EXERCISE - 4
SEX DETERMINATION, NEUROSPORA GENETICS, OPERON CONCEPT, GENETIC ENGINEERING, DNA FINGER PRINTING, PCR TECHNIQUE, HUMAN GENOME PROJECT

1. How the sex of offsprings determined in humans
(1) Sex chromosome of mother
(2) Size of ovum
(3) Size of sperm
(4) Sex chromosome of father

2. Test cross can not be performed in :-
(1) Neurospora (2) Man
(3) Pea (4) Dogs

3. Agrobacterium tumefaciens used in Genetic engineering for :-
(1) DNA-mapping
(2) DNA-modification
(3) Vector
(4) DNA finger printing

4. Biologically functional gene coding for tyrosine t-RNA of E.coil synthesized by Khorana in 1979 had:-
(1) 333 nucleotide pairs
(2) 312 nucleotide pairs
(3) 77 nucleotide pairs
(4) 207 nucleotide pairs

5. A genetically engineered bacteria used for clearing oil spills is :-
(1) Escherischia coli
(2) Bacillus subtilis
(3) Agrobacterium tumifaciens
(4) Pseudomonas putida

6. In plants sex determination due to :-
(1) X - chromosome (2) Y - chromosome
(3) A - chromosome (4) B - Chromosome

7. Who isolated the first restriction endonucleases :-
(1) Temin & Baltimore (2) Sanger
(3) Nathans & Smith (4) Paul berg

8. Which of the following possess homogametic male
(1) Plants (2) Man
(3) Insect (4) Birds

9. Hepatitis - B and Herpes virus vaccines are :-
(1) First generation vaccine
(2) Second generation vaccine
(3) Third generation vaccine
(4) None of the above

10. Which scientist discovered sex determination in Melandrium album :-
(1) H.E. Warmke (2) Pro.R.P.Roy
(3) C.B. Bridges (4) Wilson & Stevens

11. Genetic engineering is :-
(1) Study of extra nuclear gene
(2) Manipulation of genes by artificial method
(3) Manipulation of RNA
(4) Manipulation of enzymes

12. Polymerase chain reaction technology technique) is used for :-
(1) DNA identification (2) DNA repair
(3) DNA amplification (4) Cleave DNA

13. Which of the following enzymes cut the DNA molecule at specific nucleotide sequence :-
(1) Restriction endonuclease
(2) DNA - ligase
(3) RNA - polymerase
(4) Exonuclease

14. DNA finger printing was invented by :-
(1) Karl mullis (2) Alec Jeffery
(3) Dr. Paul Berg (4) Francis Collins

15. Which structure involved in genetic ngineering:-
(1) Plastid (2) Plasmid
(3) Codon (4) None

16. In Drosophilex index of super female is :-
(1) 1 (2) 0.5
(3) 1.5 (4) 0.67

17. Which of the following is the example of chemical scissors -
(1) ECo - RI (2) Hind - III
(3) Bam - I (4) All the above

18. Which scientist obtained interferon through recombinant DNA technology :_
(1) Kohler and milstein (2) Charles weismann
(3) Nathans & smith (4) An American firm

19. If X/A Ratio of two Drosophila is 0.6 and 0.33 respectively what would be their sex :-
(1) Female & male
(2) Super female & super male

(3) Inter sex & super male
(4) Inter sex and super female

20. Which of the following genotype represent intersex Drosophila :-
(1) 2A + XXX (2) 2A + XXY
(3) 3A + XXY (4) 2A + XY

21. Restriction endonucleases are used in genetic engineering bacause :-
(1) They can degrade harmful proteins
(2) They can join DNA fragments
(3) They can cut DNA at variable site
(4) They can cut DNA at specific base sequences

22. In free martin condition :-
(1) Female is sterile and male is normal
(2) Male sterile and female is normal
(3) Both male & female are sterile
(4) Both male & female normal

23. When the genotype of an organism is improved by the addition of foreign gene, the process is called
(1) Tissue culture (2) Genetic diversity
(3) Genetic engineering (4) Plastic surgery

24. Which chromosome set is found in male grass hopper
(1) 2A + XY (2) 2A + XO
(3) 2A + YY (4) 2A + XX

25. A genetically manipulated organism containing in its genome one or more inserted gene of another species is called :-
(1) Transposon (2) Gene expression
(3) Transgenic organism (4) Retroposons

26. Use of transgenic plants as biological factories for the production of special chemicals is called
(1) Molecular farming
(2) Molecular genetics
(3) Molecular mapping
(4) Dry farming

27. Which vector is commonly used in the transfer of gene in a crop plant -
(1) Plasmids of B. Subtilis
(2) Bacteriophages
(3) Ti-plasmids of Agrobacterium
(4) E. Coli Phages

28. The tumour indusing capacity of Agrobacterit tumaefaciens is located in large extrachromosorr plasmid and called –
(1) Ti - plasmid (2) Ri - plamid
(3) Lambda phage (4) Plasmid PBR322

29. Chimeric DNA is :-
(1) DNA which contains uracil
(2) DNA synthesized from RNA
(3) Recombinant DNA
(4) DNA which contains single strand

30. Genetic engineering aims at :-
(1) Destroying wild gene
(2) Preserving defective gene
(3) Curing human disease by introducing ne\gene(Haemophillia)
(4) All the above

31. Gene which is responsible for the synthesis of i polypeptide chain is called :-
(1) Promotor gene (2) Structural gene
(3) Regulator gene (4) Operator gene

32. Genie balance theory for sex determination ir Drosophila was proposed by :-
(1) Pro. R.P.Roy (2) H.E.Warmke
(3) C.B. Bridges (4) Me. clung

33. Which is true for tryptophan operon :-
(1) It is the example of inducible operon
(2) It is example of repressible operon
co-repressor .
(3) On ————————> off
(4) (2) and (3) both are correct

34. A piece of nucleic acid using to find out a gene, by forming hybrid with it, is called as :-
(1) c - DNA (2) DNA probe
(3) Sticky end (4) Blunt end

35. In Bonellia, all larvae are genetically and cytologically similar. In this worm male individuals live in the uterus of female. If a particular larva settle near proboscis of an adult female, it becomes a male individuals. If larva develops free in water it becomes :-
(1) Male individuals
(2) Female individuals
(3) Intersex
(4) Any of the above

36. Taq - polymerase which is used to amplification of DNA related with :-
(1) Hybridoma technique
(2) PCR-technique
(3) Gene cloning

(4) r-DNA technology

37. The end product of a metabolic pathway may bind a represser to make the latter active enough to bind to operator, in which case the end-product is called :-
(1) Inducer (2) aporepressor
(3) Co-repressor (4) Regulator

38. In Neurospora both recessive and dominant alleles express their effect because :-
(1) Each gene has many alleles
(2) Many genes has only one allele
(3) It has only one allele of a gene
(4) There are two alleles of a gene

39. In Neurospora arrangement of Ascospores in Ascus is 2a+ : 4a : 2a+ showing :-
(1) No crossing over.
(2) First division segregation.
(3) second division segregation or presence of crossing over.
(4) Some meiosis.

40. Which is true for repressible operon :-
(1) Off ——Inducer
(2) Inactive represser + Co-repressor = active represser
(3) Active represser + Inducer = inactive represser
(4) On off

41. First transgenic plant .-
(1) Potato (2) Tomato
(3) Tobacco (4) Maize

42. Dolly sheep was obtained by :-
(1) Cloning the udder cell (somatic cell) fused with unnucleated oocyte.
(2) Cloning of gametes.
(3) Tissue culture
(4) None

43. E. coli are used in production of
(1) Rifampicin (2) LH
(3) Ecdyson (4) Interferon

44. A giant rat is formed in the laboratory, what is thereason :-
(2) Gene synthesis
(4) Gene replication
(1) Gene mutation
(3) Gene manipulation

45. Plasmid has been used as vector because :-
(1) It is circular DNA which have capacity to join to eukeryotic DNA.
(2) It can move between prokaryotic and eukaryotic cells.
(3) Both ends show replication.
(4) It has antibiotic resistance gene.

46. First cloned animal :-
(1) Dolly sheep (3) Molly sheep
(2) Polly sheep (4) Dog

47. In Drosophila the XXY condition leads to female-ness whereas in human beings the same condition leads to Klienfelter's syndrome in male. It proves
(1) In human beings Y chromosome is active in sex determination
(2) Y chromosome is active in sex determination in both human beings and Drosophila
(3) In Drosophila Y - chromosome decides femaleness
(4) Y chromosome of man has genes for syndrome

48. What is true for plasmid :-
(1) Plasmids are widely used in gene transfer
(2) These are found in virus
(3) Plasmid contains gene for vital activities
(4) These are main part of chromosome

49. Which of the following cuts the DNA from specific
places :-
(1) Restriction endonuclease (E-Co-RI)
(2) Ligase
(3) Exonuclease
(4) Alkaline phosphate

50. No. of Bar Body in XXXX female
(1) 1 (2) 2
(3) 3 (4) 4

51. Manipulation of DNA in genetic engineering became possible due to the discovery of :-
(1) Restriction endonuclease
(2) DNA ligase
(3) Transcriptase
(4) Primase

52. Introduction of food plants developed by genetic engineering is not desirable because-
(1) Economy of developing countries may

suffer.
(2) These products are less tasty as compared to the already existing products.
(3) This method is costly.
(4) There is danger of coming viruses and toxins with introduced crop.

53. What does "lac" refer to, in what we call the lac operon :-
(1) Lactose
(2) Lactase
(3) Lac insect
(4) The number 1,00,000

54. In Drosophila, the sex is determined by :-
(1) The ratio of number of X-chromosomes to the sets of autosomes
(2) X and Y chromosomes
(3) The ratio of pairs of X-chromosomes to the pairs of autosomes
(4) Whether the egg is fertilized or develops parthenogenetically

55. Which one of the following has found extensive use in genetic engineering work in plants
(1) Bacillus coagulem
(2) Agrobacterium tumefaciens.
(3) Clostridium septicum
(4) Xanthomonas citri

56. Maximum application of animal cell culture technology today is in the production of :-
(1) Vacci (2) Edible protein
(3) Insulin (4) Interferon

57. Which one of the following pairs of terms/names mean one and the same thing
(1) Gene pool - genome
(2) Codon - gene
(3) Cistron - triplet
(4) DNA Fingerprinting - DNA profiling

58. Restriction enzymes
(1) Are endonucleases which cleave DNA at specific sites
(2) Make DNA complementary to an existing DNA or RNA
(3) Cut or join DNA fragments
(4) Are required in vectorless direct gene transfer.

59. DNA fingerprinting refers to :-
(1) Techniques used for identification of fingerprints of individuals
(2) Molecular analysis of profiles of DNA samples
(3) Analysis of DNA samples using imprinting devices
(4) Techniques used for molecular analysis of different specimens of DNA

60. Restriction endonucleases :-
(1) Are synthesized by bacteria as part of their defense mechanism
(2) Are present in mammalian cells for degradation of DNA when the cell dies
(3) Are used in genetic engineering for ligating two DNA molecules
(4) Are used for invitro DNA synthesis

61. A nutritionally wild type organism, which does notrequire any additional growth supplement is knownas :-
(1) Prototroph (2) Phenotype
(3) Holotype (4) Auxotroph

62. The Ti plasmid, is often used for making transgenic plants. This plasmid is found in
(1) Yeast as a 2 urn plasmid
(2) Azotobacter
(3) Rhizobium of the roots of leguminous plants
(4) Agrobacterium

63. Cultivation of Bt cotton has been much in the news.The prefix "Bt" means :-
(1) "Barium - treated" cotton seeds.
(2) "Bigger thread" variety of cotton with batter tensile strength.
(3) Produced by "biotechnology" using restriction enzymes and ligases.
(4) Carrying an endotoxin gene from Bacillus thuringiensis.

64. An example of gene therapy is
(1) Production of injectable Hepatitis-B vaccine
(2) Production of vaccines in food crops like potatoes which can be eaten
(3) Introduction of gene for adenosine deaminase in persons suffering from severe combined immuno-deficiency (SCID)
(4) Production of test tube babies by artificial insemination and implantation of fertilized eggs

65. What is the first step in the Southern Blot technique
(1) Denaturation of DNA on the gel for hybridization

with specific probe
(2) Production of a group of genetically identical cells
(3) Digestion of DNA by restriction enzyme
(4) Isolation of DNA from a nucleated cefl such as the one from the scene of crime

66. The bacteria Pseudomonas is useful because of its ability to :-
(1) Transfer genes from one plant to another
(2) Decompose a variety of organic compounds
(3) Fix atmospheric nitrogen in the soil
(4) Produce a wide variety of antibiotics

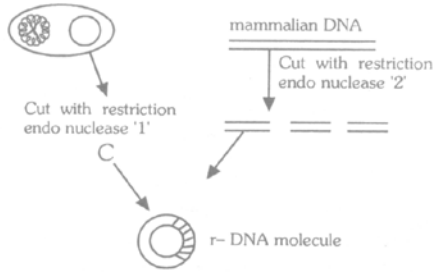
67. Which of the following is not produced by E.Coli in the lactose -
(1) P galactosidase
(2) Thiogalactoside transacetylase
(3) Lactose dehydrogenase
(4) Lactose permease

68. Which step does not involve in DNA finger printing
(1) Southern blotting
(2) Gel electrophoresis
(3) Restriction enzyme digestion
(4) Northern blotting

69. Which of the following is the example of direct gene transfer :-
(1) Microinjection (2) Electroporation
(3) Particle gun (4) All the above

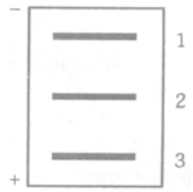
How many copies of DNA sample are produced in PCR technique after 6-cycle:-
(1) 4 (2) 32 (3) 64 (4) 16

71. The basic procedure involved in the synthesis of recombinant DNA molecule is depicted below. The mistake in the procedure is :-



(1) Enzyme polymerase is not included
(2) The mammalian DNA is shown double stranded
(3) Only one fragment is inserted
(4) Two different restriction enzymes are used

72. DNA fragments separated by gel electrophoresis are shown. Mark the correct statement :-



(1) Band 3 contains more positively charged DNA molecule than 1
(2) Band '3' indicates more charge density than 1 and 2
(3) Band 1 has longer DNA fragment than 2 and 3
(4) All the bands have equal length and charges but differ in base composition

73. An organism is able to live on a culture medium containing nutrient A, by the enzyme catalysed reactinons :-
A ——^—> B ——-> C A mutant failed to survive on this medium but grew when nutrient B was added to it. Which gene of this mutant was defective :-
(1) Only X (2) Only Y
(3) X and Y both (4) Neither X or Y

74. The technique of transferring DNA fragment separated on agarose gel to a synthetic membrane such as nitrocellulose is known as **[OLYMPIAD-2004]**
(1) Northern blotting (2) Southern blotting
(3) Western blotting (4) Dot blotting

75. In Drosophila formation of gynandromorph and their cytological explaination provide best evidence that
(1) X-Chromosome plays important role in sex determination
(2) X-Chromosome does not play any role in sex determination
(3) Y-Chromosome does not play any role in sex determination
(4) Y-Chromosome required for maleness.

76. Western blotting is used for the identification of
(1) DNA (2) RNA
(3) Protein (4) All the above

77. Thermal cycle takes place in which technique
(1) Gel electrophoresis (2) PCR-technique
(3) Centrifugation (4) Southern blotting

78. In melandrium plant with XY chromosome arrangement, which sex will be determined, if Ist region of y-chromosome is removed :-
(1) Male (2) Female
(3) Bisexual (4) Unisexual

79. Cry-gene which synthesize crystal protein isolated from :-
(1) Bacillus thuriengensis
(2) Rhizobium
(3) Bacillus polymyxa
(4) Clostridium

80. Which of the following combination of risk are associated with genetically modified food :-
(1) Toxicity
(2) Allergic reaction
(3) Antibiotic resistance in microorganism present in alimentary canal
(4) All the above

81. In r-DNA technique which of the following technique is not used in introducing DNA into host cell :-
(1) Transduction (2) Conjugation
(3) Transformation (4) Electroporation

82. Which of the following techniques are used in analyzing restriction fragment length polymorphism (RFLP) :-
(a) Electrophoresis (b) Electroporation
(c) Methylation (d) Restriction digestion
(1) 'a' and (2) 'c1 and 'd"c'
(3) 'a' and'd' (4) 'b' and 'd'

83. In Drosophila male differentiation is controlled by:
(1) No. of Y-chromosome
(2) No. of X-chromosomes
(3) Ratio between number of X-chromosome and the set of autosome
(4) Sets of autosome

84. PCR-technique is used in :-
(1) Production of transgenic microbes
(2) Production of genetically modified food
(3) Forensic investigation
(4) r-DNA technique

85. TDF gene is a :-
(1) A gene present on X-chromosome
(2) A segment of RNA
(3) A proteinaceous factor
(4) A gene present on Y-chromosome

86. BACs and YACs are :-
(1) Natural DNA obtained from bacteria and yeast
(2) Useful vectors for eucaryotic gene transfer
(3) Artificial DNA obtained from bacteria and yeast
(4) (2) & (3) both

87. Restriction enzymes are :-
(1) Not always required in genetic engineering
(2) Essential tool in genetic engineering
(3) Nucleases that cleave DNA at specific sites
(4) (2) and (3) both

88. Gene therapy first used in the treatment of :-
(1) Albinism (2) Haemophilia
(3) SCID (4) LIQID

89. DNA probe is used for :-
(1) DNA finger printing
(2) Detection of pathogenic bacteria
(3) Medical genetics to find whether a person carries a particular gene or not
(4) All the above

90. A cross between white eyed female and red eyed male Drosophila gives rise red eyed females and white eyed male. Rarely the cross gives rise to white eyed females and red eyed males. This is due to
(1) Loss of one X-chromosome
(2) Segregation of X- chromosome in female
(3) Non disjunction of X- chromosome in female
(4) Non disjunction of X- chromosome in male

91. In Melandrium what is function of IV region of Y-chromosome :
(1) Promote femaleness
(2) Induce male reproductive
(3) Pairing and regular disjunction of X and Y chromosome
(4) Helps in non disjunction

92. Function of restriction endonuclease enzyme is :
(1) Useful in genetic engineering
(2) Protects the bacterial DNA against foreign DNA
(3) Helpful in transcription
(4) Helpful in protein synthesis

93. E. coli cells with a mutated z gene of the lac operon cannot grow in medium containing only lactose as the source of energy because -
(1)They cannot synthesize functional betagalactosidase
(2)They cannot transport lactose from the medium into the cell
(3)The lac operon is constitutively active in these cells
(4)In the presence of glucose, E. coli cells do not utilize lactose

94. Bacillus thuringiensis (Bt) strains have been used for designing novel -
(1) Bioinsecticidal plants
(2) Bio-mineralization processes
(3) Biofertilizers
(4) Bio-metallurgical techniques

95. Production of a human protein in bacteria by generic engineering is possible because
(1) Bacterial cell can carry out the RNA splicing reactions
(2) The mechanism of gene regulation is identical in humans and bacteria
(3) The human chromosome can replicate in bacterial cell
(4) The genetic code is universal

96. Which one of the following is a correct statement
(1) "Bt" in "Bt-cotton" indicates that it is a genetically modified organism produced through biotechnology
(2) Somatic hybridization involves fusion of two complete plant cells carrying desired genes.
(3) The anticoagulant hirudin is being producedfrom transgenic Brassica napus seeds.
(4) "Flavr Savr" variety of tomato has enhanced the production of ethylene which improves its taste.

97. Electroporation procedure involves :
(1) Fast passage of food through sieve pores in phloem elements with the help of electric stimulation.
(2) Opening of stomatal pores during night by artificial light
(3) Making transient pores in the cell membrane to introduce gene constructs
(4) Purification of saline water with the help of a. membrane system.

EXERCISE - 4 ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A.	4	1	3	4	4	2	3	4	2	1	2	3	1	2	2
Q.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
A.	3	4	2	3	3	4	1	3	2	3	1	3	1	3	3
Q.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
A.	2	3	4	2	2	2	3	3	3	2	3	1	4	3	1
Q.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
A.	1	1	1	1	3	1	4	1	1	2	1	4	1	2	1
Q.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
A.	1	4	4	3	1	2	3	4	4	3	4	3	1	2	3
Q.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
A.	3	2	3	1	4	2	3	3	3	4	4	4	3	4	3
Q.	91	92	93	94	95	96	97								
A.	3	2	1	1	4	3	3								