104 PU Ph D Bioinformatics

129 PU-2016_104_E
To convert a galvanometer to a voltmeter, you should add a:-

○ High resistance in parallel

○ Low resistance in parallel

○ Low resistance in series

○ High resistance in series

195 PU-2016_104_E
Solar spectrum is an example for:-

○ continuous emission spectrum

○ band absorption spectrum

○ line absorption spectrum

○ line emission spectrum

132 PU-2016_104_E
Formula to find the average velocity of a body is given by:-

○ $V = u + at$

○ $S = ut + \frac{1}{2} a t^2$

○ $V_{av} = (u + v)/2$

○ $S_n = \{u + a/2(2n-1)\}$

212 PU-2016_104_E
Which of the following software programmes is used for automated *de novo* drug design?

○ CoMFA

○ LUDI

○ CHEM3D

○ DOCK

121 PU-2016_104_E
Standard free energy (ΔG°) of hydrolysis of creatine phosphate is:-

○ -15.9 KJ/mol

○ -30.5 KJ/mol

○ -51.4 KJ/mol

○
-43.1 KJ/mol

203 PU-2016_104_E
Which of the following statements is true about a peptide bond (RCONHR')?

○ The *cis* configuration is favoured over the *trans* configuration

○ Single bond rotation is permitted between nitrogen and the carbonyl group

○ It is capable of forming a hydrogen bond

○ It is non planar

141 PU-2016_104_E
Which of the following is not intrinsic flour?

○ Tryptophan

○ Phenyl alanine

○ Tyrosine

○ Histidine

128 PU-2016_104_E
A toy train moves in a circle of 8 meters radius with a speed of 4 meters per second. What is the magnitude of the acceleration of the train?

○ 2 METERS PER SECOND SQUARED

○ 6 METERS PER SECOND SQUARED

○ 4 METERS PER SECOND SQUARED

○ 8 METERS PER SECOND SQUARED

192 PU-2016_104_E
In which of the processes, does the internal energy of the system remain constant?

○ Adiabatic

○ Isothermal

○ Isobaric

○ Isochoric

133 PU-2016_104_E
The relation between the weight of an object on the moon (W_M) and on the earth (W_e):-

○ $W_e = 1/6 W_M$

○ $W_M = 6 W_e$

○ $W_M = W_e$

○ $W_M = 1/6 (W_e)$

11 of 100

137 PU-2016_104_E

Haemoglobin contains 0.33% of iron, if one molecule of haemoglobin contains 4 atoms of iron, the approximate molecular weight of haemoglobin will be:-

○ 6770

○ 34000

○ 67700

○ 76700

12 of 100

183 PU-2016_104_E

A long string is stretched by 2 cm and the potential energy is E. if the spring is stretched by 10 cm. its potential energy will be:-

○ E/25

○ E/5

○ 5E

○ 25E

13 of 100

204 PU-2016_104_E

Identify the strongest form of intermolecular bonding that could be formed involving the residue of the amino acid serine.

○ van der Waals interactions

○ ionic bond

○ hydrogen bond

○ none of the above

14 of 100

148 PU-2016_104_E

The percentage of false positives in Structure-based Virtual Screening software is typically:-

○ <25%

○ 50-75%

○ 25-50%

○ >75%

15 of 100

104 PU-2016_104_E

Most of the red, blue and purple colors of plants are due to a pigment called:-

○ Xanthophylls

○ Chlorophyll

○ Carotene

○ Anthocyanin

16 of 100
196 PU-2016_104_E
The maximum kinetic energy of emitted electrons in a photoelectric effect does not depend upon:-

○ intensity of the radiation

○ wavelength of the radiation

○ work function of the material

○ frequency of the radiation

17 of 100
120 PU-2016_104_E
The mean intracellular concentration of ATP in mammalian cell is about:-

○ 1 mM

○ mM

○ 2 mM

○ 3mM

18 of 100
160 PU-2016_104_E
Which one of the following amino acid is basic:-

○ Gln

○ Arg

○ Asn

○ Tyr

19 of 100
117 PU-2016_104_E
In the degradation of heme, which of the following substances is produced along with monoxide?

○ Urobilin

○ Biliverdin

○ Bilirubin

○ Stercobilin

20 of 100
200 PU-2016_104_E
What is meant by a binding site?

○ The functional groups used by a drug in binding to a drug target

○ The area of a macromolecular target that is occupied by a drug when it binds

○ The bonds involved in binding a drug to its target

○ The portion of the drug to which a drug target binds

21 of 100
167 PU-2016_104_E
Which of the following statement is true about the basic chemistry of cell is true?

○ All cells contain exactly the same proteins

○ The genetic instructions in all cells are stored in DNA

○ All proteins are constructed from same 20 amino acids except the rare amino acid Tyrosine

○ All organisms contain the same gene

22 of 100
125 PU-2016_104_E
Electric field intensity is 400 V m^{-1} at a distance of 2 m from a point charge. It will be 100 Vm^{-1} at a distance?

○ 1.5 m

○ 4 cm

○ 50 cm

○ 4 m

23 of 100
152 PU-2016_104_E
The difference between DNA and RNA is due to:-

○ The kind of sugar found in the sugar-phosphate backbone

○ The number of phosphates between the sugars in the sugar-phosphate backbone

○ One of the purines used

○ The number of different bases used

24 of 100
116 PU-2016_104_E
A derivative of pyridoxine (vitamin B6) is required as a coenzyme in:-

○ Oxidative deamination

○ Carbamoyl phosphate formation

○ Transamination

○ The urea cycle

25 of 100
208 PU-2016_104_E

Which of the following statements is not true regarding the active site of an enzyme?

○ An active site contains amino acids which are important to the binding process and the catalytic mechanism

○ An active site is normally hydrophilic in nature

○ An active site is normally a hollow or cleft on the surface of an enzyme

○ Substrates fit into active sites and bind to functional groups within the active site

159 PU-2016_104_E
pH refers to:-

○ hydrogen ion concentration

○ hydrogen deficiency

○ log to base ten

○ negative log to base te

207 PU-2016_104_E
Which of the following statements is false with respect to an enzyme's ability to catalyse a reaction?

○ An enzyme allows the reaction to go through a less stable transition state than would normally be the case

○ An enzyme provides a reaction surface and a suitable environment for the reaction to take place

○ An enzyme can weaken bonds in reactants through the binding process

○ An enzyme binds reactants such that they are positioned correctly and can attain their transition-state configurations

144 PU-2016_104_E
The most common covalent cross-links in proteins are sulfur-sulfur bonds that form between two amino acids with - SH (thiol) groups as side chains. Which amino acid has this side chain?

○ Cysteine

○ Methionine

○ Proline

○ Tryptophan

153 PU-2016_104_E
Isomers due to Chiral carbon is called:-

○ Enantiomer

○ Diastereoisomer

○ Branch Isomer

30 of 100
176 PU-2016_104_E
A sphere, a cube and a thin circular plate all made of the same material and having the same mass are initially heated to a temperature of 300°C. Which one of these cools faster?

○ Sphere

○ Cube

○ Circular plate

○ All will cool at the same rate

31 of 100
179 PU-2016_104_E
If C_P - C_V is 'a' for hydrogen gas and 'b' for oxygen, then a and b are related to each other as:-

○ 16 a = b

○ a = 4 b

○ a = 16 b

○ a = b

32 of 100
136 PU-2016_104_E
A car starts from rest and accelerates uniformly over a time of 5.21 seconds for a distance of 110 m. Determine the acceleration of the car.

○ 8.10 m/s^2

○ 5.10 m/s^2

○ 13.57 m/s^2

○ 1.80 m/s^2

33 of 100
145 PU-2016_104_E
The orbital angular momentum of an electron in a 2S orbital is:-

○ $\sqrt{2}$ h/2π

○ h/2π

○ zero

○ 1/2 h/2π

34 of 100
105 PU-2016_104_E
Opening to the trachea is covered by a small flap of tissues termed as the:-

○ Epiglottis

○ Glottis

○ Larynx

○ Trachea

199 PU-2016_104_E
Docking is used in:-

○ Virtual screening

○ Virtual screening & Structure-based drug design

○ Ligand based drug design

○ Structure-based drug design

149 PU-2016_104_E
Peptide mass finger printing generally uses the following technique to purify the protein component:-

○ HPLC technique

○ TLC technique

○ 2D- gel electrophoresis

○ Hybridization

171 PU-2016_104_E
Proline is known as helix breaker. Cause of the break is:-

○ Lack of amide hydrogen

○ Proline is a hydrophilic residue

○ Proline is rigid in structure

○ Proline is similar to Histidine

109 PU-2016_104_E
Which of the following does not act as a neurotransmitter?

○ Glutamic acid

○ Epinephrine

○ Tyrosine

○ Acetylcholine

168 PU-2016_104_E
The basic difference between eukaryote and prokaryote is:-

○ Presence of nucleus in prokaryote

○ Presence of nucleus in eukaryote

○ Presence of plasma membrane in eukaryote

○ Presence of DNA in prokaryote

156 PU-2016_104_E
Benzene is most stable due to:-

○ The resonance of Pi electrons

○ S-orbitals have created a hybridized system that has become delocalized

○ Its chemical nature

○ The sigma bonding system hybridized to create a flat shape which gives benzene its symmetry

100 PU-2016_104_E
Cell division cannot be stopped in this phase of the cell cycle?

○ G1- Phase

○ S-Phase

○ G2-Phase

○ Prophase

187 PU-2016_104_E
If E and B represent the electric and magnetic vectors, then the direction of propagation of a light wave is along:-

○ The direction of E

○ along the direction of E x B

○ the direction of B

○ E x (E x B)

124 PU-2016_104_E
The major determinant of the overall rate of denovo purine nucleotide biosynthesis is the concentration of:-

○ 5-phosphoribosyl 1-pyrophosphate

○ Glycinamide ribosyl-5-phosphate

○ Formylglycinamide ribosyl-5-phosphate

○ 5-phospho β-D-ribosylamine

163 PU-2016_104_E
Naturally producing amino acid has the form of:-

○ L form

○ R form

○ D form

○ R&S form

45 of 100
113 PU-2016_104_E
Chitin is a:-

○ Nitrogenous polysaccharide

○ Protein

○ Heteropolysaccharide

○ Lipoprotein

46 of 100
184 PU-2016_104_E
A body of mass 4 kg is accelerated upon by a constant force, travels a distance of 5 m in the first second and a distance of 2 m in the third second. The force acting on the body is:-

○ 12 N

○ 8 N

○ 2 N

○ 4 N

47 of 100
211 PU-2016_104_E
On which of the following molecules would you find a codon?

○ transfer RNA

○ ribosomal RNA

○ small nuclear RNA

○ messenger RNA

48 of 100
101 PU-2016_104_E
The non-sister chromatids twist around and exchange segments with each other during:-

○ Pachytene

○ Diakinesis

○ Diplotene

○ Leptotene

49 of 100
191 PU-2016_104_E
If an electron and a proton have the same de-Broglie wavelength, then the kinetic energy of the proton is:-

equal to that of the electron

zero

less than that of the electron

more than that of the electron

50 of 100
164 PU-2016_104_E
Using the following approach one can build structured model of sequence having less than 20% similarity:-

fold recognition

ab initio method

Homology modeling

Threading

51 of 100
108 PU-2016_104_E
Which one of the following pairs of structures distinguishes a nerve cell from other types of cell?

Perikaryon and dendrites

Flagellum and medullary sheath

Vacuoles and fibres

Nucleus and mitochondria

52 of 100
180 PU-2016_104_E
A molecule of mass m moving with a velocity v makes 5 elastic collisions with a wall of the container per second. The change in its momentum per second will be:-

mv/5

mv

5 mv

10 mv

53 of 100
172 PU-2016_104_E
Ramachandran plot discusses about:-

Phi-Psi correlation diagram

Phi-Psi energy diagram

Phi-Psi scatter diagram

Phi-Psi steric contour diagram

54 of 100

216 PU-2016_104_E
Which of the following terms is used to describe the dose of a drug required to produce a measurable effect in 50% of the animals tested?

- ○ MD_{50}
- ○ SD_{50}
- ○ LD_{50}
- ○ ED_{50}

188 PU-2016_104_E
A body of mass m hits normally a rigid wall with velocity v and bounces back with the same velocity. The impulse experienced by the body is:-

- ○ Zero
- ○ 1.5 mv
- ○ mv
- ○ 2 mv

215 PU-2016_104_E
What is the term used for drugs that are similar in structure to a known drug and which are used for the same purpose?

- ○ 'me-too' drugs
- ○ 'copycat' drugs
- ○ 'analogue' drugs
- ○ 'derivative' drugs

175 PU-2016_104_E
The transfer of heat between a hot body and a cold body is an example of:-

- ○ Reversible process
- ○ Irreversible process
- ○ Isothermal process
- ○ endothermic process

155 PU-2016_104_E
Anthrax is caused by:-

- ○ Mycoplasmas
- ○ Fungus
- ○ A. Virus

○ Bacteria

112 PU-2016_104_E
Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these:-

○ Enhance oxidative metabolism

○ Help in regulating metabolism

○ Are exclusively synthesized in the body of a living organism as at present

○ Are conjugated proteins

140 PU-2016_104_E
An α- helix can be recognized in the 3-dimensional structure of a protein on the basis of:-

○ The absence of β sheet in the structure

○ Hydrogen bonding pattern (n to n+4) and φ, ψ angles of a stretch of residues

○ Hydrogen bonding between consecutive residues

○ φ, ψ angles of alternative residues

245 PU-2016_104_M
Biological control of agricultural pests, unlike chemical control, is:-

○ Self-perpetuating

○ very expensive

○ polluting

○ toxic

257 PU-2016_104_M
The approximate relationship between quartile deviation (QD), mean deviation (MD) and standard deviation (SD) is:-

○ QD:MD:SD ::12:10:15

○ QD:MD:SD :: 10:12:15

○ QD:MD:SD ::10:15:12

○ QD:MD:SD ::10:12:18

229 PU-2016_104_M
Antibody diversity is generated by:-

○ protein splicing

○ somatic mutation

○ inter-chromosomal recombination

○ allelic exclusion

64 of 100
248 PU-2016_104_M
If the lines 2x+y-3=0 , 5x+ky-3 = 0 and 3x-y-2 =0 are concurrent, find the value of 'k'.

○ -2

○ -3

○ 3

○ 2

65 of 100
256 PU-2016_104_M
From the following two regression equations calculate the mean values of X and Y:4y-5x =0 ; 5y-x-63 =0

○ 4,5

○ 15,10

○ 2,3

○ 12,15

66 of 100
236 PU-2016_104_M
Proteins may be separated according to size by:-

○ isoelectric focusing

○ ion exchange chromatography

○ molecular exclusion chromatography

○ reverse phase chromatography

67 of 100
252 PU-2016_104_M
Find the mean deviation about median for the following data.

3,9,5,3,12,10,18,4,7,19,21

○ 4.27

○ 5

○ 5.27

○ 6.27

68 of 100
233 PU-2016_104_M
Transamination is a:-

○ irreversible process

○ reversible process

○ irreversible & reversible process

○ Interchanged

237 PU-2016_104_M
In peptide bond, resonance energy stabilization contributes to:-

○ peptide bond

○ Coplanarity

○ asp-asp interaction

○ cys-cys interaction

244 PU-2016_104_M
Which of the following is not recycled in an ecosystem:-

○ nitrogen

○ energy

○ water

○ carbon

220 PU-2016_104_M
Which of the intermolecular bonding interactions below are possible for a ketone?

○ Ionic bonding only

○ van der Waals interactions only

○ Hydrogen bonding only

○ Both hydrogen bonding and ionic bonding

228 PU-2016_104_M
Which of the following statements is false:-

○ T cell response in MHC restricted

○ MHC class II molecules are made up of two polypeptides

○ MHC class II molecules are present on all nucleated cells

○ MHC class I molecules are present on all nucleated cells

249 PU-2016_104_M
A person has 2 parents, 4 grandparents, 8 great grandparents, and so on . Find the number of his ancestors during the 10 generations preceding his own.

○ 2042

○ 2004

○ 2040

○ 2046

74 of 100
253 PU-2016_104_M
A can solve 80% of the problems given in a book and B can solve 60%. What is the probability that at least one of them will solve a problem selected at random from the book?

○ 11/25

○ 12/25

○ 97/100

○ 23/25

75 of 100
225 PU-2016_104_M
Which of the following statement is correct?

○ T lymphocytes are conditioned by the bone marrow

○ T cells do not produce cytokines

○ B cells produce plasma and memory cells

○ B cells lymphocytes are conditioned by thymus

76 of 100
232 PU-2016_104_M
Which of the following is not correct about the collagen triple-helix:-

○ is rich in proline

○ is rich in hydroxyproline

○ is an α-helix

○ is rich in glycine

77 of 100
224 PU-2016_104_M
Which of the following statement is false?

○ biosynthesis of DNA containing animal virus occur in the nucleus

○ most bacteria in nature are lysogens

○ TMV is minus ssRNA virus

○ lysogenic phage contains dsDNA

78 of 100
241 PU-2016_104_M

Cellulose is indigestible by humans because we lack the enzyme that hydrolyzes:-

○ α-1,6 glycosidic bonds

○ β-1,4 glycosidic bonds

○ long chain polysaccharides

○ α-1,4 glycosidic bonds

221 PU-2016_104_M
Which of the following statements is true?

○ Energy minimisation stops when a structure is formed with a much greater stability than the previous one in the process

○ Energy minimisation is carried out by varying only bond angles and bond lengths

○ Energy minimisation is used to find a stable conformation for a molecule

○ Energy minimisation is carried out using quantum mechanics

240 PU-2016_104_M
O-glycosidic bond in a polysaccharide forms between:-

○ anomeric hydrogen and alkoxy carbon

○ anomeric oxygen and alkoxy carbon

○ anomeric carbon and alkoxy oxygen

○ anomic nitrogen and alkoxy carbon

293 PU-2016_104_D
Which of the following is not considered to be a basic element of an enterprise-class database system?

○ Database applications

○ DBMS

○ COBOL programs

○ Users

272 PU-2016_104_D
Biological networks have:-

○ Poisson distribution

○ Binomial distribution

○ Exponential distribution

○ Scale-free distribution

284 PU-2016_104_D
Which of the following short-read alignment program is NOT based on FM-index:-

○ Bowtie

○ BWA

○ SOAP2

○ SOAP

261 PU-2016_104_D
The letters of the word 'article' are arranged at random. Find the probability that the vowels may occupy the even places.

○ 3/4

○ 4/7

○ 3/7

○ 1/35

285 PU-2016_104_D
SAM and BAM format is related to:-

○ alignment of both short and long reads to reference sequence

○ alignment of short reads to reference sequence

○ alignment of two reference sequences

○ alignment of long reads to reference sequence

269 PU-2016_104_D
Type I error in hypothesis testing is:-

○ Accepting a false hypothesis

○ Accepting a true hypothesis

○ Rejecting a false hypothesis

○ Rejecting a true hypothesis

281 PU-2016_104_D
Support vector machine (SVM) is a:-

○ supervised learning and classification algorithm

○ supervised learning algorithm

○ unsupervised learning and classification algorithm

○ classification algorithm

277 PU-2016_104_D
Bootstrapping in phylogenetics measures:-

○ Confidence of a clade

○ Confidence of a branch

○ Confidence of a taxa

○ Confidence of a tree

265 PU-2016_104_D
A number consists of 3 digits whose sum is 10. The middle digit is equal to the sum of the other two and the number will be increased by 99 if its digits are reversed. The number is:-

○ 370

○ 145

○ 352

○ 253

260 PU-2016_104_D
P and Q are friends. P is elder to Q by 5 years. Q's sister R is half the age of Q while P's father S is 8 years older than twice the age of Q. If the present age of S is 48 years, then find the present ages of P,Q and R.

○ 25, 20, 10

○ 25, 20,15

○ 25,12,30

○ 30,25,12

273 PU-2016_104_D
The rate of nucleotide substitution is highest in:-

○ 5'UTR

○ Pseudogene

○ 3'-UTR

○ Coding sequence

264 PU-2016_104_D
An integer is chosen at random from the first 200 positive integers. What is the probability that integer chosen is divisible by 6 or 8?

○ 1/6

○ 1/8

○ 1/4

○ 1/2

93 of 100
280 PU-2016_104_D
The goal of ENCODE consortium is to:-

○ to sequence human genome in different populations

○ to understand gene expression in human genome

○ to understand the functional elements in human genome

○ to understand the systems biology of human tissues

94 of 100
289 PU-2016_104_D
The drastic and random changes in the gene frequency in a small population is caused by:-

○ Migration

○ Natural selection

○ Mutation

○ Genetic drift

95 of 100
296 PU-2016_104_D
The method to be invoked during determination at runtime:-

○ Dynamic binding

○ Dynamic loading

○ Data hiding

○ Dynamic Typing

96 of 100
297 PU-2016_104_D
Which of the following is an abstract data type?

○ Int

○ Double

○ Class

○ String

97 of 100
288 PU-2016_104_D
The sickle cell trait has heterozygote advantage in African population in terms of:

○ resistance to *Trypanosoma*

○ resistance to *Mycobacterium*TATCCC

○ resistance to *Clostridium*

○ resistance to *Plasmodium*

98 of 100
292 PU-2016_104_D
Homologous genes have:-

○ common ancestry

○ sequence similarity

○ different ancestry

○ sequence dissimilarity

99 of 100
276 PU-2016_104_D
Long branch attraction is related to:-

○ Maximum parsimony

○ Neighbour joining

○ UPGMA

○ Maximum likelihood

100 of 100
268 PU-2016_104_D
If the expectation of a Poisson variable is 1, then P(x>1) is:-

○ $-2e^{-1}$

○ e^{-1}

○ $1 - e^{-1}$

○ $1 - 2 e^{-1}$