Molecular Basis of Inheritance

Question 1.
In a DNA strand the nucleotides are linked together by
(a) glycosidic bonds
(b) phosphodiester bonds
(c) peptide bonds
(d) hydorgen bonds.
Answer:
(b) phosphodiester bonds

Question 2.
The net electric charge on DNA and histones is
(a) both positive
(b) both negative
(c) negative and positive, respectively
(d) zero.
Answer:
(c) negative and positive, respectively

Question 3.
Which of the following statements is the most appropriate for sickle cell anaemia ?
(a) It cannot be treated with iron supplements.
(b) It is a molecular disease.
(c) It conferes resistance to acquiring malaria.
(d) All of the above.
Answer:
(d) All of the above.

Question 4.
The first genetic material could be
(a) protein
(b) cabohydrates
(c) DNA
(d) RNA.
Answer:
(d) RNA.

Question 5.
The human chromosome with the highest and least number of genes in them are respectively
(a) chromosome 21 and Y
(b) chromosome 1 and X
(c) chromosome 1 and Y
(d) chromosome X and Y.
Answer:
(c) chromosome 1 and Y

Question 6.
Who amongst the following scientist had no contribution in the development of the double helix model for the structure of DN A ?
(a) Rosalind Franklin
(b) Maurice Wilkins
(c) Erwin Chargaff
(d) Meselson and Stahl
Answer:
(b) Maurice Wilkins

Question 7.
Which of the following steps in transcription is catalysed by RNA polymerase ?
(a) Initiation
(b) Elongation
(c) Termination
(d) All of the above
Answer:
(d) All of the above

Question 8.
Control of gene expression takes place at the level of
(a) DNA-replication
(b) transcription
(c) translation
(d) none of the above.
Answer:
(b) transcription

Question 9.
Which was the last human chromosome to be completely sequenced ?
(a) Chromosome 1
(b) Chromosome 11
(c) Chromosome 21
(d) Chromosome X
Answer:
(a) Chromosome 1

Question 10.
In some viruses, DNA is synthesised by using RNA as template. Such a DNA is called
(a) A – DNA
(b) B – DNA
(c) cDNA
(d) rDNA.
Answer:
(c) cDNA

Question 11.
If the sequence of initrogen bases of the coding strand of DNA in a transcription unit is: 5' – ATGAATG – 3', the sequence of bases in its RNA transcript would be
(a) 5' – AUG A AUG – 3'

(b) 5′ – UACUU AC – 3′
(c) 5′ – CAUUCAU – 3′
(d) 5′ – GUAAGUA – 3′.
Answer:
(d) 5′ – GUAAGUA – 3′.

Question 12.
The RNA polymerase holocnzyme transcribes
(a) the promoter, structural gene and the terminator region.
(b) the promoter and the terminator region
(c) the structural gene and the terminator region
(d) the structural gene only.
Answer:
(b) the promoter and the terminator region

Question 13.
If the base sequence of a codon in mRNA is 5′ – AUG – 3′ the sequence of tRNA pairing with it must be
(a) 5′ – UAC – 3′
(b) 5′ – CAU – 3′
(c) 5′-AUG – 3′
(d) 5′ – GUA – 3′
Answer:
(b) 5′ – CAU – 3′

Question 14.
The amino acid attaches to the tRNA at its
(a) 5′- end
(b) 3′ – end
(c) anticodon site
(d) DHUloop.
Answer:
(b) 3′ – end

Question 15.
To initiate translation, the wiRNA first bind to
(a) the smaller ribosomal sub-unit
(b) the larger ribosomal sub-unit
(c) the whole ribosome
(d) no such specificity exists.
Answer:
(a) the smaller ribosomal sub-unit

Question 16.
In E. colt, the lac operon gets switched on when
(a) lactose is present and it binds to the repressor
(b) repressor binds to operator
(c) RNA polymerase binds to the operator
(d) lactose is present and it binds to RNA polymerase.

Answer:
(a) lactose is present and it binds to the repressor

Question 17.
In DNA strand, the nucleotides are linked together by
(a) glycosidic bonds
(b) phosphodiester bonds
(c) peptide bonds
(d) hydrogen bonds.
Answer:
(b) phosphodiester bonds

Question 18.
If a double stranded DNA has 20% of cytosine, what will be the percentage of adenine in it ?
(a) 20%
(b) 40%
(c) 30%
(d) 60%
Answer:
(c) 30%

Question 19.
If the sequence of bases in one strand of DNA is ATGCATGCA, what would be the sequence of bases on complementary strand ?
(a) ATGCATGCA
(b) AUGCAUGCA
(c) TACTACGT
(d) UACGUACGU
Answer:
(c) TACTACGT

Question 20.
How far is each base pair from the next one in DNA double helix model ?
(a) 2 nm
(b) 3.4 nm
(c) 34 nm
(d) 0.34 nm
Answer:
(d) 0.34 nm

Question 21.
Synthesis of DNA from RNA is explained by
(a) central dogma reverse
(b) reverse transcription
(c) feminism
(d) all of these.
Answer:
(d) all of these.

Question 22.
Histone proteins are
(a) basic, negatively charged
(b) basic, positively charged
(c) acidic, positively charged
(d) acidic, negatively charged
Answer:
(b) basic, positively charged

Question 23.
The structure in chromatin seen as 'beads-on string' when viewed under electron microscope are called
(a) nucleotides
(b) nucleosides
(c) histone octamer
(d) nucleosomes.
Answer:
(d) nucleosomes.

Question 24.
Find out the wrong statement about heterochromatin,
(a) It is densely packed
(b) It stains dark.
(c) It is transcriptionally active.
(d) It is late replicating.
Answer:
(c) It is transcriptionally active.

Question 25.
They year 2003 was celebrated as the 50th anniversary of discovery of
(a) transposons by Barbare Me Clintock
(b) structure of DNA by Watson and Crick
(c) Mendel's laws of inheritance
(d) biotechnology by Kary Muliis.
Answer:
(b) structure of DNA by Watson and Crick

Question 26.
The process of transofrmation is not affected by which of the following enzymes ?
A. DNase
B. RNase
C. Peptidase
D. Lipase
(a) A, B
(b) A, B, C, D
(c) B, C, D
(d) A, B, C
Answer:
(c) B, C, D

Question 27.
The three codons which result in the termination of polypeptide chain synthesis are
(a) UAA, UAG, GUA
(b) UAA, UAG, UGA
(c) UAA, UGA, UUA
(d) UGU,UAG,UGA
Answer:
(b) UAA, UAG, UGA

Question 28.
Amino acids which are specified by single codons are
(a) phenylalanine and arginine
(b) tryptophan and methionine
(c) valine and proline
(d) methionine and aroinine.
Answer:
(b) tryptophan and methionine

Question 29.
Which out of the following statements is incorrect ?
(a) Genetic code is ambiguous.
(b) Genetic code is deqenerate.
(c) Genetic code is universal.
(d) Genetic code is non-overlanning.
Answer:
(a) Genetic code is ambiguous.

Question 30.
Some amino acids are coded by more than one codon, hence the genetic code is
(a) overlapping
(b) degenerate
(c) wobbled
(d) unambiguous.
Answer:
(d) unambiguous.

Question 31.
The mutations that involve addition, deletion or substitution of a single pair in a gene are referred to as
(a) point mutations
(b) lethal mutations
(c) silent mutations
(d) retrogressive mutations.
Answer:
(a) point mutations

Question 32.
Sickle cell anemia results from a single base substitution in a gene, thus it is an example of
(a) point mutation
(b) frame-shift muttion

(c) silent mutation
(d) both (a) and (b).
Answer:
(a) point mutation

Question 33.
Select the incorreclty matched pair.
(a) Initation codons – AUG,GUG
(b) Stop codons – UAA, UAG, UGA
(c) Methionine – AUG
(d) Anticodons – mRNA
Answer:
(d) Anticodons – mRNA

Question 34.
Amino acid acceptor end of tRNA lies at
(a) 5’ end
(b) 3’ end
(c) T VC loop
(d) DHUloop.
Answer:
(b) 3’ end

Question 35.
Which RNA carries the amino acids from the amino acid pool to mRnA during protein synthesis ?
(a) rRNA
(b) mRNA
(c) /RNA
(d) hnRNA
Answer:
(c) /RNA

Question 36.
During translation, activated amino acids get linked to tRNA. This process is commonly called as
(a) charging of tRNA
(b) discharging of tRNA
(c) aminoacylation of tRNA
(d) both (a) and (c)
Answer:
(b) discharging of/RNA

Question 37.
To prove that DNA is the genetic material, which radioactive isotopes were used by Hershey and Chase (1952) in experiments ?
(a) 33S and 15N
(b) 32P and 35S
(c) 32P and 15N
(d) 14N and 15N

Answer:
(d) 14N and 15N

Question 38.
RNA is the genetic material in
(a) prokaryotes
(b) eukaryotes
(c) Tabacco Mosaic Virus (TMV)
(d) E.coli.
Answer:
(c) Tabacco Mosaic Virus (TMV)

Question 39.
Which one among the following was the first genetic material ?
(a) DNA
(b) RNA
(c) Protein
(d) Nuclein
Answer:
(b) RNA

Question 40.
Which of the following life processes is evolved around RNA ?
(a) Metabolism
(b) Translation
(c) Splicing
(d) All of these
Answer:
(b) Translation

Question 41.
Chemically, RNA is (i) reactive and (ii) stable as compared to DNA.
(a) (i) equally, (ii) equally
(b) (i) less, (ii) more
(c) (i) more, (ii) less
(d) (i) more, (ii) equally
Answer:
(c) (i) more, (ii) less

Question 42.
Which of the following phenomena was experimentally proved by Meselson and Stahl ?
(a) Transformation
(b) Transduction
(c) Semi-conservative DNA replication
(d) Central dogma
Answer:
(c) Semi-conservative DNA replication

Question 43.
First experimental proof for semi-conservative DNA replication was shown in

(a) Streptococcus pneumoniae
(b) Escherichia coli
(c) Neurospora crassa
(d) Rattus rattus.
Answer:
(b) Escherichia coli

Question 44.
Select the correct match of enzyme with its related function.
(a) DNA polymerase – Synthesis of DNA strands
(b) Helicase – Unwinding of DNA helix
(c) Ligase – Joins together short DNA segments
(d) All of these
Answer:
(d) All of these

Question 45.
Other than DNA polymerase, which are the enzymes involved in DNA synthesis ?
(a) Topoisomerase
(b) Helicase
(c) RNA primase
(d) All of these
Answer:
(d) All of these

Question 46.
DNA replication takes place at _____ phase of the cell cyle.
(a) G_1
(b) S
(c) G_2
(d) M
Answer:
(b) S

Question 47.
The process of copying genetic information from one strand of DNA to RNA is termed as _____ .
(a) replication
(b) transcription
(c) translation
(d) reverse transcription
Answer:
(b) transcription

Question 48.
The enzyme DNA dependent RNA polymerase catalyses the polymerisation reaction in _____direction.
(a) only 5′ → 3′
(b) only 3′ → 5′

(c) both (a) and (b)
(d) none of these
Answer:
(a) only 5′ → 3′

Question 49.
If the sequence of bases in coding strand of DNA is ATTCGATG, then the sequence of bases in mRNA will be
(a) TAAGCTAC
(b) UAAGCUAC
(c) ATTCGATG
(d) AUUCGAUG.
Answer:
(d) AUUCGAUG.

Question 50.
If the sequence of bases in DNA is GCTTAGGCAA then the sequence of bases in its transcript will be
(a) GCTTAGGCAA
(b) CGAATCCGTT
(c) CGAAUCCGUU
(d) AACGGAUUCG.
Answer:
(c) CGAAUCCGUU

Question 51.
Transcription unit
(a) starts with TATA box
(b) starts with pallendrous regions and ends with rho factor.
(c) starts with promoter region and ends in terminator region
(d) starts with CAAT region.
Answer:
(c) starts with promoter region and ends in terminator region

Question 52.
During transcription, the site of DNA molecule at which RNA polymerase binds is called
(a) promoter
(b) regulator
(c) receptor
(d) enhancer.
Answer:
(a) promoter

Question 53.
Polycistronic messenger RNA (mRNA) usually occurs in
(a) bacteria
(b) prokaryotes
(c) eukaryotes
(d) both (a) and (b)

Answer:
(d) both (a) and (b)

Question 54.
In transcription in eukaryotes, heterogenous nuclear RNA (hnRNA) is tmascribed by
(a) RNA polymerase I
(b) RNA polymerase II
(c) RNA poly merase II
(d) all of these.
Answer:
(b) RNA polymerase II

Question 55.
Methyl guanosine triphosphate is added to the 5' end of hnRNA in a process of
(a) splicing
(b) capping
(c) tailing
(d) none of these
Answer:
(b) capping

Question 56.
In eukaryotes, the process of processing of primary transcript involves
(a) removal of introns
(b) capping at 5'end
(c) tailing (polyadenlation) at 3' end
(d) all of these.
Answer:
(b) capping at 5'end

Question 57.
In a n/RNA molecule, untranslated regions (UTRs) are present at
(a) 5' – end (before start codon)
(b) 3' – end (after stop codon)
(c) both (a) and (b)
(d) 3'- end only.
Answer:
(c) both (a) and (b)

Question 58.
UTRs are the untranslated regions present on
(a) rRNA
(b) hnRNA
(c) mRNA
(d) hnRNA.
Answer:
(c) mRNA

Question 59.
Which of the following statements is correct regarding ribosomes ?

(a) Most of a cell's DNA molecule are stored there.
(b) Complete polypeptide is released from there.
(c) mRNAs are produced there.
(d) DNA replication takes place there.
Answer:
(b) Complete polypeptide is released from there.

Question 60.
Regulation of gene expression occurs at the level of
(a) transcription
(b) processing/splicing
(c) translation
(d) all of these.
Answer:
(d) all of these.

Question 61.
During expression of an operon, RNA polymerase binds to
(a) structural gene
(b) regulator gene
(c) operator
(d) promoter.
Answer:
(d) promoter.

Question 62.
The sequence of structural genes in lac operon is
(a) Lac A, Lac Y, Lac Z
(b) Lac A, Lac Z, Lac Y
(c) Lac Y, Lac A, Lac A
(d) Lac Z, Lac Y, Lac A
Answer:
(d) Lac Z, Lac Y, Lac A

Question 63.
Which of the following cannot act as inducer ?
(a) Glucose
(b) Lactose
(c) Galactos
(d) Both (a) and (c)
Answer:
(d) Both (a) and (c)

Question 64.
Human genome consists of approximately
(a) 3×10^9 bp
(b) 6×10^9 bp
(c) 20,000 – 25,000 bp
(d) 2.2×10^4 bp.

Answer:
(a) 3×10^9 bp

Question 65.
Estimated number of genes in human beings is
(a) 3,000
(b) 80,000
(c) 20,500
(d) 3×10^9
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Answer:
(c) 20,500