MOLECULAR BASIS OF INHERITANCE

SECTION - C

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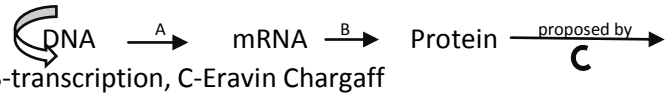
1. The diagram shows an important concept in the genetic implication of DNA. Fill in the blanks A to C



   a. A-transition, B-transcription, C-Eravin Chargaff
   b. A-transcription, B-transcription, C-Francis Crick
   c. A-transcription, B-extension , C- Rosalind Franklin
   d. A- transcription, B-replication, C-James Watson

2. Which enzyme/s will be produced in a cell in which there is a nonsence mutation in the lac Y gene?
   a. Lactose permease
   b. Transacetylase
   c. Lactose permease and transacetylase
   d. B-galactosidase

3. Uridine, present only in RNA is a
   a. Pyrimidine
   b. Nucleoside
   c. Nucleotide
   d. Purine

4. Which of the following is not a property of the genetic code?
   a. Universal
   b. Non-overlapping
   c. Ambiguous
   d. Degeneracy

5. One of the most frequently used techniques in DNA fingerprinting is
   a. AFLP
   b. VNTR
   c. SSCP
   d. SCAR

6. In an inductive operon, the gene are
   a. Always expressed
   b. Usually not expressed unless a signal turns them “on”
   c. Usually expressed unless a signal turns them “off”
   d. Never expressed

7. How many genome types are present in a typical green plants cell?
   a. More than five
   b. More than ten
   c. Two
   d. Three

8. PCR and Restriction Fragment length Polymorphism are the methods for
   a. DNA sequencing
   b. Genetic fingerprinting
   c. Study of enzymes
   d. Genetic transformation

9. Removal of RNA polymerase III from nucleoplasm will affect the synthesis of
   a. mRNA
   b. rRNA
   c. tRNA
   d. hnRNA

10. Removal of introns and joining of exons in a defined order during transcription is called
   a. Slicing
   b. Splicing
   c. Looping
   d. Inducing

11. Which of the following is not a part of a transcription unit in DNA?
   a. A promoter
   b. The structural gene
   c. The inducer
   d. A terminator

1(b), 2(d), 3(b), 4(c), 5(b), 6(b), 7(c), 8(b), 9(c), 10(b), 11(c), 12(b), 13(d)

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12. A single strand of nucleic acid tagged with a radioactive molecule is called
    a. Plasmid
    b. Probe
    c. Vector
    d. Selectable marker
13. If one strand of DNA has the nitrogenous base sequence as ATCTG, what would be the complementary RNA strand sequence?
    a. AACTG
    b. ATCGU
    c. TTAGU
    d. UAGA

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14. Read the following four statements (A - D)
    a. In transcription, adensine pairs with uracil.
    b. Regulation of lac operon by repressor is referred to as positive regulation.
    c. The human genome has appromiately 50,000 genes.
    d. Haemophila is a sex-linked recessive disease
15. What is it that forms the basic of DNA fingerprinting?
    a. The relative proportions of purines and pyrimides in DNA
    b. The relative difference in the DNA occurrence in blood, skin and saliva
    c. The relative amount of DNA in the ridges and grooves of the fingerprintings
    d. Satellite DNA occurring as highly repeated short DNA segments
16. The reaction, Amino acid + ATP → Aminoacyl-AMP + P-P depicts
    a. Amino acid and assimilation
    b. Amino acid transformation
    c. Amino acid activation
    d. Amino acid translocation
17. The transcription of any gene is the indication of its
    a. Induction
    b. Activity
    c. Stimulation
    d. Hypersensitivity
18. mRNA directs the building of proteins through a sequence of
    a. Introns
    b. Codons
    c. Exons
    d. Anticodons
19. Beadle and Tatum showed that each kind of mutant bread mould they studied lacked a specific enzyme. Their experiments demonstrated that
    a. Cells need specific enzymes in order to function
    b. Genes are made of DNA
    c. Genes carry-information for making proteins
    d. Enzymes are required to repair damaged DNA Information
20. Which of the following makes use of RNA template to synthesize DNA?
    a. DNA polymerase
    b. RNA polymerase
    c. Reverse transcriptase
    d. DNA dependant RNA polymerase
21. Telemere repetitive DNA sequences control the function of eukaryotic chromose because they
    a. Are RNA transcription initiator
    b. Help in chromosome pairing
    c. Prevent chromosome loss
    d. Acts as replicons
22. Which of the following pairs of codons is correctly matched with their function or the signal for the particular amino acid?
    a. UUA, UCA – Leucine
    b. GUU, GCU – Alanine
    c. UAG, UGA – Stop
    d. AUG, ACG – Start / Methionine
23. Which of the following nucleotide sequences contain 4 pyrimidine bases?
    a. GATCAATGC
    b. GCUAGACAA
    c. UAGCGGUAA
    d. Both (b) & (c)
24. The 1992 Nobel Prize for medicine was awarded to Edmond H. Fischer and Edwin J. Krebs for their work concerning
    a. Reversible protein phosphorylation as a biological regulation mechanism
    b. Isolation of the gene for a human disease
    c. Human genome project
    d. Drug designing involving inhibition of DNA synthesis of the pathogen
25. Initiation codon in eukayotes is

14(a), 15(d), 16(c), 17(b), 18(b), 19(c), 20(c), 21(c), 22(c), 23(a), 24(a)

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a. GAU
b. AGU
c. AUG
d. UAG

26. 'Lac operon' in E. coli, is induced by
    a. "I" gene
    b. Promoter gene
    c. B-galactosidase
    d. Lactose
27. There are special proteins that help to open up DNA double helix in front of the replication fork. These proteins are
    a. DNA ligase
    b. DNA topoisomerase I
    c. DNA gyrase
    d. DNA polymerase I
28. In protein synthesis, the polymerization of amino acids involves three steps. Which one of the following is not involved in the polymerization of protein?
    a. Termination
    b. Initiation
    c. Elongation
    d. Transcription
29. Anticodon is an unpaired triplet of bases in an exposed position of
    a. t-RNA
    b. m-RNA
    c. r-RNA
    d. both (2) & (3)
30. An environmental agent , which triggers transcription from an operon, is a
    a. Depressor
    b. Controlling element
    c. Regulator
    d. Inducer
31. In split genes, the coding sequences are called
    a. Exons
    b. Cistrons
    c. Introns
    d. Operons
32. The lac operon is an example of
    a. Repressible operon
    b. Overlapping genes
    c. Arabinose operon
    d. Inducible operons
33. If the DNA codons are ATG ATG ATG and a cytosine base in inserted at the beginning, then which of the following will result?
    a. CAT GAT GATG
    b. A non-sense mutation
    c. C ATG ATG ATG
    d. CA TGA TGA TG
34. The wild type E. coli cells are growing in normal medium with glucose. They are transferred to a medium containing only lactose as sugar. Which of the following changes take place?
    a. The lac operon is induced
    b. E. coli cells stop dividing
    c. The lac operon is repressed
    d. All operons are induced
35. If the sequence of bases in DNA in ATTCGATG, then the sequence of bases in its transcript will be
    a. GAUGUUA
    b. AUUCGAUG
    c. CAUCGAAU
    d. UAAGUAC
36. Which of the following serves as an stop codon?
    a. UAG
    b. AGA
    c. AUG
    d. GCC
37. The codons causing chain termination are
    a. AGT, TAG, UGA
    b. UAG, UGA, UAA
    c. TAG, TAA, TGA
    d. GAT, AAT, AGT

38. DNA synthesis can be specifically measured by estimating the incorporation of radio-labelled
    a. Thymidine
    b. Deoxyribo sugar

25(c), 26(d), 27(c), 28(d), 29(a), 30(d), 31(a), 32(d), 33(a), 34(a), 35(d), 36(a), 37(b)

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c. Uracil
d. Adenine

39. Which of the following step of translation does not consume a high energy phosphate bond?
    a. Peptidyl transferase reaction
    b. Aminoacyl t-RNA binding to A-site
    c. Translocation
    d. Amino acid activation
40. DNA elements, which can switch their position, are called
    a. Cistrons
    b. Transposons
    c. Exons
    d. Introns
41. Sequence of which of the following is used to know the phylogency?
    a. m-RNA
    b. r-RNA
    c. t-RNA
    d. DNA
42. Genes that are involved in turning on or off the transcription of a set of structural genes are called
    a. Redundant genes
    b. Regulatory genes
    c. Polymorphic genes
    d. Operator genes
43. In operon concept, regulation gene functions as
    a. Inhibitor
    b. Repressor
    c. Regulator
    d. All of these
44. In DNA, when AGCT occurs, their association as per which of the following pair?
    a. AT-GC
    b. AG-CT
    c. AC-GT
    d. All of these
45. Irregularity is found in Drosophilla during the organ differentiation. For example, in place of wing long legs are formed. Which gene is responsible?
    a. Double dominant gene
    b. Homeotic gene
    c. Complimentary gene
    d. Plastid gene
46. Method of DNA replication in which two strands of DNA separate and synthesise new strands, is
    a. Dispersive
    b. Conservative
    c. Semi conservative
    d. Non conservative
47. In negative operon
    a. Co-repressor with repressor
    b. Co-repressor does not bind with repressor
    c. Co-repressor binds with inducer
    d. cAMP have negative effect on lac operon
48. Gene and cistron words are sometimes used synonymously because
    a. One cistron contains many genes
    b. One gene contains many cistron
    c. One gene contains one cistron
    d. One gene contains no cistron
49. m-RNA is synthesised on DNA template in which direction?
    a. 5’ → 3’
    b. 3’ → 5’
    c. Both (a) & (b)
    d. Any of these
50. At the time of organogenesis, genes regulate the process at different levels and at different time due to
    a. Promoter
    b. Regulator
    c. Intron
    d. exon
51. A mutant strain of T_4 – bacteriophage, R-II, fails to lyse the E. coli but when two strains R-IIX and R-IIY are mixed then they lyse the E. coli. What may be the possible reason?
    a. Bacteriophage transforms in wild
    b. It is not mutated
    c. Both strains have similar cistrons
    d. Both strains have different cistrons

38(a), 39(a), 40(b), 41(a), 42(b), 43(b), 44(a), 45(b), 46(c), 47(a), 48(c), 49(a), 50(d)

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52. In E. coli, during lactose metabolism repressor binds to
    a. Regulator gene
    b. Operator gene
    c. Structural gene
    d. Promoter gene
53. In a DNA, percentage of thymine is 20% then what will be percentage of guanine?
    a. 20%
    b. 40%
    c. 30%
    d. 60%
54. Out of 64 codons, 61 codons code for 20 types of amino acid. It is called
    a. Degeneracy of genetic code
    b. Overlapping of genes
    c. Wobbling of codons
    d. University of codons
55. Jacod anad monad studied lactose metabolism in E. coli and proposed operon concept. Operon concept is applicable for
    a. All prokaryotes
    b. All prokaryotes and some eukaryoted
    c. All prokaryotes and all eukaryoted
    d. All prokaryotes and some protozoans
56. Exon part of hn-RNA have code for
    a. Protein
    b. Lipid
    c. Carbohydrate
    d. Phospholipid
57. Which of RNA has a structure resembling with clover leaf?
    a. r-RNA
    b. hn-RNA
    c. mRNA
    d. tRNA
58. Which of the following reunites the exon segments afte RNA splicing?
    a. RNA polymerase
    b. RNA primase
    c. RNA ligase
    d. RNA proteoses
59. During initiation of translation in prokaryotes, a GTP molecule is needed in
    a. Formation of formyl-met-tRNA
    b. Binding of 30 S subunit of ribosome with mRNA
    c. Association of 30 S mRNA with formyl-met-tRNA
    d. Association of 50 S subunit of ribosome with initiation complex
60. In the genetic code dictionary, how many codons are used to code for all the 20 essential amino acids?
    a. 20
    b. 64
    c. 61
    d. 60
61. The telomeres of eukaryotic chromosomes consist of short sequences of
    a. Thymine rich repeats
    b. Cytosine rich repeats
    c. Adenine rich repeats
    d. Guanine rich repeats
62. What does “lac” refer to in what we call the lac operon?
    a. Lactose
    b. Lactase
    c. Lac insect
    d. The number 1,00,000
63. Degeneration of a genetic code is attribute to the
    a. Fisrt member of a codon
    b. Second member of codon
    c. Entire codon
    d. Third member of a codon

51(d), 52(b), 53(c), 54(a), 55(a), 56(a), 57(d), 58(c), 59(c), 60(c), 61(d), 62(b), 63(d)

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64. During transcription, the DNA site at which RNA polymerase binds is called
    a. Promoter
    b. Regulator
    c. Receptor
    d. Enhancer
65. What would happen if in a gene encoding a polypeptide of 50 amino acids, 25th codon (UAU) is mutated to UAA?
    a. A polypeptide of 24 amino acids will be formed
    b. Two polypeptides of 24 and 25 amino acids will be formed
    c. A polypeptide of 49 amino acids will be formed
    d. A polypeptide of 25 amino acids will be formed
66. Which one of the following triplet codon, is correctly matched with its specificity for an amino acid in protein synthesis or as 'start' or as 'stop' codon?
    a. UCG – start
    b. UUU – stop
    c. UGU – leucine
    d. UAC – tyrosine
67. DNA fingerprinting refer to
    a. Molecular analysis of profiles of DNA samples
    b. Analysis of DNA samples using imprinting devices
    c. Technique used for identification of fingerprints of individuals
    d. Techniques used for identification of fingerprints of individuals
68. During transcription, if the nucleotide sequence of the DNA strand that is being coded is ATACG then the nucleotide sequence in the mRNA would be
    a. TATGC
    b. TCTGG
    c. UAUGC
    d. UATGC
69. After a mutation at a genetic locus the character of an organism changes due to change in
    a. Protein structure
    b. DNA replication
    c. Protein synthesis pattern
    d. RNA transcription pattern
70. During replication of a bacterial chromosome DNA synthesis starts from a replication origin site and
    a. RNA primers are involved
    b. Is facilitated by telomerase
    c. Moves in one direction of the site
    d. Moves in bi-directional way
71. The following ratio is generally constant for a given species
    a. A + G / C + T
    b. T + C / G + A
    c. G + C / A + T
    d. A + C / T + G
72. What is true for E. coli with inhibited lac-z gene?
    a. They cannot synthesize permease
    b. They cannot synthesize functional beta galactosidase
    c. They cannot synthesize transacetylase
    d. They cannot transport lactose from the medium into the cell
73. During transcription holoenzyme RNA polymerase binds to a DNA sequence and the DNA assumes a saddle like structure at that point. What is that sequence called?
    a. AAAT box
    b. TATA box
    c. GGTT box
    d. CAAT box
74. Amino acid sequence, in protein synthesis is decided by the sequence of
    a. rRNA
    b. tRNA
    c. mRNA
    d. cDNA
75. One turn of the helix in a B-form DNA is approximately

64(a), 65(a), 66(d), 67(b), 68(c), 69(a), 70(d), 71(c), 72(b), 73(b), 74(c)

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a. 2nm
b. 20nm
c. 0.34 nm
d. 3.4 nm

76. Antiparallel strands of a DNA molecule means that
    a. One strand turns clockwise
    b. One strand turns anti-clockwise
    c. The phosphate groups of two DNA strands, at their ends, share the same position
    d. The phosphate groups at the start of two DNA strands, are in opposite position(pole)
77. One gene-one enzyme hypothesis was postulated by
    a. Beadle and tatum
    b. R. Franklin
    c. Hershey and Chase
    d. A. Garrod
78. Which antibiotic inhibits interaction between tRNA and mRNA during bacterial protein synthesis?
    a. Tetracycline
    b. Erythromycin
    c. Neomycin
    d. Streptomycin
79. The Okazaki fragments in DNA chain growth
    a. Polymerize in the 3’-to-5’ direction and form replication fork
    b. Prove semi-conservative nature of DNA replication
    c. Polymerize in the 5’ - to - 3’ direction
    d. Result in transcription
80. The length of DNA molecule greatly exceeds the dimensions of the nucleus in eukaryotic cells. How the dimension of the nucleus in eukaryotic cells. How is this DNA accommodated?
    a. Super- colling in nucleosomes
    b. DNase digestion
    c. Through elimination of repetitive DNA
    d. Deletion of non-essential genes
81. During transcription, RNA polymerase holoenzyme binds to a gene promoter and assumes a saddle – like structure. What is it’s DNA-binding sequence?
    a. AATT
    b. CACC
    c. TATA
    d. TTAA
82. Differentiation of organs and tissues in a developing organism, is associated with
    a. Differential expression of genes
    b. Lethal mutations
    c. Deletion of genes
    d. Developmental mutations
83. One gene – one enzymes relationship was established for the first time in
    a. Salmonella typhimurium
    b. Escherichia coli
    c. Diplococcus pneumonia
    d. Neurospora crassa
84. The two polynucleotide chains in DNA are
    a. Discontinuous
    b. Antiparallel
    c. Semiconservative
    d. Parallel
85. Molecular basis of organ differentiation depends on the modulation in transcription by
    a. Ribosome
    b. Transcription factor
    c. Anticodon
    d. RNA polymerase
86. The nuclease enzyme, which begins its attack from free end of a polynucleotide, is
    a. Polymerase
    b. Endonuclease
    c. Exonuclease
    d. Kinase
87. Radio-tracer technique shows that DNA is in
    a. Multi-helix stage
    b. Single-helix stage
    c. Double-helix stage
    d. None of these
88. Genes are packaged into a bacterial chromosome by
    a. Acidic protein
    b. Actin

75(d), 76(d), 77(a), 78(c), 79(c), 80(a), 81(c), 82(d), 83(d), 84(b), 85(b), 86(c), 87(c)

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c. Histones
d. Basic protein

89. The hereditary material present in the bacterium E. coli is
    a. Single-stranded DNA
    b. Double-stranded DNA
    c. DNA and RNA
    d. RNA
90. The pneumococcus experiment proves that
    a. Bacteria do not reproduce sexually
    b. RNA sometime controls the production of DNA and proteins
    c. DNA is the genetic material
    d. Bacteria undergo binary fission
91. E. coli about to replicate was placed in a medium containing radio active thymidine for five minutes. Then it was made to replicate in a normal medium. Which of the following observation shall be correct?
    a. Both the strands of DNA will be radioactive
    b. One strand radioactive
    c. Each strand half radioactive
    d. None is radioactive
92. Types of RNA polymerase required in nucleus of eukaryotes for RNA synthesis is/are
    a. 1
    b. 2
    c. 3
    d. 3
93. Transformation experiment was first performed on which bacteria?
    a. E. coli
    b. Diplococcus pneumoniae
    c. Salmonella
    d. Pasteurella pestis
94. Telomerase is an enzymes which is a
    a. Simple protein
    b. RNA
    c. Ribonucleoprotein
    d. Repetitive DNA
95. In transgenics, expression of transgene in target tissue is determined by
    a. Enhancer
    b. Transgene
    c. Promoter
    d. Reporter
96. A nutritionally wild type organism, which does not require any additional growth supplement, is known as
    a. Osmotroph
    b. Mixotroph
    c. Auxotroph
    d. Prototroph
97. What is not true for genetic code?
    a. It is unambiguous
    b. A codon in mRNA is read in a non-contiguous fashion
    c. It is nearly universal
    d. It is degenerate
98. Removal of introns and joining the exons in a defined order in a transcription unit is called
    a. Capping
    b. Splicing
    c. Tailing
    d. Transformation
99. Semiconservative replication of DNA was first demonstrated in
    a. Salmonella typhimurium
    b. Drosophila melanogaster
    c. Escherichia coli
    d. Streptococcus pneumonia
100. Whose experiments cracked the DNA discovered unequivocally that a genetic code is a "triplet"?
    a. Beadle and Tatum
    b. Nirenberg and Mathaei

88(d) ,89(b), 90(c), 91(b), 92(c), 93(b), 94(c), 95(c), 96(d), 97(b), 98(b), 99(c)

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c. Hershey and Sturtevant
d. Morgan and Sturtevant

101. The one aspect which is not a salient feature of genetic code, is its being
a. Specific
b. Degenerate
c. Ambiguous
d. Universal

102. Satellite DNA is useful tool in
a. Genetic engineering
b. Organ transplantation
c. Sex determination
d. Forensic science

103. Which one of the following does not follow the central dogma of molecular biology?
a. HIV
b. Pea
c. Muoor
d. Chlamydomonas

104. Select the two correct statements out of the four (a-d) given below about lac operon.
i. Glucose or galactose may bind with the repressor and inactivate it.
ii. In the absence of lactose the repressor binds with the operator region
iii. The z-gene codes for permease
iv. This was elucidate by Francois Jacob and Jacque Monod
The correct statement are
a. (i) and (ii)
b. (ii) and (iii)
c. (i) and (iii)
d. (ii) and (iv)

105. In eukaryotic cell transcription, RNA splicing and RNA capping take place the
a. Ribosomes
b. Nucleus
c. Dictyosomes
d. ER

106. The lac operon consists of
a. Four regulatory genes only
b. One regulation gene and three structural genes
c. Two regulatory genes and two structural genes
d. Three regulatory genes and three structural genes

107. Which one of the following statements about the particular entity is true?
a. Nucleosome is formed of nucleotides
b. DNA consists of a core of eight histones
c. Centromere is found in animal cells. Which produces aster during cell
d. The gene for producing insulin is present in every body cell

108. The 3' – 5' phosphodiester linkages inside a polynucleotide chain serve to join
a. One nucleotide with another nucleotide
b. One nitrogenous base with pentose sugar
c. One DNA strand with the other DNA strand
d. One nucleoside with another nucleoside

109. Which one of the following also acts as a catalyst in a bacterial cell?
a. 23 S rRNA
b. 5 S rRNA
c. SnRNA
d. hn RNA

110. the unequivocal proof of DNA as the genetic material came from the studies on a
a. viroid
b. bacterial virus
c. bacterium
d. fungus

111. Which one of the following is wrongly matched?
a. Transcription-Writing information from DNA to tRNA
b. Transilation-using information in m-RNA to make protein
c. Repressor protein-binds to operator to stop enzyme synthesis

100(b),101(c), 102(d), 103(a), 104(d), 105(b), 106(b), 107(d), 108(a), 109(a), 110(b)

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d. Operon-Structural genes, operator and promoter

112. Transformation was discovered by

a. Meselson and Stahi
b. Hershey and Chase
c. Griffith
d. Watson and crick

113. Select the correct option.

	Direction of RNA synthesis	Direction of reading of the template DNA strand
a.	5’ – 3’	3’ – 5’
b.	3’ – 5’	5’ – 3’
c.	5’ – 3’	5’ – 3’
d.	3’ – 5’	3’ – 5’

111(d), 112(c), 113(a)