) Electrofusion is a method to fuse protoplast

87. Which of the following is used as a biocontrol agent against caterpillars of butterflies ?

(A) Trichoderma

(B) Streptococcus

(C) Bacillus Thuringiensis

(D) Saccharomyces cerevisiae

88. Bt toxin does not kill the Bacillus because Bt toxin protein exist as inactive :

(A) Lipid

(B) Protein

(C) Protoxin

(D) Carbohydrate

89. Bt-gene encodes which protein that kills insect?

(A) Crystal

(B) Solid

(C) Liquid

(D) none of these

90. The plant tissue culture medium is generally composed of :

(A) Inorganic salts, organic salts, Growth regulator, Carbon source

(B) Organic salts, Carbon source and growth regulators

(C) Carbon source, inorganic salts, Sucrose, growth regulator

(D) Inorganic salts, organic salts, Growth regulator

91. Insect resistance in the transgenic plant has been achieved by :

(A) Transferring genes for Bt toxins

(B) Transferring genes for protease inhibitors

(C) Transferring genes for other insecticidal secondary metabolities

(D) All of the above

92. Which of the following genes can be used for making resistances against viral infection?

(A) Genes for capsid protein

(B) Gene for nucleocapsid protein

(C) Satellite RNA

(D) All of these

93. Cross protection against viruses in transgenic plants can be obtained by :

(A) Inoculating the susceptible strain of a crop with a mild strain of a virus that helps in developing resistance against more virulent strain

(B) Inoculating the susceptible strain with the coat proteins of virulent strain

(C) Inoculating the susceptible strain with genes of nucleocapsid

(D) Any of the above

94. Transgenic plants :

(A) Contain foreign genes in their cells

(B) are used to produce human antibodies

(C) Both (A) & (B)

(D) are plants that differ in geographical locations

95. Transplastomics :

(A) Targets genes in the chloroplast

(B) Provides exceptionally low yields of protein products

(C) Produces genes that are released in pollen

(D) Offers little opportunity for practical use

96. Which of the following metabolites are implicated in stress tolerance?

(A) Proline

(B) Betaines

(C) Both (A) & (B)

(D) Citrate

97. Antisense technology :

(A) Selectively blocks expression of a gene

(B) Combines genetic material from different species

(C) Combines organelles and cells

(D) Alters or transfers cells

98. What are the various disadvantages of cross protection?

(A) Possibility of mutations in inducing mild virus strain

(B) Possibility of synergism between inducing virus and other unrelated virus

(C) Possibility of unnecessary spread of mild virus

(D) All of the above

99. Sense and antisense RNA are _____ to each other :

(A) Similar

(B) Same

(C) Complementary

(D) Different

100. Sense and antisense RNA forms _____.

(A) ds RNA

(B) ss RNA

(C) ds DNA

(D) ss DNA

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Rough Work / रफ कार्य

DO NOT OPEN THE QUESTION BOOKLET UNTIL ASKED TO DO SO

1. Examinee should enter his / her roll number, subject and Question Booklet Series correctly in the O.M.R. sheet, the examinee will be responsible for the error he / she has made.
2. **This Question Booklet contains 100 questions, out of which only 75 Question are to be Answered by the examinee. Every question has 4 options and only one of them is correct. The answer which seems correct to you, darken that option number in your Answer Booklet (O.M.R ANSWER SHEET) completely with black or blue ball point pen. If any examinee will mark more than one answer of a particular question, then the first most option will be considered valid.**
3. Every question has same marks. Every question you attempt correctly, marks will be given according to that.
4. Every answer should be marked only on Answer Booklet **(O.M.R ANSWER SHEET).**Answer marked anywhere else other than the determined place will not be considered valid.
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