

**Ph.D. ENTRANCE EXAMINATION, APRIL 2021****BIOTECHNOLOGY**

Time : Two Hours

Maximum : 100 Marks

**Section A (Multiple Choice Questions)***Each question carries 1 mark and % mark will be reduced for wrong answer.*

1. The viability staining technique used to stain dead cells is :
  - (a) Evan's blue.
  - (b) FXA.
  - (c) Gram staining.
  - (d) Malachite green.
2. The hormone mostly used in plant tissue culture for rooting :
  - (a) IBP.
  - (b) 2, 4-D.
  - (c) BAP.
  - (d) Gibberellin.
3. Triploid production favour the invitro culture of :
  - (a) Apical bud.
  - (b) Embryo.
  - (c) Anther.
  - (d) Endosperm.
4. Haploid chromosome number(n) of Rice :
  - (a) 7.
  - (b) 8.
  - (c) 16.
  - (d) 12.
5. In plant transformation was done in the plant species :
  - (a) *Datura innoxia*.
  - (b) *Arabidopsis thaliana*.
  - (c) Cabbage.
  - (d) *Rianus communis*.
6. HAT medium is used for the isolation :
  - (a) Tumor cell.
  - (b) Dead cell.
  - (c) Hybrid cell.
  - (d) Mouse cell.

**Turn over**

7. An example of animal tissue culture medium :
- (a) MS medium.
  - (b) DME medium.
  - (c) Nish medium.
  - (d) B5 medium.
8. An animal viral vector :
- (a) Gemini.
  - (b) CaMV.
  - (c) SV40.
  - (d) pUC.
9. Taq polymerase used in PCR is :
- (a) DNA polymerase I.
  - (b) DNA polymerase III
  - (c) DNA polymerase II.
  - (d) RNA polymerase.
10. Which type of colonies are produced by a recombinant clone on X-Gal IPTG medium ?
- (a) Green.
  - (b) Blue.
  - (c) White
  - (d) Red
11. The nucleoside sequence upstream of a gene for RNA polymerase binding :
- (a) Primer.
  - (b) Probe.
  - (c) Linker.
  - (d) Promoter.
12. TOL plasmid in *Pseudomonas putida* is :
- (a) Resistance plasmid.
  - (b) Virulent plasmid.
  - (c) Degradative plasmid.
  - (d) Col plasmid.
13. A plasmid capable of integrating into host cell chromosome :
- (a) Episome.
  - (b) Transposon.
  - (c) Integone.
  - (d) Mesosome.
14. Largest lymphoid organ is :
- (a) Lymph node.
  - (b) Thymus.
  - (c) Bone marrow.
  - (d) Spleen.

15. Shape of Rhabdo virus is :
- (a) Linear. (b) Bullet.  
(c) Supercoiled. (d) Hexagonal.
16. Which among produce antibodies ?
- (a) B-cells. (b) Lymphocytes.  
(c) Monocytes. (d) T-cells.
17. Which organism used as probiotic ?
- (a) Cyanobacteria. (b) Bifidobacteria.  
(c) Pseudomonas. (d) Spirochetes.
18. Kimchi is :
- (a) Fermented cabbage. (b) Fermented rice.  
(c) Fermented fish. (d) Fermented cauliflower.
19. Which element is present largest % in the biosphere ?
- (a) Carbon. (b) Nitrogen.  
(c) Oxygen. (d) Hydrogen.
20. The primary energy source of ecosystem ?
- (a) Reserve food material. (b) Photosynthesis.  
(c) Respiration. (d) Sun light.
21. Photosynthesis is found in :
- (a) Producers. (b) Consumers.  
(c) Decomposers. (d) None of these.
22. Which one is sedimentary type of nutrient cycle ?
- (a) Phosphorous cycle. (b) Nitrogen cycle.  
(c) Carbon cycle. (d) Oxygen cycle.

23. Highest potential energy is found in :

- (a) Consumers.
- (b) Producers.
- (c) Decomposers.
- (d) Detrivores.

24. A producer found in the marine ecosystem :

- (a) Shark.
- (b) Crab.
- (c) Star fish.
- (d) Gracilaria.

25. Rice is native of :

- (a) China.
- (b) Japan.
- (c) Korea.
- (d) India.

26. Zoo falls under which type of conservation :

- (a) In vitro.
- (b) In situ.
- (c) Ex situ.
- (d) In vivo.

27. The most widely found pollutant in the air is :

- (a) CO<sub>2</sub>.
- (b) SO<sub>2</sub>.
- (c) CSF.
- (d) CO.

28. Red is sea named after the abundant occurrence of :

- (a) Red algae.
- (b) Cyanobacteria.
- (c) Brown algae.
- (d) Oil spillage.

29. Fluorocarbon are released in the atmosphere by :

- (a) Automobile.
- (b) Industries.
- (c) Jet air planes.
- (d) Acid rain.

30. HIV infect which type of cells :

- (a) RBC.
- (b) B-cell.
- (c) T-Helper cell.
- (d) Neutrophil.

31. An additive used in cured meat product.

- (a) Acetic acid.
- (b) Sodium Nitrite.
- (c) Citric acid.
- (d) Sodium Chloride.

32. Which among is an artificial sweetener ?

- (a) Sucrose.
- (b) Beet sugar.
- (c) Saccharin.
- (d) Maltose.

33. Polytene Chromosomes are :

- (a) Anaphase Chromosome.
- (b) Metaphase Chromosome.
- (c) Interphase Chromosome.
- (d) Prophase Chromosome.

34. Synthesis of Okazaki fragment occur using :

- (a) DNA primer.
- (b) Probe.
- (c) RNA primer.
- (d) DNA Polymerase.

35. Which enzyme is known as Kornberg enzyme ?

- (a) DNA Polymerase II.
- (b) RNA Polymerase.
- (c) DNA Polymerase III.
- (d) DNA Polymerase I.

36. Which RNA is known as hnRNA ?

- (a) mRNA.
- (b) rRNA.
- (c) tRNA.
- (d) SiRNA.

37. Vector used for obtaining single strand copies of cloned DNA :

- (a) pUC 18.
- (b) pGEM3Z.
- (c) M13.
- (d) pBR 322.

38. The temperature used in PCR for denaturation of DNA :

- (a) 94° C.
- (b) 70° C.
- (c) 54° C.
- (d) 37° C.

39. The largest class of plant secondary metabolite :

- (a) Terpenoid.
- (b) Alkaloid.
- (c) Phenolic compounds.
- (d) Flavonoid.

40. SiRNA mediated by :

- (a) RNA primer.
- (b) DICER.
- (c) Helicase.
- (d) Ribonuclease H.

41. Phylogenetic relationship can be shown by :

- (a) Dendrogram
- (b) Gene Bank.
- (c) Data retrieving tool.
- (d) Data Search tool.

42. SARS-CoV-2 enter in to the cell by :

- (a) Cell membrane receptor.
- (b) Angiotensin converting enzyme 2 receptor.
- (c) Endocytosis.
- (d) Phagocytosis.

43. The culture technique used to obtain virus free plant :

- (a) Anther culture.
- (b) Callus culture.
- (c) Shootip culture.
- (d) Pollen culture.

44. Enzyme used for disaggregation of animal tissue.

- (a) Pectinase.
- (b) Amylase.
- (c) Collagenase.
- (d) Cellulase.

45. GP 120 protein present in :

- (a) HINI.
- (b) SARS Corona Virus 2.
- (c) Hepatitis virus.
- (d) HIV.

46. Tumour suppressor gene :

- (a) P<sup>53</sup>.
- (b) P<sup>52</sup>.
- (c) HERT.
- (d) BCR-ABL.

47. Which among is used as feeder layer ?

- (a) Amniotic mesenchymal cells.
- (b) 3T3 cell line.
- (c) Vero cells.
- (d) Caco2.

48. Which organism used as whole cell biosensor ?

- (a) Lactobacillus plantarum.
- (b) Lactobacillus arabinosus.
- (c) Lactobacillus lactis.
- (d) Pseudomonas aeruginosa

49. Which of the following is a method of disinfection ?

- (a) Chlorination.
- (b) Sedimentation.
- (c) Coagulation.
- (d) Fermentation.

50. Which among is a prebiotic ?

- (a) Sucrose.
- (b) Glucose.
- (c) Lactulose.
- (d) Maltose.

(50 × 1 = 50 marks)

### Section B

*Write briefly about any **ten** question.*

*Each question carries 5 marks.*

- 51. Antimicrobial resistance is a global threat. What are the possible measures to control this.
- 52. Explain strain improvement programs adopted for an industrial strain.
- 53. Describe different methods for microbial growth estimation.
- 54. What is mean by Gene knock out ? Discuss its application.

**Turn over**

55. What is apoptosis ? Explain any *two* techniques to detect apoptosis.
56. Explain different physical methods of sterilization.
57. Explain Mendel's important Law's and discuss the merits and demerits of mendilian genetics.
58. What are the checkpoints in cell cycle? and describe the control system to manage these checkpoints.
59. Describe the fluid mosaic model of plasma membrane
60. Role of Biotechnology research to boost start up program in India
61. Discuss the SARS-2 Corona vaccine development in India.
62. What is the principle of FT IR ? Explain its application in biomedical research.
63. Discuss ethics in research.
64. Explain different method of bioremediation.

(10 × 5 = 50 marks)