

SECTION C: PREVIOUS YEARS' EXAMINATION QUESTIONS

1. During transcription, holoenzyme RNA polymerase binds to DNA sequence and DNA assumes a saddle like structure at that point. The sequence is called **(2007)**
(A) AAAT box (B) **TATA box**
(C) GGTT box (D) CAAT box
2. RNA polymerase requires for initiation **(2007)**
(A) **Sigma subunit** (B) α -subunit
(C) rho subunit (D) Spliceosome
3. While working on *Neurospora crassa*, Beadle and Tatum proved **(2007)**
(A) **Every gene is responsible for a specific enzyme**
(B) Plant, cells are totipotent
(C) DNA replication is semiconservative
(D) Viruses have genetic material
4. Site for protein synthesis is **(2007)**
(A) Nucleus (B) Cytosol
(C) **Ribosome** (D) Lysosome
5. Which one is correctly matched? **(2008)**
(A) AUG, ACG—Start or methionine
(B) UUA, UCA—Leucine
(C) GUU—Alanine
(D) **UAG, UGA—Stop**
6. Antisense technology is **(2008)**
(A) **Use of complementary RNA to stop expression of specific gene**
(B) RNA polymerase producing DNA

- (C) A cell with foreign antigen used for synthesis of antigens
- (D) Production of somaclonal variants in tissue culture
7. What is not true for genetic code? **(2009)**
- (A) It is degenerate
- (B) It is nearly universal
- (C) A code in mRNA is read in a non-contiguous fashion**
- (D) It is unambiguous
8. Removal of introns and joining the exons in a defined order in a transcription unit is **(2009)**
- (A) Splicing** (B) Capping
- (C) Tailing (D) Transformation
9. Whose experiments cracked DNA and discovered triplet nature of genetic code? **(2009)**
- (A) Beadle and Tatum
- (B) Hershey and Chase
- (C) Morgan and Sturtevant
- (D) Nirenberg and Mathaei**
10. In operon model, RNA polymerase binds to **(2009)**
- (A) Structural gene **(B) Promoter gene**
- (C) Regulator (D) Operator gene
11. Site of tRNA that binds to mRNA molecule is **(2009)**
- (A) 3' end (B) 5' end
- (C) Codon **(D) Anticodon**
12. Lac operon consists of **(2010)**
- (A) Four regulatory genes only
- (B) Two regulatory genes and two structural genes

(C) Three regulatory genes and three structural genes

(D) One regulatory gene and three structural genes

13. 3'—5' phosphodiester linkage occurs between (2010)

(A) One RNA and other DNA strands

(B) One nucleoside with another nucleoside

(C) One nucleotide with another nucleotide

(D) One nitrogenous base with pentose sugar

14. Which does not follow central dogma of molecular biology? (2010)

(A) *Mucor*

(B) *Chlamydomonas*

(C) HIV

(D) Pea

15. Which is not a salient feature of genetic code? (2010)

(A) Ambiguous

(B) Universal

(C) Specific

(D) Degenerate

16. In lac operon system, lac gene-I codes for (2010)

(A) Inducer

(B) Repressor

(C) Promoter

(D) β -galactosidase

17. During transcription, DNA site at which RNA polymerase binds is called (2011)

(A) Promoter

(B) Receptor

(C) Regulator

(D) Enhancer

18. A solution of purified DNA will have pH (2011)

(A) Basic

(B) Highly basic

(C) Acidic

(D) Neutral

19. Which amino acid has a single codon? (2011)

(A) Serine

(B) Cysteine

- (C)Tyrosine (D)Tryptophan
20. 1.7 m double helical DNA will have base pairs (2011)
- (A)3.4 x 10⁹ (B)5 x 10⁹
- (C)1.7 x 10⁹ (D)1.7 x 10⁵
21. DNA finger printing requires (2011)
- (A)Restriction endonuclease
- (B)Taq polymerase
- (C)Oligonucleotide Primers
- (D)All the above
22. PCR and RFLP are employed in (2012)
- (A)DNA sequencing
- (B)Genetic engineering
- (C)Study of enzymes
- (D)Genetic transformation
23. Which is not part of transcription unit? (2012)
- (A)Promoter (B)Terminator
- (C)Structural gene (D)Inducer
24. Read statements a—d. (2012)
- (A)In transcription, adenosine pairs with uracil
- (B)Regulation lac operon by repressor is positive regulation
- (C)Human genome has approximate 50,000 genes
- (D)Haemophilia is sex-linked recessive disease
- How many of above statements are correct?
- (A)2 (B)3

(C)4

(D)1

25. Crick, one of the discoverer of DNA double helix was men of (2012)

(A)Botany

(B)Physics

(C)Chemistr

(D)Zoology

26. Number of codons coding GGG is (2012)

(A)6

(B)4

(C)2

(D)1

27. Basis of DNA finger printing is (2012)

(A)Double helix

(B)Error in base sequence

(C)Polymorphism in sequence/RELP/satellite DNA

(D)DNA coiling

28. In double helix of DNA, there are sugar phosphate back bones with bases projected (2013)

(A)Outwardly

(B)Outwardly and inwardly

(C)Inwardly

(D)Interpolated

29. Select the correct option (2014)

Direction of RNA **Direction of reading of the**

Synthesis **temple DNA strand**

(A)3'→5'

3'→5'

(B)5'→3'

3'→5'

(C)3'→5'

5'→3'

(D) 5'→3' 5'→3'

30. Which one of the following is wrongly matched?(2014)

(A) Operon—Structural genes, operator and promoter

(B) Transcription—Writing information from DNA to rRNA

(C) Translation—Using information in mRNA make protein

(D) Repressor protein—Binds to operator to stop enzyme synthesis

31. An analysis of chromosomal DNA using the Southern by hybridization technique does not use (2014)

(A) PCR

(B) Electrophoresis

(C) Blotting

(D) Autoradiography

32. Commonly used vectors for human genome sequencing are (2014)

(A) T/A Cloning Vectors

(B) T-DNA

(C) BAC and YAC

(D) Expression Vectors

33. Of the total number of genes estimated in human genome, nearly 10% are contained in (2014)

(A) Chromosome 11

(B) Chromosome 21

(C) Y-Chromosome

(D) Chromosome 1

34. The technique of DNA finger printing relies on (2014)

(A) Repetitive DNA

(B) Mini-satellite DNA

(C) Both A and B

(D) None of the above

35. Heterogeneous nuclear RNA is converted into mRNA by (2014)

(A) Splicing

(B) Capping

(C) Tailing

(D) All of the above

36. Number of nucleotide bases of a spiral of ds-DNA molecule is (2015)

(A) 5

(B) 10

- (C)20 (D)40
37. The okazaki fragments on the lag stand are joined together by the enzyme (2015)
- (A)DNA primase (B)DNA polymerase
(C)DNA ligase (D)Helicase
38. Which one of the following terms is used to explain the acquisition of new genes in mammalian cells due to uptake of naked DNA?
- (A)Transduction (B)Transformation
(C)Transfection (D)Conjugation
39. The process of synthesis of messenger RNA on the DNA template is called (2015)
- (A)Replication (B)Transcription
(C)Translation (D)Reverse transcription
40. Meselson and Stahl used an isotope to demonstrate semiconservative nature of DNA duplication. Which isotope did they use? (2015)
- (A)¹⁴C (B)³H
(C)³²P (D)¹⁵N
41. Identify the correct order of organization of genetic material from largest to smallest? (2015)
- (A)Genome, chromosome, nucleotide, gene
(B)Genome, chromosome, gene nucleotide
(C)Chromosome, genome, nucleotide, gene
(D)Chromosome, gene, genome, nucleotide
42. Satellite DNA is important because it (2015)
- (A)Shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children.
(B)Does not code for proteins and is same in all members of the population.
(C)Codes for enzymes needed for DNA replication.

(D)Codes for proteins needed in cell cycle.

43. Which one of the following is not applicable to RNA? (2015)

(A)5' phosphoryl and 3' hydroxyl ends

(B)Heterocyclic nitrogenous bases

(C)Chargaff's rule

(D)Complementary base pairing

44. The movement of a gene from one linkage group of another is called (2015)

(A)Translocation

(B)Crossing over

(C)Inversion

(D)Duplication

45. Gene regulation governing lactose operon of *E.coli* that involves the lac-I gene products is (2015)

(A)Negatively and repressible because repressor protein prevents transcription

(B)Feedback inhibition because excess of β -galactosidase can switch off transcription

(C)Positive and inducible because it can be induced by lactose

(D)Negative and inducible because repressor protein prevents transcription

46. The coding region on the DNA is called a (2015)

(A)Muton

(B)Cistron

(C)Operon

(D)Recon

47. Which of the following alters the genetic code? (2015)

(A)Frameshift mutations

(B)Translation

(C)Inversion

(D)Suppressor mutation

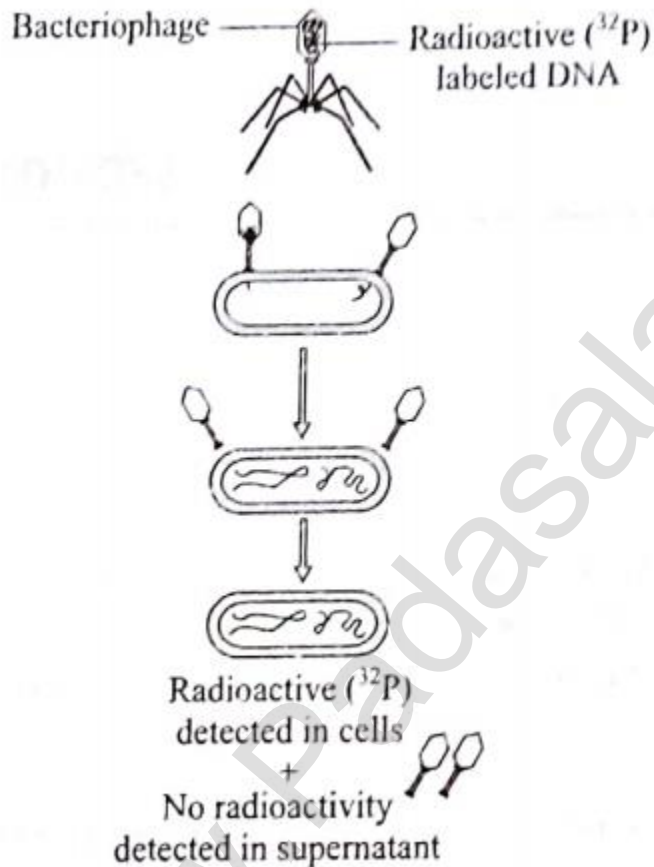
48. DNA polymorphism that has been used to develop the DNA fingerprinting technology is based upon (2015)

(A)Single nucleotide polymorphism

(B)Variation in the number of tandemly repeated sequence

- (C) Number of protein coding genes
 (D) Unique nucleotide bases present in genome

49. Escherichia coli was infected with bacteriophage having radioactive (^{32}P) DNA in a culture. It was blended, centrifuged and distribution of ^{32}P determined. What does the experiment show?
 (2015)



- (A) Protein is not the genetic material
 (B) DNA is not involved in heredity
 (C) Nothing is proved
 (D) DNA is the genetic material

50. Which of the following are the purine nucleotides? (2015)

- (A) Adenine and cytosine
 (B) Guanine and thymine
 (C) Cytosine and thymine
 (D) Adenine and guanine

51. The following is not a character of RNA (2016)
- (A) RNA is unstable and degradable
 - (B) RNA mutates at faster rate than DNA
 - (C) RNA evolves slowly
 - (D) RNA is catalytic/reactive
52. Which of the following nitrogenous base is double ringed? (2016)
- (A) Guanine
 - (B) Thymine
 - (C) Uracil
 - (D) Cytosine
53. In DNA finger printing, DNA hybridization with the help of specific DNA probe is done through (2016)
- (A) Western blotting
 - (B) Northern blotting
 - (C) Southern blotting
 - (D) Eastern blotting
54. Who proved experimentally that DNA is genetic material?
- (A) O. Avery and colleagues
 - (B) J. Watson and F. Crick
 - (C) W. Arber and Colleagues
 - (D) G. Mendel
55. Which one of the following is the starter codon? (2016)
- (A) UAA
 - (B) UAG
 - (C) AUG
 - (D) UGA
56. Which of the following is required as inducer(s) for the expression of Lac operon? (2016)
- (A) Lactose
 - (B) Lactose and galactose
 - (C) Glucose

(D)Galactose

57. Which of the following statements is not true for cancer cells in relation to mutations? (2016)

(A)Mutations inactivate the cell control

(B)Mutations inhibit production of telomerase

(C)Mutations in proto-oncogenes accelerate the cell cycle

(D)Mutations destroy telomerase inhibitor

58. Which of the following is not required for any of the techniques of DNA fingerprinting available at present? (2016)

(A)Restriction enzymes

(B)DNA—DNA hybridization

(C)Polymerase chain reaction

(D)Zinc finger analysis

59. A complex of ribosomes attached to a single strand of RNA is known as (2016)

(A)Polypeptide

(B)Okazaki fragment

(C)Polysome

(D)Polymer

SECTION D: CHAPTER-END TEST

1. Wobble hypothesis establishes

(A)Peptide chain formation

(B)Initiation of peptide chain

(C)Termination of peptide chain

(D)Economy in tRNA molecules

2. DNA replication in eukaryotes commences

(A)From both ends of a chromosome simultaneously

(B)Several sites along DNA of a chromosome simultaneously

- (C) From centromere to either end
- (D) From one end of chromosome to the other

3. An anticodon of tRNA can recognize more than one codon of mRNA. It is

- (A) Wobble hypothesis
- (B) Gene flow hypothesis
- (C) Template hypothesis
- (D) Richmond & Lang effect

4. Who proposed that genes control production of enzymes?

- (A) R. d. Kornberg
- (B) Beadle and Tatum
- (C) A. E. Garrod
- (D) T. H. Morgan

5. Nobel Prize for one gene one enzyme hypothesis was given to

- (A) Watson and Crick
- (B) Sutton and Boveri
- (C) Avery et al
- (D) Beadle and Taum

6. The number of base substitution possible in amino acid codons is

- (A) 261
- (B) 264
- (C) 535
- (D) 549

7. Find out the correct answers out of the following discoveries.

1. Griffith—Transformation
2. Gamow—Triplet code
3. Miescher—Nucleic acid

- (A) 1, 2 and 3 correct
- (B) 1 and 2 correct, 3 false
- (C) 1 correct 2 and 3 false
- (D) 1 and 3 correct 2 false

8. Protein helping in opening of DNA double helix in front of replication fork is

(A) DNA gyrase

(B) DNA polymerase-I

(C) DNA ligase

(D) DNA topoisomerase

9. Lac operon is

(A) Arabinose operon

(B) Repressible operon

(C) Inducible operon

(D) Overlapping genes

10. Who synthesized the first artificial gene?

(A) Morgan

(B) Nirenberg

(C) Khorana

(D) Mendel

11. tRNA recognizes ribosome by

(A) T ψ C loop

(B) DHU loop

(C) Anticodon

(D) AA-site

12. A mutation at one base of first codon of a gene forms a nonfunctional protein. It is

(A) Nonsense mutation

(B) Reserve mutation

(C) Frame shift mutation

(D) Mis-sense mutation

13. Jacob and Monod won Nobel Prize for their work on

(A) Operon model

(B) Structure of gene

(C) Genetic diseases

(D) Function of gene

14. Temin worked on virus

(A) Rhinovirus

(B) Dengue virus

(C) Herpes virus

(D) Retrovirus

15. Reverse transcription was discovered by

(A) Beadle and Tatum

(B) Temin and Baltimore

- (C) Watson and Crick (D) Khorana
16. Transition mutation is due to replacement of
- (A) GC by TA (B) AT by CG
(C) CG by GC (D) AT by GC
17. On which organism Beadle and Tatum worked to propose one gene—one enzyme hypothesis
- (A) *Drosophila* (B) *Escherichia coli*
(C) *Neurospora crassa* (D) *Nostoc*
18. Which one is involved in DNA repair?
- (A) Ligase (B) Primase
(C) DNA polymerase III (D) DNA polymerase I
19. Khorana was awarded Nobel prize for
- (A) Discovering DNA
(B) Discovering RNA
(C) Chemical synthesis of gene
(D) Discovering DNA polymerase
20. Telomere of eukaryotic chromosome possess short segments
- (A) Guanine rich repeats (B) Thymine rich repeats
(C) Cytosine rich repeats (D) Adenine rich repeats
21. Enzyme needed for production of DNA from RNA is
- (A) RNA polymerase (B) Reverse transcriptase
(C) DNA helicase (D) DNA polymerase
22. The ratio constant for species is
- (A) $A + G/C + T$ (B) $T + C/G + A$
(C) $A + C/T + G$ (D) $G + C/A + T$

23. Why does cytosine make pair with guanine and not with adenine?

- (A) Polar nature of C and A
- (B) C—A pair would not reach across the double helix
- (C) C—A pair would be wider than double
- (D) Hydrogen bond forming functional groups are not complementary between C and A

24. cDNA is copied from mRNA molecule the help of

- (A) Restriction enzyme
- (B) Reverse transcriptase
- (C) DNA polymerase
- (D) Adenosine diaminase

25. Antibiotic inhibiting interaction between tRNA and mRNA during protein synthesis in bacteria

- (A) Tetracycline
- (B) Neomycin
- (C) Erythromycin
- (D) Streptomycin

26. Which antibiotic inhibits peptide bond formation

- (A) Streptomycin
- (B) Tetracycline
- (C) Chloramphenicol
- (D) Neomycin

27. The phenomenon of 5' end third base of tRNA pairing, with non-complementary base of mRNA is

- (A) Collinearity
- (B) Degeneracy
- (C) Wobbling
- (D) Universality

28. DNA produced from RNA is called

- (A) A-DNA
- (B) B-DNA
- (C) Z-DNA
- (D) C-DNA

29. Smallest gene affected by mutation is

- (A) Muton
- (B) Cistron

- (C) Recon (D) Exon
30. Clover leaf model of tRNA was proposed by
- (A) Holley (B) Went
- (C) Meselson (D) Fleming
31. Okazaki is known his contribution to the understanding of
- (A) Transcription (B) Translation
- (C) Mutation (D) DNA replication
32. Who was awarded Nobel Prize for contribution of finding nature of gene?
- (A) De Vries (B) T.H. Morgan
- (C) H.J. Muller (D) Darwin
33. ADNA is
- (A) Left handed with 10 bp per turn
- (B) Right handed with 9 bp per turn
- (C) Right handed with 10 bp per turn
- (D) Right handed with 11 bp per turn
34. Gene does not produce
- (A) mRNA (B) Sugar
- (C) Polypeptide (D) Enzyme
35. DNA gyrase is a type of
- (A) DNA topoisomerase (B) DNA ligase
- (C) DNA polymerase (D) Reverse transcriptase
36. Hargobind Khorana deduced code for amino acid
- (A) Serine and leucine
- (B) Leucine and isoleucine

- (C)Valine and glutamic acid
- (D)Phenylalanine and methionine

37. Human genome project was started in

- (A)1989
- (B)1990
- (C)1992
- (D)1995

38. Human genome project lead to the development of

- (A)Bioinformatics
- (B)Biotechnology
- (C)Biomonitoring
- (D)Biosystematics

39. The phenomenon of closely placed genes being inherited together is

- (A)Linkage
- (B)Crossing over
- (C)Gene interaction
- (D)Qualitative inheritance

40. Mutations altering nucleotide sequence within a gene are

- (A)Frame shift mutations
- (B)Base pair substitution
- (C)Both A and B
- (D)None of the above

41. Heterochromatic region is

- (A)Genetically more active
- (B)Genetically less active
- (C)Loosely coiled region
- (D)Lightly coloured region

42. DNA duplex shows

- (A) Right handed coiling and parallel
(B) Right handed coiling and antiparallel
(C) Left handed coiling and antiparallel
(D) Left handed coiling and parallel
43. mRNA is polymer of
(A) Ribonucleotides
(B) Deoxyribonucleotides
(C) Ribonucleosides
(D) Deoxyribonucleosides
44. DNA replication requires
(A) DNA polymerase
(B) RNA polymerase and translocase
(C) DNA ligase
(D) DNA polymerase and DNA ligase
45. Lactose metabolizing enzyme, produced in the presence of lactose only is
(A) Inducible enzyme
(B) Repressible enzyme
(C) Regulatory enzyme
(D) Constitutive enzyme
46. A unit lac-operon which in the absence of lactose, suppresses the activity of operator gene is
(A) Structural gene
(B) Regulatory gene
(C) Repressor protein
(D) Promoter gene
47. *Escherichia coli* fully labeled with ^{15}N is allowed to grow in ^{14}N medium. The two strands of DNA molecule of the first generation bacteria have
(A) Different density and do not resemble parent DNA
(B) Different density but resemble parent DNA

- (C) Same density and resemble parent DNA
- (D) Same density but do not resemble parent DNA

48. Nuclear DNA sends information for protein synthesis through

- (A) tRNA
- (B) mRNA
- (C) rRNA
- (D) All the above

49. Which is not involved in protein synthesis?

- (A) Transcription
- (B) Initiation
- (C) Methionine
- (D) Lysine

50. Polypeptide chain in eukaryotes is initiated by

- (A) Glycine
- (B) Leucine
- (C) Methionine
- (D) Lysine

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