GENETICS : MOLECULAR BASIS OF INHERITANCE

1. Which of the following is not the feature of human genome ?

(1) Less than 2 percent of the genome code for protein

(2) Chromosome 1 has fewest gene (231)

(3) Repetitive sequences make up very large portion of human genome

(4) The functions are unknown for over 50% of the discovered genes

2. The sequence of which chromosome number was completed in May 2006 ?

(1) Chromosome number 1

(2) Chromosome number 2

(3) Chromosome number 5

(4) Chromosome number 10

3. The repressor of the operon is synthesized :

(1) All the time (2) Certain time

(3) Non constitutively (4) None of these

4. Match the following

(A) ϕ x 174	(i) 48502 bp
(B) Lambda phage	(ii) 5386 Nucleotides
(C) E.Coli	(iii) 6.6×10^9 bp
(D) Human somatic cell	(iv) 4.6×10^6 bp

(1) A(i), B(ii), C(iv), D(iii)

(2) A(ii), B(i), C(iv), D(iii)

(3) A(i), B(ii), C(iii), D(iv)

(4) A(iv), B(iii), C(ii), D(i)

5. Which of the following pyrimidine base is common in both DNA and RNA

(1) Adenine (2) Guanine

(3) Cytosine (4) Thymine

6. In nucleoside which of the following bond exists between sugar and nitrogenaous base

(1) Phosphodiester bond

(2) Hydrogen bond

(3) Phosphoester bond

(4) N-glycosidic bond

7. By which of the following bond phosphoric acid remain linked with 5' carbon of sugar in one nucleotide

(1) Phosphoester bond

(2) Phosphodiester bond

(3) N-Glycosidic bodn

(4) Hydrogen bond

8. The backbone in a polynucleotide chain is formed due to

(1) Sugars and nitrogenous bases

(2) Phosphates and nitrogenous base

(3) Nitrogenous bases and histones

(4) Sugar and phosphates

9. In RNA, every nucleotide residue has an additional – OH group at which of the following position

(1) 2' position of deoxyribose

(2) 1' possition of ribose sugar

(3) 3' position of ribose sugar

(4) 2' position of ribose sugar

10. DNA as an acidic substance present in nucleus was first identified by

(1) Wilkins and Franklin

(2) Watson and Crick

(3) Friedich meischer

(4) Altmann

11. Double helix model of DNA proposed by watson and crick was based on

(1) X-ray diffraction data of Meischer

(2) X-ray crystallography data of Wilkins and Franklin

(3) X-ray diffraction data of Watson and Crick

(4) X-ray diffraction data of Chargaff

12. Regarding to features of double helix struture of DNA which of the following is wrong

(1) Two polynucleotide chains have antiparallel polarity

(2) The bases in two strands are paired through phosphodiester bonds

(3) Adenine form two hydrogen bonds with thymine

(4) The pitch of the helix is 3.4 nm

13. In addition to hydrogen bonding which of the following feature confers stability to helical structure

(1) Phosphodiester bond

(2) Pairing between one purine and one pyrimidine

(3) Glycosidic linkage between sugar and nitrogenous base

(4) The plane of one base pair stacks over the other

14. Which of the following is responsible for constant distance between two polynuclestide chains in DNA
(1) Antiparallel polarity of two polynucleotide strands
(2) Hydrogen bonding
(3) Pairing between one purine and one pyrimidine
(4) All the above

15. Phosphoric acid remain associated with which of the following carbon of sugar in a nucleotide :-
(1) Ist (2) 3rd
(3) 4th (4) 5th

16. In there are 3.3×10^9 bp present in genome, then what would be the length of the DNA of any somatic cell
(1) 1.1 meter (2) 2.2 meter
(3) 3.3 meter (4) 6.6 meter

17. Positive charge and basic nature of histone is due to abundance of
(1) Lysines and tryptophanes
(2) Arginines & threonines
(3) Lysines and arginines
(4) Tryptophanes and threonines

18. Negative charge of DNA is due to which of the following constituent
(1) Sugar (2) Nitrogenous base
(3) Phosphoric acid
(4) Hydroxyl group (–OH) present on sugar

19. A typical nucleosome contains how much amount of DNA
(1) 100 bp (2) 146 bp
(3) 200 bp (4) 346 bp

20. In a mammalian somatic cell how many nucleosomes are present
(1) 6.6×10^9 (2) 3.3×10^9
(3) 3.3×10^7 (4) 3.3×10^5

21. Which of the following is actual sequence of packaging of DNA in eukaryotic cells
(1) DNA $\rightarrow$ Chromatin $\rightarrow$ Nucleosome $\rightarrow$ Chromosome
(2) DNA $\rightarrow$ Nucleosome $\rightarrow$ Chromosome $\rightarrow$ Chromatin
(3) DNA $\rightarrow$ Nucleosome $\rightarrow$ Chromatin $\rightarrow$ Chromosome
(4) DNA $\rightarrow$ Chromosome $\rightarrow$ Chromatin $\rightarrow$ Nucleosome

22. The packaging of chromatin at higher level requires additional set of proteins that is known as
(1) Histone proteins
(2) NHC proteins
(3) Homeotic proteins
(4) Domain proteins

23. The unequivocal proof that DNA is the genetic material came from the experiments of
(1) Griffith
(2) Avery, Macleod & Mccarty
(3) Hershey and Chase
(4) Watson and Crick

24. Radioactive (^{35}S) was detected in
(1) Supernatant (2) Sediment
(3) Both (4) Either 1 or 2

25. Which of the folloiwng is not a criteria for determination of genetic material
(1) Ability of replication
(2) Chemically and structurally stable
(3) It should be non mutable
(4) Ability to expres itself in from of Mendelian characters

26. Which of the folloiwng feature of RNA make it labile and easily degradable
(1) Single stranded nature
(2) 2'–OH group on sugar
(3) Phosphodiester bond
(4) Absence of Hydrogen bond

27. Regarding to RNA which of the following feature is wrong
(1) Catalytic property
(2) Labile and easily degradable
(3) Absence of thymine
(4) Presence of methylated uracil

28. Which fo the folloiwng reason is suitable to expalin that RNA is best for expression of characters
(1) It shows catalytic properties
(2) Presence of 2'–OH group on ribose sugar
(3) It can directly code for the synthesis of protein
(4) Presence of uracil

29. Which of the following is responsible for short life span and fast rate of mutation and evolution
(1) Presence of DNA
(2) Presence of highly reactive RNA
(3) Double stranded genetic material
(4) Single stranded genetic material

30. Which of the following evidence suggests that essential life processes evolved around RNA

(1) RNA used to act as genetic material

(2) RNA can act as catalyst

(3) RNA is highly reactive

(4) Both 1 and 2

31. Regarding to Meselson and Stahl experiment for semi conservative nature of DNA replication select out the wrong statement

(1) ^{15}N of $^{15}NH_4Cl$ was incorporated in DNA and other compounds

(2) ^{15}N & ^{14}N can be differentiate on the basis of radioactive activity

(3) Heavy and normal DNA molecules could be distinguished by CsCl density gradient centrifugation

(4) ^{15}N used in $^{15}NH_4Cl$ was not a radioactive isotope

32. If E.Coli is allow to grow for 80 minutes in $^{15}NH_4Cl$ medium then what would be the proportion of hybrid and heavy density DNA molecules

(1) 1 : 7 (2) 7 : 1

(3) 14 : 2 (4) 1 : 4

33. Semiconservative replication of DNA in chromosomes was proved by

(1) Meselson & Stahl by using $^{15}NH_4Cl$

(2) Taylor by using $^{15}NH_4Cl$

(3) Meselson & Stahl by using tritiated thymidine

(4) Taylor by using tritiated thymidine

34. How much duration of time required for replication of 4.6×10^6pb in E.coli

(1) 83 minutes

(2) 20 minutes

(3) 2 minutes

(4) 3 hrs

35. What is the rate of polymerisation in *E.coli*

(1) 20,000 bp per second

(2) 2000 nucleotides per second

(3) 2000 bp per minute

(4) 2000 bp per second

36. During replication large amount of energy get exhausted. The source of this energy is

(1) Deoxy ribonucleotide triphosphophate

(2) Deoxyribonucleoside monoplosphate

(3) Deoxyribonucleoside triphosphate

(4) Both 1 and 2

37. Regarding to direction of DNA replication select out the correct one

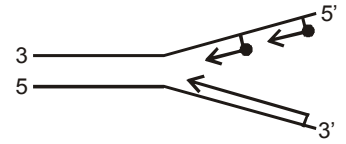
(1) 5' $\rightarrow$ 3' Template – continuous synthesis

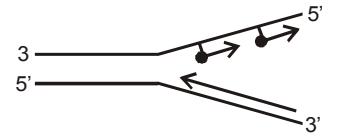
(2) 3' $\rightarrow$ 5' Template – discontinuous synthesis

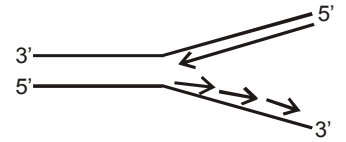
(3) 3' $\rightarrow$ 5' Template – continuous synthesis

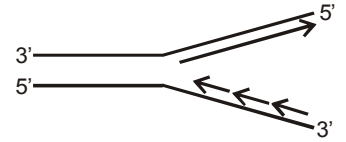
(4) 5' $\rightarrow$ 3' Template – synthesis leadingstrand

38. Which of the following scheme of replication fork is true

(1)


(2)


(3)


(4)


39. During transcription only one of the strand of DNA get transcribed. Which of the following reason explain it

(1) Otherwise one segment of DNA would be coding for two different proteins

(2) Otherwise dsRNA comes in existance

(3) Otherwise antisense RNA arise which donot participate in Translation

(4) All the above

40. A transcription unit in DNA is defined primarily by three regions in DNA. These regions are

(1) Promoter, regulator and structural gene

(2) Promoter, structural gene and terminator

(3) Promoter, regulator and terminator

(4) Promoter, regulator and operator gene

41. In transcription unit promoter and terminator are determined on the basis of

(1) Coding strand (2) Template strand

(3) Noncoding strand (4) Antisense strand

42. In eukaryotes as well as prokaryotes those DNA sequences that appear in mature or processed RNA are known as

(1) Introts (2) Exons

(3) Recons (4) Mutons

43. Regarding to role of RNA in protein synthesis find out the odd one

(1) m-RNA - provides the template

(2) t-RNA - brings aminoacids

(3) r-RNA - read genetic code

(4) sn-RNA splicing

44. Which of the following exclusive property of trancription found in RNA-polymerase

(1) Initiation (2) Elongation

(3) Termination (4) Processing

45. What is the length and constituent base of tail in functional m-RNA

(1) Poly U – 200-300 bp

(2) Poly A – 200-300 bp

(3) Poly C – 200-300 nucleotides

(4) Poly A – 200-300 nucleotides

46. DNA dependent RNA polymerases mediated synthesis of RNA over DNA called transcription. About it which of the following statement is wrong

(1) In bacteria m-RNA doesnot required any processing to become active

(2) In eukaryotes there is clearcut division of labour in RNA polymerases

(3) Absence of introns in RNA of eukaryotes is reminiscent of antiquity

(4) RNA polymerase - III is responsible for synthesis of sn-RNA

47. Which of the following was not involved in deciphering of genetic code

(1) Physicist george Gamow's permutation combination of 4^3 bases

(2) H.G. Khorana's based synthesis of RNA molecules with defined combination of bases

(3) Severo ochoa enzyme for polymerising DNA with defined sequences

(4) Marshall Nirenberg's cell free system for protein synthesis

48. Which of the following mutation forms the genetic basis of proof that codon is a triplet and it is read in a continuous manner

(1) Chromosomal structural mutations

(2) Chromosomal numerical mutations

(3) Substitutional mutation

(4) Frame shift insertion or deletion mutation

49. An adapter molecule that would on one hand read the code and on the other hand would bind to specific amino acids is

(1) m-RNA (2) r-RNA

(3) t-RNA (4) hm-RNA

50. Which of the following r-RNA show structural as well as functional role in bacteria :-

(1) 16s rRNA (2) 23s rRNA

(3) 5s rRNA (4) 28s rRNA

51. A m-RNA also has some additional sequences that are not translated called UTR. The function of UTR is

(1) Charging of t-RNA

(2) Formation of peptide bond

(3) Helps in efficient translation

(4) Helps in translocation

52. The t-RNA move away from ribosomes after translocation of ribosome in relation to m-RNA, is known as

(1) Acylated t-RNA (2) Peptidyle t-RNA

(3) Deacylated t-RNA (4) Charged t-RNA

53. At which of the following levels, regulation of gene expression in eukaryotes donot occur

(1) Transcription level

(2) Processing level

(3) Transport of ribosomal subunits from nucleus to cytoplasm level

(4) Translation level

54. In prokaryotes predominant site for control of gene expression is the

(1) Control of rate of processing of primary transcript

(2) Control of rate of transcription initiation

(3) Control of transport of m-RNA from nucleus to cytoplasm

(4) Control of Translation

55. HGP was closely associated with the rapid development of a new area in biology called as

(1) Biofortification

(2) Bioinformatics

(3) Biomining

(4) Biotransformation

56. Which of the following is not a goal of HGP

(1) Identify all the approximately 20,000–25,000 genes

(2) Store this information in database

(3) Restrict the related technologies so that other sector donot benefited with it

(4) Address the ethical, legal and social issues

57. The human genome project was coordinated by

(1) U.S. department of energy

(2) National institute of health

(3) Sanger centre

(4) Both 1 and 2

58. Which of the following organism was not used as model organism is human genome project

(1) Arabidopsis

(2) Caenorhabdities elegans

(3) Rice

(4) Hyacinthus orientalis

59. Approach of HGP focused on identifying all the genes that expressed as RNA is known as

(1) Expressed sequence tags

(2) Sequence annotation

(3) Polymerase chain reaction

(4) Dermatoglyphics

60. Automated DNA sequencers worked on the principle of a method developed by

(1) Watson

(2) Chargaff

(3) Frederick sanger

(4) Singer and Nicolson

61. Regarding to salient features of human genome select out the incorrect one

(1) Human genome contains 3164.7 million nucleotide bases

(2) Human genome contain 30,000 genes

(3) y-chromosome has largest number of genes

(4) 1.4 million locations are associated with SNPs

62. Match the following

A.	SNPs	i	3164.7 million
B.	Genes of chromosome No. 1	ii	1.4 Million
C.	Total No. of Human genes	iii	30000
D.	Total nucleotides of human genome	iv	2968

	A	B	C	D
(1)	ii	iii	iv	i
(2)	ii	iv	iii	i
(3)	ii	iv	i	iii
(4)	iv	ii	iii	i

63. If an inheritable mutation is observed in a population at high frequency, it is referred as

(1) DNA polyploidy

(2) DNA polymorphism

(3) DNA redundancy

(4) Sequence annotation

64. Due to high degree of polymorphism, size of VNTR varies in size from

(1) 0.1 – 2 kb

(2) 0.1 – 2000 kb

(3) 0.1 – 20 kb

(4) 0.1 – 200 kb

65. What is the basis of heredity

(1) Variations

(2) Inheritance

(3) Genetics

(4) Recombination

66. Change in a single base pair of DNA can be termed as

(1) Chromosomal aberrations

(2) Point mutation

(3) Genomatric mutation

(4) Frame shift mutation

67. Which of the following cell cycle event is responsible for aneuploidy based chromosomal disorders

(1) Failure of G_1 phase

(2) Failure ofDNA replication in s-phase

(3) Failure of segregation/Disjunction

(4) Failure of movement of chromosomes

68. Which of the folloiwng cell cycle event is responsible for polyploidy phenomenon

(1) Failure of karyokinesis

(2) Failure of cytokinesis

(3) Failure of segregation

(4) Failure of non-disjunction

ANSWERS KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	**2**	**1**	**1**	**2**	**3**	**4**	**1**	**4**	**4**	**3**	**2**	**2**	**4**	**3**	**4**	**2**	**3**	**3**	**3**	**3**
Que.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	**3**	**2**	**3**	**1**	**3**	**2**	**4**	**3**	**2**	**4**	**2**	**1**	**4**	**2**	**4**	**3**	**3**	**2**	**4**	**2**
Que.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	**1**	**2**	**3**	**2**	**4**	**3**	**3**	**4**	**3**	**2**	**3**	**3**	**3**	**2**	**2**	**3**	**4**	**4**	**1**	**3**
Que.	61	62	63	64	65	66	67	68												
Ans.	**3**	**2**	**2**	**3**	**2**	**2**	**3**	**2**												