Q.P. Code :07294

[Time: 3 Hours] **[Marks:100]**

Please check whether you have got the right question paper.

N.B:
1. **All** questions are **compulsory**
2. Draw neat labeled diagrams wherever necessary
3. Use of simple calculator is permitted
4. **Use supplement only for the subjective portion, the objective is to be marked on the question paper and submitted.**

Seat No **40**

Section I

Kindly choose the most appropriate answer

1. MAtDB is a molecular database for
   a. Mouse
   b. Drosophila
   c. Arabidopsis thaliana
   d. E.coli

2. Which of the following is a multiple sequence alignment tool
   a. CLUSTAL W
   b. Chime
   c. Dismol
   d. PDB

3. A compound that has desirable properties to be a drug is called as
   1. Lead
   2. Find
   3. Fit
   4. Fit drug

4. Process of finding relative locations of genes on chromosomes is called as
   a) Genome Walking
   b) Genome mapping
   c) Genome tracing
   d) Charomosome mapping

5. When bacteria are cultivated in the presence of an antibiotic and a resistant clone arises:
   (a) The antibiotic caused the mutation conferring resistance to occur
   (b) The antibiotic selected for a cell carrying a mutation conferring antibiotic resistance
   (c) Antibiotic resistance gene is inserted
   (d) All bacteria are killed

[P.T.O]

6. Gene transfer in bacteria by transformation has the following characteristics:
   (a) A majority of the donor genes are transferred
   (b) It involves a plasmid
   (c) It depends on phage infection of the recipient cell
   (d) It can be carried out using free DNA extracted from the donor.

7. Which of the following mutations would be easiest to revert:
   (a) An insertion of 10 base pairs
   (b) A deletion of more than 10 base pairs
   (c) A base pair substitution
   (d) Insertion of a transposon

8. An enzyme that recognizes a specific (palindromic) sequence and cuts within a DNA molecule is called a(n):
   (a) Exonuclease
   (b) Methylase
   (c) Modification enzyme
   (d) Restriction endonuclease

9. The amount of a specific DNA sequence can be increased more than 10^6 fold by using which of the following reactions?
   (a) Restriction endonuclease reaction
   (b) Ligation reaction
   (c) Polymerase chain reaction
   (d) Reverse translation

10. Which is the correct order, from smallest to largest number of base pairs?
    (a) Plasmid, transposon, chromosomal DNA
    (b) Chromosomal DNA, transposon, plasmid
    (c) Transposon, plasmid, chromosomal DNA
    (d) Plasmid, chromosomal DNA, transposon

11. A culture medium which supports growth of only a certain group of organisms:
    (a) Selective medium
    (b) Differential medium
    (c) Enrichment culture
    (d) Selective and differential medium

12. A culture stared with 4 cells and ended with 128 cells. How many generations did the cells go through?
    (a) 64
    (b) 32
    (c) 6
    (d) 5

13. A large inversion of chloroplast DNA is found in the ____ family.
    a) Pea
    b) Rice
    c) Oats
    d) Sunflower

14. Which one of the following amino acids has a higher propensity for cis peptide bond formation?
    (a) Histidine
    (b) Cysteine
    (c) Glycine
    (d) Proline

15. The terminal electron acceptor during mitochondrial respiration is
    (a) O_2
    (b) FAD^+
    (c) NAD+
    (d) ATP

16. To which one of the following groups do the anitibiotics kanamycin, streptomycin and gentamicin belong
    (a) Cephalosporins
    (b) Macrolides
    (c) Aminoglycosides
    (d) Quinolones

17. Shine Dalgarno's sequence present in mRNA binds to
    (a) 3 end of rRNA
    (b) 5 end of rRNA
    (c) 5 end of tRNA
    (d) 3 end of tRNA

18. Which of the following is a protein sequence database
    a. DDBJ
    b. EMBL
    c. PIR
    d. Genbank

19. A comprehensive database for study of human genetics and molecular biology is
    a. PDB
    b. STAG
    c. OMIM
    d. PSD

20. Margaret Dayhoff developed the first protein called as
    a. PDB
    b. SWISS PROT
    c. Atlas of protein sequence and structure
    d. Protein sequence databank

21. Literature databases include
    a. MEDLINE and PubMED
    b. MEDLINE and PDB
    c. PubMED and PDB
    d. MEDLINE and PDS

22. State if the following statement is true or false
    A gene always encodes a protein product.
    (a) True
    (b) False

23. Complete the following statement
    During transcription:
    (a) Nucleotides are polymerized by DNA polymerase
    (b) Initiation occurs at a site recognized by the sigma factor
    (c) Only single gene-sized mRNA molecules are synthesized
    (d) Both DNA strands of a single gene are used as templates simultaneously

24. The most widely used chemical for protoplast fusion, as fusogens, is
    a) Mannitol
    b) Sorbitol
    c) Mannol
    d) Poly ethylene glycol (PEG)

25. Growth hormone producing apical dominance is
    a) Auxin
    b) Gibberellin
    c) Ethylene
    d) Cytokinin

26. One use of a regression line is
    a. To determine if any x-values are outliers.
    b. To determine if any y-values are outliers.
    c. To determine if a change in x causes a change in y.
    d. To estimate the change in y for a one-unit change in x.

27. Somaclonal variations are the ones
    a) Caused by mutagens
    b) Produce during tissue culture
    c) Caused by gamma rays
    d) Induced during sexual embryogeny

28. The method of plasmid isolation by alkaline lysis was published by
    a) Mandel and Higa
    b) Sharp and Lederberg
    c) Temin and Baltimore
    d) Birnboim and Doly

29. Alec Jeffery's name is associated with
    a) DNA sequencing
    b) DNA Fingerprinting
    c) RNA sequencing
    d) Site directed mutagenesis

30. The name Kary Mullis is associated with
    a) RELP
    b) PCR
    c) Chain Termination reaction
    d) RAPD

31. The group associated with first man made recombinant DNA molecules:
    a) Daniel Nathans, Arber, Kary Mullis
    b) Paul Berg, Annie Chang, Boyer, Stanley Cohen
    c) Howard Temin, Sydney Brenner, Philip Sharp
    d) Tim Hunt, Paul Nurse, Leyland Hartwell

Pick the choice that best completes the following sentence.

32. If a relationship between two variables is called statistically significant, it means the investigators think the variables are
    a. Related in the population represented by the sample.
    b. Not related in the population represented by the sample.
    c. Related in the sample due to chance alone.
    d. Very important

33. Plant secondary metabolites
    a) Help to increase growth rate of plant
    b) Help in plant reproduction processes
    c) Provide defence mechanisms against microbial attack
    d) Make the plant susceptible to unfavourable conditions

34. The process of extraction of metals from rocks is called as
    a. Bioleaching
    b. Biomagnification
    c. Biofilteration
    d. Bioextraction

35. Expression of which of the following reporter genes does not require addition of specific substrate for detection
    a) Luciferase
    b) β-Glucuronidase
    c) β- Glucosidase
    d) Green Fluorescent Protein(GFP)

36. Parthenogenetic embryos in plant are those are formed by
    a) Unfertilized eggs
    b) Fertilized eggs
    c) Male gametophyte
    d) Sporophytic cells

37. A list of 5 pulse rates is: 70,64,80,74,92. The median for this list is ….
    a. 74
    b. 76
    c. 77
    d. 80

38. For protoplast fusion to be successful in plant cells
    a) Fusion agents other than polyethylene glycol should be used
    b) Cell wall of the two strains of cells should be compatible
    c) DNA between the two cells should be compatible
    d) Osmolarity of the medium is not important

39. Which one of the following reactions is used for the purpose of recycling enzymes in bioprocesses?
    a) Isomerisation
    b) Immobilization
    c) Phosphorylation
    d) Polymerization

40. Ex situ Bioremediation involves
    a. Degradation of pollutants by microbes
    b. Removal and assimilation collection of pollutants at a place for microbial degradation
    c. Degradation of pollutants by GMO
    d. None of the above

Section II

Answer any THREE of the following: **30**

1. Explain the principle and applications confocal microscopes
2. What is Phytoremediation? Discuss the process and principle in detail with suitable examples
3. Comment on the types of methods of DNA sequencing and comment on their advantages
4. Enlist the types of microbial contaminants appearing in Animal tissue culture. Comment on the detection and eradication of Mycoplasma's
5. Comment on the application of nanotechnology in areas of biotechnology
6. Discuss the significance of IPR citing an example in an Indian context.

Section III **30**

Answer any TWO of the following:

a. Write in detail about metabolic disorders of nucleic acids with special reference to the diagnosis, and treatment.
b. What is the significance of hairy-roots culture? Discuss in details with appropriate examples the production of hairy roots.
c. Explain the type data present in PDB and Genbank. Explain how the data can be used for analysis.
d. What are the advantages and drawbacks of using Jatropha as a potential raw material for biofuel production? In comparison to microalgae which would be a better source for biofuel production?

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