

Entrance Examinations Model Questions

Model Paper - 3 : Bioinformatics

51. What is added to the 3'-end of many eukaryotic mRNAs after transcription?

a. Introns	b. a poly A tail	c. Exons	d. the trinucleotide 5'-CCA
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52. *which* is the following not a feature of eukaryotic gene expression?

a. Many genes are interrupted by noncoding DNA sequences	b. RNA synthesis and protein synthesis are coupled as in prokaryotes	c. mRNA is extensively modified before translation	d. polycistronic mRNAs are very rare
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53. RNAs that catalyze biological reactions, such as self-splicing introns, are known as

a. Enzymes	b. Spliceosomes	c. Mature RNAs	d. Ribozymes
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54. Which of these characteristics does the gene controlling ABO blood groups show?

a. Sex linkage	b. Codominance	c. Sex determination	d. Polygenic inheritance
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55. Zellweger syndrome is

a. An autosomal recessive disorder	b. Due to mutation in PEX genes	c. Due to reduction or absence of functional peroxisomes	d. All of the above
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56. Which of the following event does not require energy

a. Symport	b. Glucose transport	c. Antiport	d. all of the above
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57. Which one of the following isotopes was used by Hershey and Chase to label bacteriophages to prove that DNA is the genetic material?

a. ^{14}C	b. ^{15}N	c. ^{32}P	d. ^3H
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58. Which of the below is/are cloning vector(s) in the context of DNA cloning?

i. Bacteriophages, ii. Bacterial artificial chromosomes, iii. Yeast artificial chromosomes

a. i only	b. i and ii	c. ii and iii	d. i, ii and iii
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59. Which of the following are the only mammals that possess nucleated red blood corpuscles?

(i) Camel (ii) Llama (iii) Man (iv) Dog

a. i and ii	b. ii and iii	c. iii and iv	d. i and iv
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60. Hormones are normally absent in

a. Rat	b. Monkey	c. Bacterium	d. Cat
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61. What do telomeres do?

a.They protect the chromosomes from degradation by nucleases	b.They prevent the ends of chromosomes from fusing with one another	c.They are required for complete chromosomal replication	d.All of these are correct
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62. When all or a piece of a chromosome becomes attached to another chromosome, the aberration is called

a.Inversion	b.Translocation	c. deletion	d.duplication
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63. Alternate splicing means

a.The same gene can code for several different proteins	b.Several different genes can code for the same protein	c.Gene expression can be regulated at the level of transcription	d.Pieces of DNA can move around within the genome
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64. The longevity of mRNA is related to

a.the length of the poly (A) tail	b. the 5' cap on the mRNA	c. All of these are correct	d.None of these are correct
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65. In mammalian cells, the DNA of the centromere is characteristic of

a. Facultative heterochromatin	b.Constitutive heterochromatin	c.Euchromatin	d.Dispersed chromatin
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66. The following statement is not true for the cellular senescence

a. Is an irreversible cellular arrest of cell proliferation	b. lead to activation of p53,pRB	c. Deregulation in this process directed to the particular cell to acquire stemness	d. Is mediated by the hc-siRNA
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67. Dichlorophenyldimethylurea (DCMU) blocks

a. Calvin cycle	b.Photo system II electron transfer	c.carbon fixation	d. release of electron from water
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68. Which one of the following RNA involves in gene regulation as well as gene activation

a. mRNA	b. piwi-interacting RNA	c. micro RNA	d. tRNA
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69. The stem cells specific gene is

a. PIWI, SOX3	b. p53, cMYC	c. PIWI, pRB	d. p53, pRB
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70. In prokaryotes RNA polymerase binds to

a. Homeo box	b. Pribnow box	c. Hogness box	d. Shine-Delgarno box
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71. Ribosome assembled in

a. Nucleus	b. cytoplasm	c. Nucleolus	d. Golgi bodies
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72. Which one of the following steps is not featured in initiation of protein translation

a. Ribosome assembly	b. transfer of activated amino acids tRNA	c. binding of mRNA to ribosome	d. joining of amino acids by peptide bond
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73. Cyclohexamide inhibits

a. Peptidyl transferase of 80S ribosome	b. Initiation of translation in prokaryotes	c. Transcription by intercheating with promoter	d. By interacting with sigma factor
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74. Influenza virus binds to

a. N-acetyl glucosamine	b. Sialic acid	c. N-acetylmuramic acid	d. Fucose
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75. Natural inducer of *lac* operon in *E. coli* is

a. Lactose	b. IPTG	c. Galactose	d. Glucose
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76. Tumor initiating cells can be identified by

a. Side population assay, Sphere assay	b. Size exclusion assay, side population assay	c. Trypan blue exclusion assay, Confocal microscope	d. Sphere assay, chromatin immune precipitation assay
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77. Geminiviruses are

a. ssRNA viruses	b. ssDNA viruses	c. bipartite ssRNA viruses	d. dsDNA viruses
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78. Suppressors

a. are encoded by viruses which render the host-defense mechanism	b. are proteins which regulate gene expression by binding 3'UTR of mRNA	c. bind to DNA and prevents DNA replication	d. bind to 5'UTR of mRNA and inhibits to ribosome assembly
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79. Human cellular senescence is initiated by

a. Oxidative stress, mutation, telomerase, oncogene activation	b. miRNA, piRNA, hc-siRNA, ta-siRNA	c. cells damage, p53, pRB, cMYC	d. injury, mRNA, tRNA, rRNA
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80. Deamination of cytosine produces

a. N-methyl uracil	b. Uracil	c. Inosine	d. Hypoxanthine
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81. When white light passes through a prism, which colour deviates the maximum

a. Red	b. Yellow	c. Violet	d. Blue
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82. Which of the condition is necessary for total internal reflection?

a. Ray should travel from denser to rarer medium	b. The angle of incidence should be more than the critical angle	c. Only white light should be used	d. Ray should have a higher velocity after refraction.
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83. A phase change from solid to vapor is called

a. Evaporation	b. Anti-freezing	c. Effervescence	d. Sublimation
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84. In a reversible adiabatic change

a. there is no change in entropy	b. the heat absorbed is equal to work done	c. any heat absorbed will result in increase of entropy	d. change in entropy is given by $C_v dT$ where C_v is specific heat capacity and dT is change in temperature
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85. When a magnet moves past an object, it will produce eddy currents in the object only if the object is

a. a solid	b. an insulator	c. a conductor	d. a coil
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86. The electricity from the power station, to our home is transmitted at high voltage rather than at high current because

a. It is safer this way for the engineers who work with those cables	b. It requires less insulation	c. electricity travels faster through cables when it has high voltage	d. it is cost effective in terms of the less energy loss
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87. One coulomb per second is equal to one

a. Watt	b. Ampere	c. Joule	d. electron-volt
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88. Which of the following is one of the functions performed by a diode?

a. filter	b. amplifier	c. rectifier	d. inverter
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89. If a dielectric medium is introduced between the plates of a parallel plate capacitor, its capacitance

a. increases	b. decreases	c. remains unaltered	d. increases or decreases depending on the nature of the dielectric medium
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90. The phenomena of producing X-rays is an instance of

a. conversion of momentum into radiation	b. conversion of kinetic energy into radiation	c. conversion of mass into energy	d. principle of conservation of charge
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91. If two atoms are isotopes then they have same number of (i) _____ but different number of (ii) _____.

a. (i) electrons; (ii) nucleons	b. (i) neutrons; (ii) protons	c. (i) protons; (ii) neutrons	d. (i) nucleons; (ii) electrons
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92. An alpha particle is made up of

a. two protons and two neutrons	b. two protons only	c. two protons and two electrons	d. two protons and two positrons
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93. Which logic gate has its output high if and only if all its inputs are low

a. X-OR	b. NAND	c. NOR	d. AND
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94. How many NAND gates are needed to construct an OR gate

a. 3	b. 2	c. 4	d. 1
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95. Printed documents to be transmitted by fax are converted into electrical signals by the process of

a. modulation	b. light variation	c. scanning	d. imaging
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96. The magnetic quantum number decides

a. The distance of the orbital from the nucleus	b. The shape of the orbital	c. The orientation of orbital in space	d. The spin of the electron
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97. If an element can lose an electron readily, it is said to be

a. electronegative	b. electropositive	c. electronative	d. electrovalent
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98. What is the total number of sigma bonds found in the following compound
 $\text{CH}_3\text{-CH=C=CH-CH=CH}_2$

a. 5	b. 8	c. 13	d. 15
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99. Column chromatography is based on the principle of

a. Absorption	b. Partition	c. Adsorption	d. Distribution
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100. The hybridization of carbons in ethylene is

a. dsp^2	b. sp	c. sp^3	d. sp^2
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101. The noble gases are unreactive because they

a. have same number of electrons	b. have stable electronic configuration	c. are gases with low densities	d. have an atomicity of one
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102. Compounds having same chemical formula but different structural formula are called

a. isotopes	b. allotropes	c. isomers	d. isotones
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103. In an equilibrium reaction, which of the following factors does not alter the state of chemical equilibrium

a. change in temperature	b. change in concentration of the reactants	c. change in pressure	d. addition of a catalyst
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104. Elements whose atoms have their s and p sublevels complete are the

a. Normal elements	b. Transition elements	c. Noble gases	d. Metalloids
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105. The compound that contains both ionic and covalent bonds is

a. CH ₄	b. H ₂	c. KCN	d. KCl
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106. If in a diagonal matrix all the entries along the main diagonal are equal, then that matrix is called

a. Identity matrix	b. scalar matrix	c. triangular matrix	d. square matrix
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107. Which of the following is not correct

a. cross product of vectors is commutative	b. addition of vectors is associative	c. addition of two matrices is commutative	d. addition of three matrices is associative
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108. Value of factorial zero (0!) is

a. 0	b. infinity	c. indeterminate	d. 1
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109. If $\log(a/b) + \log(b/a) = \log(a+b)$ then

a. $a+b=1$	b. $a-b=1$	c. $a=b$	d. $a^2 - b^2 = 1$
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110. Which of the following statements is not correct

a. $\log_{10}10=1$	b. $\log(2+3) = \log(2 \times 3)$	c. $\log_{10}1 = 0$	d. $\log(1+2+3) = \log 1 + \log 2 + \log 3$
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111. Matrix A is of order 2 x 3 and B is of order 3 x 2, then the order of the matrix BA is

a. 2 x 3	b. 3 x 2	c. 3 x 3	d. 2 x 2
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112. If $nPr = 120$ and $nCr = 120$, then the value of r is

a. 10	b. 5	c. 120	d. 12
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113. If the diagonals of a parallelogram are equal, then it is a

a. rectangle	b. cyclic quadrilateral	c. trapezoid	d. none of the above
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114. If $a^x = b^y$ then

a. $\log(a/b) = x/y$	b. $(\log a) / (\log b) = x/y$	c. $\log b - \log a = y - x$	d. $(\log a) / (\log b) = y/x$
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115. If $\log_{10} 7 = a$, then $\log_{10} (1/70)$ is equal to

a. $-(a + 1)$	b. $(a + 1)^{-1}$	c. $a / 10$	d. $10 / a$
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116. A computer program that converts an entire program into machine language is called a/an

a. Interpreter	b. Simulator	c. Compiler	d. Commander
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117. ASCII stands for

a. American Stable Code for International Interchange	b. American Standard Case for Institutional Interchange	c. American Standard Code for Information Interchange	d. American Standard Code for Interchange Information
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118. Central Processing Unit is a combination of

a. Control and storage	b. Control and output unit	c. Arithmetic logic and input unit	d. Arithmetic logic and control unit
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119. Which language is directly understood by the computer without translation program?

a. Machine language	b. Assembly language	c. High level language	d. None of above
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120. The octal equivalent of the binary number 111010 is

a. 81	b. 72	c. 71	d. None of above
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121. What is the default subnet mask for a class C network?

a. 127.0.0.1	b. 255.0.0.0	c. 255.255.0.0	d. 255.255.255.0
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122. Which of the following protocols are used to transfer files between computers connected in a LAN:

a. FTP	b. SMTP	c. POP3	d. SNP
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123. The acronym DHCP stands for

a. Dynamic Host Control Protocol	b. Dynamic Host Configuration Protocol	c. Dynamic Hyper Control Protocol	d. Dynamic Hyper Configuration Protocol
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124. Which symbol is used as a statement terminator in C?

a. !	b. #	c. ;	d. \$
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125. An Ampersand (&) before the name of a variable in a C program denotes

a. Actual value	b. Variable name	c. Data type	d. Address
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126. Array subscripts in C always start at

a. 1	b. 0	c. -1	d. user defined value
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127. The standard symbol to write comment in a C++ program is

a. //	b. /	c. #	d. /* and */
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128. Which of the following is a database management tool developed by Microsoft

a. Oracle	b. SyBaSE	c. Access	d. dBase
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129. A scalar data in PERL scripting language is

a. an integer	b. a floating point value	c. a string	d. a number or a string
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130. Which of the following is not one of the common algorithm designs?

a. Divide and conquer	b. Search and Divide	c. Branch and Bound	d. Dynamic programming
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131. If an algorithm having a growth factor of $O(n^3)$ runs in 10 seconds for an input of size $n = 5$, how long it will take for an input size of 50?

a. 1000 seconds	b. 100 seconds	c. 50 seconds	d. 500 seconds
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132. Which of the following HTML tag will insert a line break in a web page

a. <p />	b. <lb />	c. 	d. <break />
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133. While designing a web page using HTML, is it possible to insert a table within another table?

a. Yes, if there are only 2 rows and 2 columns in the first table	b. Yes, a table can be inserted into any cell of any other table	c. Yes, if the number of rows and columns in the second table are less than those of first table	d. No, HTML does not allow nested tables
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134. The father of all processes in UNIX is

a. sh	b. root	c. Init	d. ls
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135. The command in UNIX to know the current working directory is

a. echo "working directory"	b. pwd	c. PWD	d. echo "pwd"
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136. Which of the following sets of amino acids does not contain any residues with aromatic side Chain

a. G, W, K, R	b. V, T, L, S	c. A, H, F, P	d. C, M, Y, D
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137. The database that has the coordinates of known protein structures is

a. PDB	b. NCBI	c. EBI	d. KEGG
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138. What does the term genome refer to

a. functional annotation of various genes in the organism	b. the information on all the proteins expressed in an organism	c. the set of genes turned on in an organism, tissue or cell	d. the complete set of information in an organism's DNA
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139. BLAST is a/an

a. pairwise sequence alignment tool	b. multiple sequence alignment tool	c. structure based sequence query tool	d. alignment based sequence similarity search tool
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140. Which of the following scoring matrices is optimized for more diverged sequences

a. BLOSUM62	b. BLOSUM78	c. BLOSUM90	d. BLOSUM95
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141. As per Juke-Cantor model of evolution, what is the probability that a particular site will be in the state 'G' if infinite time of evolution is considered

a. 1	b. 0	c. $\frac{1}{4}$	d. $\frac{1}{2}$
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142. The number of distinct unrooted phylogenetic trees that could be constructed out of 5 species is

a. 5	b. 15	c. 105	d. 125
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143. Which phylogenetic method will always give rooted and ultrametric tree

a. UPGMA	b. neighbour joining	c. parsimony	d. maximum-likelihood
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144. The component of the molecular mechanics force field that accounts non-bonded Interactions

a. Bond stretch and angle bending	b. Torsional rotation and electrostatic interaction	c. van der Waals and electrostatic interactions	d. Angle bending and van der Waals interactions
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145. In molecular dynamics simulation studies

a. All electrons are explicitly included in the calculations	b. All nucleons are explicitly included in the calculations	c. Only the positions of nuclei of atoms constituting the molecule is included in the calculations	d. Spin and multiplicity of the electrons along with the positions of nuclei are included in the calculations.
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146. How many conformations are possible for a molecule with 4 rotatable bonds, when the bonds are rotated in increments of 10 degrees each at a time

a. 144	b. 36^4	c. 40	d. 10^4
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147. If a C-H single bond vibrates with a time period of 10 femto seconds (fs), what will be an appropriate time step to use in a single step of molecular dynamics simulation?

a. 10 fs	b. 1 fs	c. 100 fs	d. 1 ps
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148. Which one of the following data base is maintained by Protein Information Resource (PIR)

a. Protein Data Bank	b. iProLINK	c. SWISS-PROT	d. TrEMBL
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149. OMIM is a data base of

a. proteins & nucleic acids sequences	b. bacterial and viral genes	c. human genes and genetic disorders	d. disorders in Central Nervous Systems
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150. Torsion angle for trans peptide conformation is

a. 0°	b. 90°	c. 180°	d. 270°
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