

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2010.

Ph.D. (BIOCHEMISTRY AND MOLECULAR BIOLOGY)

COURSE CODE : 102

Register Number :



Signature of the Invigilator
(with date)

COURSE CODE : 102

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. How many different codons would exist in a genetic code with 4 base codons?
(A) 16 (B) 32 (C) 64 (D) 256
2. Retroviral reverse transcriptase has the following enzyme activity/activities.
(A) RNA dependent RNA polymerase (B) RNA dependent DNA polymerase
(C) RNase H (D) DNA dependent DNA polymerase
3. Palindromic sequences in DNA serve as
(A) Signals or attachment of RNA primer
(B) Signals for termination of RNA synthesis
(C) Sites for restriction endonucleases
(D) Primers for DNA replication
4. 2', 3' Dideoxynucleotide triphosphate (ddNTPs) lacks
(A) 2' hydroxyl group (B) 2' and 3' hydroxyl group
(C) 3 hydroxyl group only (D) 3 hydroxyl group
5. Terminal transferase, an unique DNA polymerase which
(A) does not require a template (B) add de-oxynucleotides to free 3' end
(C) both (A) and (B) (D) none of the above
6. DNA ligase catalyses formation of
(A) 3'-5' Phosphodiester bond (B) 5'-3' Phosphodiester bonds
(C) both (A) and (B) (D) none of the above
7. Enhancer can
(A) Work when located long distances from the promoter
(B) Work when oriented in either direction
(C) Work by binding one or more protein
(D) All the above
8. Attenuation mechanism is a characteristic of
(A) Lac Operon (B) trp Operon (C) Both (D) None

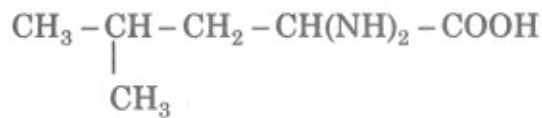
9. The two hybrid assay is used to identify
- (A) Protein-protein interaction
 - (B) DNA-protein interaction
 - (C) DNA-RNA Interaction
 - (D) DNA-DNA interaction
10. Transcription of eukaryotic genes can be repressed by a repressor by
- (A) binding to site on DNA that overlap the binding site of an activator
 - (B) binding to a site on DNA beside on an activator site and interact with activators
 - (C) binds to a site upstream of gene and by interacting with the transcriptional machinery at the promoter
 - (D) all of the above
11. The process of replicating DNA pol α /primase with DNA pol δ is called
- (A) polymerase switching
 - (B) polymerase linearization
 - (C) polymerase dimerization
 - (D) None of the above
12. Many amino acids are specified by more than one codon, the phenomenon are called
- (A) synonyms
 - (B) degeneracy
 - (C) despairing
 - (D) none of the above
13. A unit of Operon Consists of
- (A) Operator + repressor
 - (B) Repressor + structural gene
 - (C) Operator + structural gene
 - (D) Operator + activator
14. In northern blot hybridization
- (A) DNA immobilized on the filter is probed with labeled DNA
 - (B) RNA immobilized on the filter is probed with labeled DNA or RNA
 - (C) DNA immobilized on the filter is probed with labeled DNA or RNA
 - (D) DNA immobilized on the filter is probed with labeled protein
15. Dicer is
- (A) RNase III like enzyme recognize and digest long dsRNA
 - (B) RNase III like enzyme recognize and digest long ssRNA
 - (C) RNase III like enzyme recognize and digest long dsDNA
 - (D) RNase III like enzyme recognize and digest long ssDNA

16. The pH activity profile of lysozyme drop sharply on either side of the optimum at pH 5 because
- (A) Asp 52 carboxyl becomes protonated (B) Glu 35 carboxyl becomes ionised
(C) All of the above (D) None of the above
17. Enzyme catalysis can be explained by a lock and key concept of
- (A) enzyme fit on substrate
(B) substrate fit on active site
(C) cofactor fit on enzyme
(D) substrate fit on charged residues on the enzyme
18. Gel filtration is a method for separating proteins on the basis of their
- (A) stokes radii (B) solubility
(C) hydrophobicity (D) surface charge
19. Two general classes of enzymatic catalysis are
- (A) anion, cation (B) donor, acceptor
(C) acid-base, covalent (D) ionic, van derwaals
20. Equilibrium constant of a reaction is defined as the
- (A) ratio of reactant concentration to product conc.
(B) ratio of product conc, to reactant conc.
(C) product of reactant and product concentration
(D) inverse product of reactant and product conc
21. The technique of affinity labeling is employed to identify amino acid residues at
- (A) active site (B) amino terminus
(C) carboxy terminus (D) membrane interface
22. The principal fuel molecule of most cells is
- (A) carbohydrate (B) vitamins (C) alcohol (D) nucleic acids
23. Production of ATP in cells is associated with
- (A) electron transport in mitochondria (B) glucose import
(C) protein degradation (D) none of the above

24. Two important principal commodities provided to a cell by catabolic pathways are
(A) ATP and intermediates (B) ATP and NADPH
(C) NAD and intermediates (D) Substrates and intermediates
25. The cofactor in the glycogen phosphorylase reaction is
(A) NADP (B) Cyclic AMP
(C) Glucose phosphate (D) ATP
26. Electron transport is the process in which electrons are transferred from
(A) external acceptor to donor molecules
(B) donor molecules to external acceptors
(C) donor molecules to membrane bound enzymes
(D) external acceptors to cellular substrates
27. All carboxylation reactions involving CO_2 fixation in animal cells require
(A) thiamine pyrophosphate (B) biotin
(C) alpha-keto carboxylic acids (D) coenzyme-A
28. Oxidative phosphorylation is blocked by
(A) inhibitors of electron transport (B) inhibitors of phosphorylation
(C) uncoupling agents (D) all of the above
29. In the absence of an energy source, most active transport systems promote
(A) active diffusion (B) passive diffusion
(C) facilitated diffusion (D) no diffusion at all
30. What are Okazaki fragments?
(A) short fragments of the promoter sequence
(B) short fragments of newly synthesized RNA
(C) short fragments of newly synthesized DNA
(D) short fragments of the DNA sense strand
31. One CentiMorgan is
(A) Recombination ratio of 1% over small distances in a chromosome
(B) Recombination fraction of 1% over small distances in a chromosome
(C) Recombination indexes of 1% over small distances in a chromosome
(D) Recombination rate of 1% over small distances in a chromosome

32. Exonuclease III will degrade DNA
- (A) from the 5' phosphate of a recessed 5' end in a 5' to 3' direction
 - (B) from the 3' hydroxyl of a recessed 3' end in a 3' to 5' direction
 - (C) only when the DNA is a single-stranded fragment
 - (D) only at places where there are mismatched bases in the heteroduplex
33. Thermostable DNA polymerases like Taq DNA polymerase are very different from most bacterial DNA polymerases because of
- (A) their ability to use any primed DNA as a template
 - (B) their lack of requirement for a DNA primer for synthesis to occur
 - (C) their ability to easily be purified to a very pure and active state
 - (D) their ability to continue the polymerization reaction at very high temperatures that inactivate most other enzymes
34. Since the nucleotide sequence of the oligonucleotide PCR primers is always known before the reaction is started the temperature at which a PCR reaction is performed
- (A) is not critical
 - (B) is determined by the source of the polymerase used in the PCR reaction
 - (C) can be calculated to attempt to minimize undesired amplification products
 - (D) can be used to manipulate the specificity of the mixture of amplification products
35. The coenzyme required for two steps in purine synthesis as well as the thymidylate synthase reaction during pyrimidine synthesis is
- (A) cyanocobalamin
 - (B) pyridoxal phosphate
 - (C) pantothenic acid
 - (D) tetrahydrofolate
36. In the prokaryotes, all Polypeptide chain synthesis probably are initiated with the amino acid
- (A) arginine
 - (B) f-methionine
 - (C) acetyl lysine
 - (D) glycine
37. Which one of the following elements is essential for the formation of the hormone thyroxin?
- (A) Calcium
 - (B) Potasium
 - (C) Sodium
 - (D) Iodine
38. Yeast cannot ferment this carbohydrate
- (A) Sucrose
 - (B) Glucose
 - (C) Lactose
 - (D) Maltose

39. The compound having the formula



- (A) isoleucine (B) alanine (C) valine (D) leucine
40. Fucose is a
(A) Methyl pentose (B) Hexose (C) Glycoside (D) Triose
41. In the Henderson Hasselbalch's equation
$$\text{pH} = \text{_____} + \log_{10} \frac{(\text{salt})}{(\text{acid})}$$

(A) K (B) pK (C) 2 (D) 2.30
42. Extrinsic factor is
(A) Vitamin B₁₂ (B) R-Protein
(C) Glycoprotein (D) Sigma protein
43. The sequence of one strand of DNA is : 5' ATTGCCA 3' What is the sequence of the other strand?
(A) 5' TAACGGT 3' (B) 5' TGGCAAT 3'
(C) 5' ATTGCCA 3' (D) 5' UAAGCCU 3'
44. How many chromosomes are there in the fission yeast (*S. pombe*)?
(A) 3 (B) 8 (C) 12 (D) 22
45. Which of these cytoplasmic Tyr-protein kinases does not contain a SH2 domain?
(A) Fak (B) Lck
(C) Src (D) All of the above
46. What antibiotic resistance genes are found in pBR 322?
(A) Amp and Kan (B) Kan and Tet
(C) Tet and Amp (D) None of the above

47. A strain of mice is genetically engineered to lack expression of all Class II MHC antigens ; expression of Class I MHC antigens is normal. What statement best describes the expected result when T-cell subsets are determined (by flow cytometry) in *lymph nodes* of these mice?
- (A) Both CD3+CD4+ and CD3+CD8+cells should be present in normal numbers
 - (B) CD3+CD4+cells should be present in normal numbers, CD3+CD8+ cells should be absent
 - (C) CD3+CD8+cells should be present in normal numbers ; CD3+CD4+cells should be absent
 - (D) Both CD3+CD4+ and CD3+CD8+ cells should be absent
48. A patient has a positive tuberculin test, a Type IV hypersensitivity response in which CD4+T cells are stimulated by antigen and secrete cytokines. What is the antigenic stimulus to CD4 + T cells?
- (A) Antigen fragments bound to Class I MHC proteins
 - (B) Antigen fragments bound to Class II MHC proteins
 - (C) Soluble complexes of antibody bound to antigen
 - (D) Precipitated complexes of antibody bound to antigen
49. *AE. coli* cell contains an R-factor which confers resistance to ampicillin. If this cell conjugates with a plasmid-free, ampicillin-sensitive. *E. coli*, cell, what is the most likely outcome?
- (A) The ampicillin-resistant cell loses the plasmid and become ampicillin sensitive
 - (B) The ampicillin-sensitive cell gains a plasmid and become ampicillin resistant
 - (C) Chromosomal DNA is transferred from the cell with the R-plasmid to the plasmid-free cell
 - (D) Chromosomal DNA is transferred from the plasmid-free cell to the cell with the R-plasmid
50. Which of the following cell lines is not of lymphoid origin?
- (A) BJAB
 - (B) HeLA
 - (C) Jurkat
 - (D) None of the above
51. High throughput screens such as the yeast two-hybrid system and affinity purification experiments can have false-positive results because
- (A) Some proteins are inherently sticky
 - (B) Some bait proteins that are introduced into cells become mislocalized
 - (C) Some protein complexes form only very transiently
 - (D) Affinity tags or epitope tags can interfere with protein-protein interactions

52. Homology modeling may be distinguished from ab initio prediction because
- (A) Homology modeling requires a model to be built
 - (B) Homology modeling requires alignment of a target to a template
 - (C) Homology modeling is usefully applied to any protein sequence
 - (D) The accuracy of homology modeling is independent of the percent identity between the target and the template
53. In analyzing cDNA libraries, a pitfall is that
- (A) The libraries may be derived from different tissues
 - (B) The libraries may contain thousands of sequences
 - (C) The libraries may have been normalized differently
 - (D) The libraries may contain many rarely expressed transcripts
54. What advantage do oligonucleotide-based microarrays have over cDNA based arrays?
- (A) Two samples can be simultaneously and competitively hybridized to the same chip
 - (B) It is easier for the experimenter to verify the identity of each gene that is represented on the array
 - (C) It is possible to identify expression of alternatively spliced transcripts
 - (D) They are far more sensitive
55. The instrument commonly used to estimate electrolytes is
- (A) ultracentrifuge
 - (B) polarimeter
 - (C) spectrophotometer
 - (D) flame photometer
56. A mediated transport system would be expected
- (A) to exhibit increasing initial rate of transport with increasing substrate conc
 - (B) not to exhibit structural and/ or stereo specificity for the substance transported
 - (C) to be slower than that of a simple diffusion system
 - (D) to establish a concentration gradient across the membrane if there is an expenditure of energy
57. An ionophore need not
- (A) diffuse back and forth across a membrane
 - (B) form a channel across a membrane through which an ion may diffuse
 - (C) catalyze electrogenic mediated transport of an ion
 - (D) require the input of metabolic energy for mediated transport of an ion

58. At 37°C , $-2.202RT = -1.42\text{kcalmol}^{-1}$. For the reaction $A \leftarrow \rightarrow B$, if $\Delta G^{\circ} = -7.1 \text{ kcal mol}^{-1}$, what is the equilibrium ratio of B/A?
 (A) 10,000,000/1 (B) 100,000/1 (C) 1000/1 (D) 1/100,000
59. Which of the following tricarboxylic acid cycle intermediates may be added or removed by other metabolic pathways?
 (A) oxalosuccinate (B) α -ketoglutarate
 (C) isocitrate (D) geranyl phosphate
60. If rotenone is added to the mitochondrial electron transport chain
 (A) the P/O ratio of NADH is reduced from 3/1 to 2/1
 (B) the rate of NADH oxidation is diminished to 2/3 of its initial value
 (C) succinate oxidation remains normal
 (D) electron flow is inhibited at site II
61. In glycolysis ATP synthesis is catalyzed by
 (A) hexokinase
 (B) phosphofructokinase
 (C) glyceraldehydes - 3 - phosphate dehydrogenase
 (D) phosphoglycerate kinase
62. The uncontrolled production of NADH from NAD^{+} during ethanol metabolism blocks gluconeogenesis from
 (A) alpha-ketoglutarate (B) oxaloacetate
 (C) inositol (D) galactose
63. AMP activates
 (A) aspartate-oxaloacetate transaminase
 (B) succinic dehydrogenase
 (C) glycogen phosphorylase
 (D) hexokinase
64. Transketolase
 (A) transfers a C2 fragment to an aldehyde acceptor
 (B) transfers a C3 ketone containing fragment to art acceptor
 (C) converts the ketose sugar ribulose 5 phosphate to ribose 5 phosphate
 (D) converts two C5 sugar phosphates to fructose phosphate and erythrose phosphate

65. Antibody dependent cell mediated cytotoxicity (ADCC)
- (A) is carried out by B cells
 - (B) is the main mechanism for killing intracellular microbes
 - (C) involves Fc receptors on the effector cells
 - (D) is primarily mediated by IgE antibody
66. DNA polymerase I purified from the bacterium *Escherichia coli* has which of the following enzymatic activities
- (A) 5'->3' DNA polymerase only
 - (B) 3'->5' DNA polymerase only
 - (C) 5'->3' DNA polymerase, 5'->3' exonuclease, and 3'->5' exonuclease
 - (D) 5'->3' DNA polymerase and 3'->5' exonuclease
67. What was the first bacterial genome to be sequenced and made public?
- (A) *Bacillus subtilis*
 - (B) *Escherichia coli*
 - (C) *Haemophilus influenzae*
 - (D) *Mycobacterium*
68. The Maxam-Gilbert method of nucleotide sequence determination
- (A) relies on enzymatic modification of DNA to generate a nested set of end-labeled derivatives
 - (B) is based on preferential, base-specific methylation followed by chemical cleavage to generate a nested set of end-labeled derivatives
 - (C) is dependent on the differential sensitivity of the normal DNA nucleotides to chemical cleavage by piperidine
 - (D) is inherently safer and more reproducible than the dideoxy or Sanger method of nucleotide sequence determination
69. When did Watson and Crick publish the helical structure of DNA?
- (A) 1953
 - (B) 1954
 - (C) 1957
 - (D) 1952
70. In addition to AUG what initiation codon is recognized by prokaryotes?
- (A) ACG
 - (B) AUC
 - (C) GUG
 - (D) AAA
71. The approximate length of the H bonds in helical DNA A-T or G-C base pairs is
- (A) 1.5 Angstroms
 - (B) 2.0 Angstroms
 - (C) 3.0 Angstroms
 - (D) 4.0 Angstroms

72. Mitosis and meiosis always differ in regard to the presence of
(A) chromatids (B) homologs (C) bivalents (D) centromeres
73. Gene function
(A) is a mathematical equation that predicts the physical traits of offspring
(B) is immutable and cannot be changed
(C) can be demonstrated only for simple organisms like bacteria
(D) describes the mechanism by which parents pass physical traits to offspring
74. The general cellular genetic information is stored in structures known as
(A) chromosomes (B) mitochondria
(C) vacuoles (D) endoplasmic reticulum
75. The association of the molecule RNA with the cellular chromosome is
(A) of minor genetic importance
(B) of key structural significance to maintaining chromosome structure
(C) a consequence of control of levels of gene expression
(D) caused by presence of viruses that insert themselves into the chromosome Structure
76. Isoschizomers are
(A) restriction enzymes that have been isolated from the same organism but cleave DNA at different sequences.
(B) restriction enzymes that have been isolated from different organisms but cleave DNA at the same sequence
(C) restriction enzymes that recognize and cleave at the same DNA sequence but differ in their inhibition by methylation pattern within the recognition sequence
(D) two different oligonucleotide sequences that are similar enough to anneal with a common target DNA sequence.
77. The major functional difference between agarose and polyacrylamide gels is the
(A) higher pH at which the polyacrylamide gels must be run
(B) higher temperatures at which the agarose gels can be run
(C) greater size dimensions of agarose gels
(D) smaller matrix pores of the polyacrylamide gel

78. What is the biosynthetic precursor of ketone bodies?
- (A) Aceto-acetyl-CoA (B) Propionyl-CoA
(C) Succinyl-CoA (D) Acyl-CoA
79. Angiotensin converting enzyme (ACE) requires for activity
- (A) NADH (B) Zinc ions
(C) Magnesium ions and glutamine (D) Calcium ions
80. Which of the following cell junctions is responsible for metabolic Coupling?
- (A) Tight junction (B) Gap junction
(C) Adherens junction (D) Desmosome
81. A dicentric chromosome is unstable because
- (A) it cannot resynthesize its telomeres during replication
(B) it pairs with nonhomologous chromosomes in meiosis
(C) it pairs with nonhomologous chromosomes in mitosis
(D) it is often simultaneously drawn to opposing spindle poles in mitosis
82. Which of the following statements about repetitive DNA is NOT true?
- (A) Repetitive DNA is associated with the centromeres and telomeres in higher eukaryotes
(B) Repetitive DNA is restricted to nontranscribed regions of the genome
(C) Repetitive DNA sequences are often found in tandem clusters throughout the genome
(D) Repetitive DNA was first detected because of its rapid reassociation kinetics
83. Which of the following is NOT characteristic of a eukaryotic enhancer element?
- (A) Its activity is independent of its orientation (i.e., the sequence can be inverted without effect)
(B) Its activity is dependent on its distance from the start site of transcription
(C) It may be found as far as 1 to 2 kilobases from the promoter
(D) It may be positioned at the 5' end or the 3' end of the gene
84. The glyoxylate cycle is found in plants and bacteria but not in animals. The lack of this cycle in animals results in the inability to
- (A) synthesize oxaloacetate from isocitrate
(B) synthesize glutamate from malate
(C) perform gluconeogenesis from amino acids
(D) perform gluconeogenesis from fatty acids

85. The urea cycle occurs in the
- (A) mitochondrion
 - (B) mitochondrion and lysosome
 - (C) endoplasmic reticulum
 - (D) golgi complex
86. The Pasteur effect a decrease in the rate of glucose consumption when anaerobically grown yeast cells are exposed to O₂, can be attributed to
- (A) uncoupling of oxidative phosphorylation from electron transport
 - (B) an inhibition of phosphofructokinase by ATP and citrate
 - (C) an increase in ADP and AMP concentrations due to ATP hydrolysis
 - (D) a decreased ATP yield per glucose molecule
87. The equilibrium constant for the reaction catalyzed by malate dehydrogenase (malate to oxaloacetate) is about $5.9 \cdot 10^{-6}$. Which of the following best describes the situation in which malate is converted to oxaloacetate during the citric acid (Krebs) cycle?
- (A) The reaction is exergonic under standard conditions in the direction of the citric acid cycle and this drives the reaction.
 - (B) The next reaction of the cycle, citrate synthase, is highly exergonic and it pulls the malate dehydrogenase reaction forward by removing oxaloacetate
 - (C) Malate dehydrogenase catalyzes an irreversible reaction in the citric acid cycle
 - (D) Malate dehydrogenase changes the equilibrium constant for the reaction, allowing it to proceed rapidly
88. Propagation of a regenerative action potential along an axon can be accelerated by which of the following?
- (A) A decrease in the transmembrane resistance
 - (B) A decrease in the axoplasmic resistance
 - (C) Reduced myelin wrapping
 - (D) Shortened internodal lengths
89. All of the following processes occur in the pathway leading to regulated protein secretion in animal cells EXCEPT
- (A) formation of transport vesicles from the rough endoplasmic reticulum
 - (B) an increase in the concentration of cytosolic calcium ions prior to secretion
 - (C) synthesis of an amino-terminal signal sequence
 - (D) phosphorylation of a mannose residue in a glycoprotein

90. Which of the following events occurs first as a result of EGF binding to its receptor?
- (A) Activation of a serine/threonine kinase
 - (B) Activation of a tyrosine phosphatase
 - (C) Activation of a tyrosine kinase
 - (D) Activation of a Phospholipase
91. Mitosis and meiosis accomplish segregation of the replicated DNA to two or more daughter cells. Which of the following is characteristic of both mitosis and meiosis?
- (A) Chromosomes attach to spindle fibers composed of actin
 - (B) The resulting cells are diploid (2n)
 - (C) The resulting cells are haploid (1n)
 - (D) Spindle fibers attach to chromosomes at their kinetochores
92. The increase in the number of nucleoli during oocyte development in the frog *Xenopus laevis* is the result of
- (A) accelerated cell division
 - (B) rapid chromosome replication
 - (C) rapid synthesis of transfer RNA
 - (D) amplification of the ribosomal RNA genes
93. In meiosis, an inversion in one member of a pair of homologous chromosomes will most likely lead to which of the following?
- (A) Nondisjunction of the affected chromosome
 - (B) Chromosomes with duplications and deficiencies
 - (C) Increased recombination frequency in the inverted region
 - (D) Mispairing of the affected chromosome with a nonhomologous chromosome
94. One important mechanism for maintaining sequence identity among the many copies of a gene within a tandem array is
- (A) unequal crossing-over
 - (B) gene conversion
 - (C) retrotransposition
 - (D) deletion
95. Which of the following conditions is likely to interfere with the transfer of genetic material by conjugation in bacteria?
- (A) Pretreatment of the recipient cells with DNase
 - (B) Pretreatment of the recipient cells by application of strong shearing forces
 - (C) Treatment of the recipient cells with cycloheximide
 - (D) Treatment of the mating cell pairs by application of strong shearing forces

96. The zymogen chymotrypsinogen is converted to active chymotrypsin by
- (A) binding of a necessary metal ion
 - (B) reduction of a disulfide bond
 - (C) proteolytic cleavage
 - (D) phosphorylation of an amino acid side chain
97. The processes that lead to the synthesis of the functional light chain of an antibody molecule include
- (A) DNA rearrangement but no RNA Splicing
 - (B) DNA rearrangement but no gene duplication
 - (C) DNA rearrangement but no protein processing
 - (D) RNA splicing but no DNA rearrangement
98. A second mutation in the same gene restores the wild-type phenotype. This phenomenon is referred to as
- (A) intergenic complementation
 - (B) gene conversion
 - (C) synthetic enhancement
 - (D) intragenic suppression
99. During the gluconeogenic conversion of pyruvate into glucose in the liver, all of the following are involved EXCEPT
- (A) pyruvate carboxylase
 - (B) phosphoenolpyruvate carboxylase
 - (C) phosphoenolpyruvate carboxykinase
 - (D) glucose 6-phosphatase
100. Water is generally a good solvent for polar molecules and a poor solvent for nonpolar molecules. These solvent properties are best explained by
- (A) the high density of liquid water relative to polar solvents
 - (B) the ability to form intermolecular hydrogen bonds
 - (C) the density of solid water being less than the density of liquid water
 - (D) high surface tension