Entrance Examinations Model Questions

Bioinformatics

1. Entrez searches have _____ databases

24	30	41	48

2. The GenBank is the _____ database

Genetic sequence	Proteome	m-RNA sequence	None of these

3. Which one option is not for submitting data to GenBank

Bankit	Sequin	Tbl2asn	EST

4. EMBOSS is a free open source_____

Software	Database	Tool	None of these

5. Artemis R11 is a free _____ tool

Genome viewer	Proteome viewer	Protein sequence annotation	DNA sequence annotation

6. Sequencher is the _____ sequence analysis tool

DNA and RNA	DNA	RNA	protein

7. GENSCAN web server can be found at _____

IIT	NIT	MIT	NCBI

8. GENSCAN is freely available for _____

Academic	Industrial	Both A and B	None of these

9. Glimmer is a system for finding genes in microbial _____

DNA	r-RNA	m-RNA	SNP

10. A Glimmer server is available on the _____ website

EMBOSS	Pubmed	EMBL	NCBI

11. ExPASy is a _____ server

Genomics	Proteomics	Both A and B	None of these

12. ExPASy server functions in collaboration with

EBI	NCBI	EMBOSS	EMBL

13. AnthePro is the software for ___ analysis

DAN	Proteins	RNA	None of these

14. Which one of the following software is used for protein sequence analysis and modeling

Glimmer	Sequencher	Jamw	PSAAM

15. _____is an interactive protein docking and molecular superposition program

Modeller	Hex	Prime	None of these

16. _____ is a suite of automated docking tools

Auto Dock	Modeller	Prime	All of these

17. _____ a molecular modeling, graphics, and drug design program

Genscan	Glimmer	Argus Lab	EBI

18. Which one of the following is visualization tool

Rasmol	Modeller	Hex	Gold

19. _____ is a molecular graphics program for displaying, analyzing, and manipulating the three-dimensional structure of molecules

Mol mol	Prime	Auto-dock	Glimmer

20. _____ is an application that provides a user friendly interface allowing to analyze several proteins at the same time.

Swiss pdb viewer	Pymol	Rasmol	Mol mol

21. Which one of the following is Chemical drawing tool

Hex	dChip	ChemSketch	None of these

22. _____ is an open source bioinformatics software platform for visualizing molecular interaction networks and integrating with gene expression profiles and other state data.

Cytoscape	dChip	SAM	Cluster

23. Which one of the following is used for microanalysis

Pymol	Hex	Glimmer	SAM

24. Which one of the following database is not in Entrez search

SNP	Taxonomy	Genome	OMIM

25. _____ comprises more than 20 million citations for biomedical literature from MEDLINE, life science journals, and online books.

PubMed	NCBI	SNP	Taxonomy

26. The _____ database is a collection of sequences from several sources, including GenBank, RefSeq, TPA and PDB.

Genome	Protein	Nucleotide	None of these

27. The _____ provide a wealth of information on the biological function, on mechanisms linked to the function, and on the evolutionary history of and relationships between macromolecules.

3D structure	Protein sequence	Nucleotide sequence	Chromosomes

28. _____, also known as "Entrez Structure," is a database of experimentally determined structures obtained from the RCSB Protein Data Bank (PDB).

MMDB	PMDB	Modbase	HSSP

29. The expansion of NCBI is_____

National Center for Biochemical Information	National Center for Biology Information	National Center for Biotechnology Information	National Center for Biological Information

30. EMBOSS tools for _____

Molecular biology	Computational biology	Biotechnology	Cell biology

31. EMBOSS is _____

European Molecular Biology Software Suite	European Molecular work bench Software Suite	European Molecular Biology Open source	European Molecular Biology Open Software Suite

32. _____ is the nucleotide sequence database

PDB	EMBL	NCBI	EMBOSS

33. _____ is a comprehensive, high-quality and freely accessible database of protein sequence and functional information, many of which are derived from genome sequencing projects.

PDB	UniProt	Protein database	Genome database

34. _____ contains information about experimentally-determined structures of proteins, nucleic acids, and complex assemblies

PDB	NCBI	UniProt	EMBL

35. To data, about _____ of 3D structure of proteins available in PDB

74000	64000	68000	78000

36. Which one of the following module is used for molecular dynamics

Prime	Gromacs	Modeller	Hex

37. ____ of protein sequence identity is qualified for construct the 3D structure by homology modeling method

Above 30%	Above 20%	Below 25%	Above 80%

38. Which one of the following step is not involved in the homology modeling method

Template recognition	Alignment correction	Backbone generation	Energy minimization

39. _____ is a fully automated protein structure homology-modeling server

Auto-dock	swiss-model	Modeller	Pymol

40. Which one of the following is not a molecular modeling tool

Modeller	Swiss-model	Prime	Hex

41. Which one of the following server is used for Ab initio structure prediction

I-Tasser	Swiss-model	Emboss	None of these

42. _____ server is used for secondary structure prediction

PSIPRED	Swiss-model	HSSP	EMBOSS

43. _____ server is used for molecular threading/fold recognition

3D-PSSM	Swiss-model	HSSP	None of these

44. Which one following server is used for signal peptide prediction

Jpred	Abalone	signal	None of these

45. In bioinformatics _____ is an algorithm for comparing primary biological sequence information, such as the amino-acid sequences of different proteins or the nucleotides of DNA sequences.

BLAST	ClustalW	HSSP	Pairwise sequence alignment tool

46. _____ is a DNA and protein sequence alignment software package

EMBOSS	EMBL	FASTA	NCBI

47. _____ is an multiple sequence alignment tool

ClustalW	BLAST	FASTA	None of these

48. _____ is a web service for DNA sequence analysis that is free and open to all users

Genscan	Phyloscan	Genome database	None of these

49. The complete set of instruction for making an organism is called

Proteome	Genome	Both A and B	None of these

50. The human genome project was completed in

2002	2003	2004	2005

51. The human genome project identified approximately _____ thousands gene in human DNA

10-20	20-25	25-30	30-35

52. _____ originally aimed to map the nucleotides contained in a human haploid reference genome

Human genome project	Nucleic acid research	International science project	None of these

53. The protein coding instructions from the genes are transmitted indirectly through

DNA	m-RNA	t-RNA	Amino acid

54. The human genome project is an____

National project	International scientific project	Industrial scientific project	None of these

55. The human genome project was a 13 year old mega project that was launched in

1983	1990	1999	2003

56. A genetic linkage map shows the relative locations of specific _____ markers along the chromosomes.

m-RNA	DNA	t-RNA	SnRNA

57. Polymorphisms are variations in DNA sequence that occur on average once every____ bp.

100-200	300	300-500	500

58. On the genetic map, distance between markers are measured in terms of

Centimorgans	Base pair	Micro meter	Dolton

59. Different types of physical maps vary in

Degree of resolution	Base pair	Centimorgans	Chromosomal length

60. A cDNA map shows the locations of expressed DNA regions on the _____

Physical map	Chromosomal map	Genetics map	None of these

61. The macro restriction maps is also known as

Bottom up mapping	Top-down mapping	Both A and B	None of these

62. Cloning involves the use of _____ technology to propagate DNA fragments inside a foreign host.

Stunt vector	cDNA	rDNA	None of these

63. How long will take the 20 PCR cycles can amplify the target by million fold

20 minutes	45 minutes	1 hour	1 hour 30 minutes

64. Maxam-gilbert sequencing uses_____ to cleave DNA at specific bases.

Chemicals	Restriction enzymes	Probes	Biomarkers

65. Sanger sequencing involves using an _____ to synthesize DNA chains of varying length in four different reactions.

Analytical procedure	Enzymatic procedure	Chemical reactions	None of these

66. _____ generation sequencing technologies will enable speed and accuracy to increase by an order of magnitude

First	Second	Third	Fourth

67. Starting maps and sequences is relatively_____

Strong	Hard	Simple	similar

68. The current genetic map has about_____

100 markers	1000 markers	1500 markers	200 markers

69. Which one of the following single gene associated with a number of diseases

Retinoblastoma	Beta-1	Beta-2	IlvB1

70. Computational approaches to sequence alignment generally fall into ____ categories

2	3	4	5

71. Basically the pairwise sequence alignment method divided into

2 type	3 type	4 type	5 type

72. Needleman-Wunsch algorithm used for _____

Local alignment	Global alignment	Pairwise alignment	Multiple alignment

73. Smith Waterman algorithm used for _____

Local alignment	Global alignment	Pairwise alignment	Multiple alignment

74. The multiple sequence alignment require _____ sequences

One	Two	two or more	Three or more

75. _____ are probabilistic models that can assign likelihoods to all possible combinations of gaps, matches, and mismatches to determine the most likely multiple sequence alignment (MSA) or set of possible MSAs.

Hidden Markov models	Homology model	Molecular model	Artificial neural network

76. _____ is a multiple sequence alignment program

BLAST	T-Coffee	Swiss-model	None of these

77. _____ are libraries of life sciences information, collected from scientific experiments, published literature, high-throughput experiment technology, and computational analyses.

Biological databases	Genome databases	Proteome databases	Databases

78. Which one of the following database is a biological database

BAM	NCBI	NAR	EMBL

79. _____ a new tool for annotating genomes of newly sequenced species

BioKnowledge	Genscan	Prime	None of these

80. _____ is an conserved protein domain database

EBI	PDB	CDD	NCBI

81. _____ an gene-oriented clusters of transcript sequences database

UniGene	CDD	Genome	Proteome

82. Which one of the following is cytogenetic database

Proteome	CDD	UniGene	Cancer chromosomes

83. Which one of the following database have whole genome sequences

Gene	Genome	Proteome	GSS

84. Which one of the following database have gene-oriented clusters of transcript sequences

OMIA	OMIM	CDD	None of these

85. _____ database have gene-oriented clusters of transcript sequences

Gene	Genome	Proteome	None of these

86. _____ module is used for virtual screening

Prime	Modeller	Auto-dock	HTVS

87. _____ is an protein sequence analysis server

ExPASy	Glimmer	EMBOSS	Entrez

88. _____ carry information for making all the proteins required by all organisms

Protein	Gene	t-RNA	m-RNA

89. _____ is made up of four similar chemicals that are repeated millions or billions of times throughout a genome

Amino acids	Phosphate	Nucleic acid	DNA

90. _____ is the entire set of proteins expressed by a genome, cell, tissue or organism

Genome	Proteome	Gene	DNA

91. _____ is larger than the genome.

Protein	SNP	Gene	Proteome

92. In the second dimension, proteins are separated by molecular weight using

PIG	SDS-PAGE	SNP	MALDI-TOF

93. _____ is the collection of proteins found in a particular cell type under a particular set of environmental conditions such as exposure to hormone stimulation

Cellular proteome	Proteome	Genome	Gene

94. _____ involves the rapid synthesis or the computer simulation of a large number of different but structurally related molecules or materials

Molecular simulation	Computational simulation	Combinatorial chemistry	Biochemical's

95. _____ is an emergent field that aims at system-level understanding of biological systems

Systems biology	Molecular biology	Cell biology	Bioinformatics

96. _____ is the application of computer technology to the management of biological information

System biology	Bioinformatics	Computer science	Cell biology

97. _____ a discipline of biology, is the science of genes, heredity, and variation in living organisms.

Genetics	Biology	Cell biology	Computational biology

98. _____ is the branch of pharmacology which deals with the influence of genetic variation on drug response in patients by correlating gene expression with a drug's efficacy or toxicity.

Bioinformatics	Pharmacology	Pharmacogenomics	Pharmacokinetics

99. Which of the following is not a stop codon?

a. UAA	b. UAG	c. UGA	d. AUG

100. In Homology modelling, the region of the protein sequence that needs to be built is

a. Conserved region	b. Loops	c. Template	d. Rotamer

101. Which of the following is not a DNA sequence database?

a. GenBank	b. EMBL	c. DDBJ	d. PIR

102. Which of the following amino acid does not have a positively charged R-group?

a. Lysine	b. Leucine	c. arginine	d. Histidine

103. The type of DNA found in *Homo sapiens* is

a. A-dna	b. B-dna	c. D-dna	d. Z-dna

104. How many classes are enzymes classified into based on reaction type?

a. Six	b. Five	c. Four	d. Three

105. A database that classified protein 3D structure in a hierarchical scheme of structure classes known as

a. CATH	b. PDB	c. PROSITE	d. SCOP

106. PIR was established in

a. 1980	b. 1964	c. 1984	d. 2000

107. Protein structure can be derived by several methods, which one of the following models is very much reliable

a. NMR	b.X-Ray Crystallography	c. Homology modeling	d. None

108. Ramachandran plot is primarily used to

a. Protein engineering	b. Protein modeling	c. Molecular modeling	d. Protein structure validation

109. Which of the following codon codes for the termination of the translation?

a. UAC	b. UCA	c. UAG	d. GUA

113. Reconstruction of Phylogenetic tree will be carried out from

Protein sequence	Nucleic acid sequence	Both a and b	None of the above

114. The genetic heterogeneity with a population is known as

Mutation	Polymorphism	Genetic drift	Founder population

115. Phylogeniesis of species can be reconstructed only by comparing

Orthologous genes	Paralogous genes	Both a and b	None of the above

116. When hydrogen bonds occur?

a. Two electropositive atoms compete for the same hydrogen atom	Two electronegative atoms compete for the same hydrogen atom
c. Both a and b	None of the above

118. Which of the following are neutral amino acids?

Gly, Leu, Ile,Val,Ala	Phe, Cys, Met	Asn, Lys, gln, Glu, His, Asp	Arg

119. Then rotation of bonds are described as

Torsion	Dihedral	Both a and b	None of the above

120. High percentage of Collagen is present in

Bones, Tendons	Skin, Ligaments	Blood vessels, Supporting membrane tisssues	All of the above

121. Which of the following chemical is a best protein denaturant

Urea	Guanidinium Chloride	NaCl	KCl

122. What is the term used for the automated *in vitro* testing of large numbers of compounds using genetically modified cells?

a. Robotic testing	b. High throughput screening	c. Multiscreening	d. Nanotechnology

123. A database that classified protein 3D structure in a hierarchical scheme of structure classes.

a. CATH	b. PDB	c. PROSITE	d. SCOP

124. The algorithm used in local alignment

a. Smith Waterman Algorithm	b. Needleman Wunsch Algorithm	c. Hirschberg's algorithm	d. Velvet algorithm

125. PIR was established in

a. 1980	b. 1964	c. 1984	d. 2000

126. PDB identifier is assigned by

a. 3 character	b. 4 character	c. 5 character	d. 7 character

127. The algorithm used for energy minimization in Swiss-Model is

a. GROMACS96	b. GROMACS	c. EnergyM	d. CharmM

128. What is New Chemical Entities?

a. Unfair commercial use	b. Compounds which emerge from the process of synthetic materials	c. Compounds which emerge from the process of drug discovery	d. None of the Above

129. Which of the following are annotation tool in bioinformatics

a. BLAST and FASTA	b. BLAST, GENSCAN and FASTA	c. GLIMMER	d. Modeling

130. Relational databases can be created using special programming language called

a. SQL	b. Pearl	c. C++	d. Java

131. Which of the following is not used as a measure of enzyme activity?

a. EC_{50}	b. *K*i	c. IC_{50}	d. Log *P*

132. A competitive inhibitor

a. increases the K_m of an enzyme	b. decrease the K_m of an enzyme	c. increases both the V_{max} and K_m of an enzyme	d. decreases the K_m but increases the V_{max} of an enzyme

133. Who developed a program called FASTA

W. Pearson	D. Lipman	W. Pearson and D. Lipman	None of the above

134. An faster program from similarity searching in sequence databases, called BLAST was developed by

D. Lipman	W. Perason	S. Altschul	Stiegler

135. BLAST program was developed in the year

1990	1992	1994	1995

136. NCBI maintains a current set of clusters for each genome known as the

Metagene	UNIGENE	Progene	All the above

137. _____is most often used for aligning protein sequences and searching databases for similar sequences

BLOSUM62	PAM	BLOSUM120	Both a and c

138. BLAST tool that searches sequence databases for conserved domains

P-blast	PHI-blast	PSI-BLAST	Both a and b

139. _____ is an alignment of two or more sequences that matches as many characters as possible in all of the sequences

Global alignment	Local alignment	Multiple alignment	None of these

140. _____ is an alignment that includes only the best matching, highest-scoring region in two or more sequences

Global alignment	Local alignment	Multiple alignment	None of these

141. _____is a dynamic programming algorithm for producing a global alignment of sequences

Needleman-Wunsch algorithm	Smith-Waterman algorithm	Pairwise algorithm	Multiple algorithm

142. _____ is a dynamic programming algorithm for locating the highest-scoring local alignment of sequences

Smith-Waterman algorithm	Needleman-Wunsch algorithm	Pairwise algorithm	Multiple algorithm

143. Expect value (E) in similarity search between the query and random or unrelated sequences depends on

Sequence lengths	The number of sequences in the databases	Type of scoring system used	All the above

144. BLOSUM62 scoring matrices were generated by

S. Henikoff	J.G. Henikoff	Both a and b	None of the above

145. BLOSUM62 scoring matrices were generated in the year

1990	1991	1992	1995

146. _____an improved version of BLAST for finding protein families

PSI-BLAST	P-BLAST	PHI-blast	None of these

147. ____ is a broad term for the diagrammatic representation of a phylogenetic tree

Dendrogram	cladogram	Phylogram	chronogram

148. A node in a phylogeny represents a

Common ancestor	Different ancestor	Both a and b	None of the above

149. _____ is a database currently is the largest collection of freely available information about pair wise molecular interactions and complexes

BIND	DIP	GRID	HPRD

150. _____is a database which contains data on the functional interactions between proteins

MINT	IntAct	BIND	DIP

151. The A. Thaliana genome (100 Mb) is sequenced in

2000	2004	2005	2001

152. Which pair of amino acids absorbs the most UV light at 280nm

Ser and tyr	Ala and trp	Trp and Tyr	None of these

153. RB is a tumor suppressor that positively regulates

cell cycle	apoptosis	Ion Transport	none of these

154. Which is the most common post translation modification seen in secreted proteins

phosphorylation	signal peptide	glycosylation	Acetylation

155. Enrichment of phosphoproteins from a cell lysate can be achieved using

lectin affinity chromatography	precipitation with Titanium dioxide	dialysis	none of the above

156. A UTR is located in

5’ and 3’ DNA	5’ and 3’ mRNA	N-terminal and C-terminal end of protein	all of the above

157. Major mediators of TGF beta signaling are

ERK1 and ERK2	STAT proteins	SMAD proteins	PI3K proteins

158. The following is false for eukaryotic genes

Both start and end points of the genes are well defined	Most of them have introns	Expression of these genes are controlled by regulatory elements	Most of them are monocistronic

159. Majority of the available pharmaceuticals directly target

DNA binding proteins	cytoplasmic peripheral proteins	transmembrane proteins	cytosolic adaptor proteins

160. Choose the best order of permeability of the molecules through plasma membrane

H2O > CO2 > Glucose > Glycerol	CO2 > Glycerol > H2O > Glucose	CO2 > H2O > Glycerol > Glucose	CO2 > H2O > Glucose > Glycerol

161. TGF Beta receptor has the following type of intrinsic kinase activity

Ser/Thr	Tyr	Ser/Tyr	all of the above

162. Major mediators of TGF beta signaling are

ERK1 and ERK2	STAT proteins	SMAD proteins	PI3K proteins

163. Which among the following is/are ligands of G protein coupled receptors are

Epinephrine	ACTH	Serotonin	all of the above

164. Dideoxynucleotides are used in

Cloning	DNA sequencing	Culturing of bacteria	Southern hybridization

165. Which among the following sequences are stop codons?

UAA, UGG, UGA	UUU, UGA, UAA	UGA, UAA, UAG	UAG, UAA, AAG

166. Physical mapping methods include

STS mapping	EST mapping	RFLP mapping	all of the above

167. Use of RACE is involved in

End sequencing of transcripts	transcript count	Amplification of RNA	none of these

168. Which among the following is an example of Juxtacrine signaling?

Notch receptor pathway	IL-2 pathway	IL-3 pathway	IL-6 pathway

169. Which among the followings does not have known ligand?

ERBB2	ERBB3	ERBB1	ERBB4

170. Alu element is a

LINE	SINE	LTR	None of these

171. What happens to the Cdk-cyclin A complex at metaphase?

Both cyclin A and Cdk remain undegraded	Only Cdk is degraded	Only cyclin A is degraded	Both cyclic A and Cdk are degraded

172. Lipid bilayers can be formed by phospholipids which have variable head groups and fatty acyl chains. The fluidity of the membrane will depend on

Only the nature of head groups	Only the length of the fatty acid chains irrespective of the extent of unsaturation	Only unsaturation irrespective of the length of the fatty acid cahins	Length of degree of unsaturation of fatty acid chains

173. The peptide bond is planar

Due to restriction caused by rotation around cα-Nbond	Due to restriction around cα-c'bond	Due to delocalization of the lone pair of electrons of the nitrogen onto carbonyl oxygen	Because amide proteins and carboxyl oxygen are involved in hydrogen bonding

174. The average human genome has approximately 3×10^9 base pairs coding for various proteins. If an "average" protein contains 400 amino acids, what is the maximum number of proteins that can be encoded by the human genome?

2.5×10^6	2.5×10^7	3.0×10^6	3.5×10^7

175. Ionophores are small hydrophobic molecules that can partition into the lipid bilayer and increase their permeability to specific inorganic ions. Which of the following is a channel forming ionophore?

Valinomycin	Actinomycin	Gramicidin A	Nicin

176. The absence of sigma factor in RNA polymerase

affects elongation of transcription only	blocks initiation of transcription only	affects both initiation and elongation	does not affect transcription

177. In mammals, G protein coupled receptors (GPCR) play a major role in mediating effects of various hormones NOT through

activation of protein kinase A	activation of adenylate cyclase	inactivation of adenylate cyclase	activation of tyrosine kinase activity

178. Which of the following processes is a major problem in interpreting molecular phylogeny?

Horizontal transfer of genes	Gene duplication	Synonymous mutations	Non-synonymous mutations

179. Diptheria toxin causes

ADP ribosylation	ADP ribosylation	Blocking activity of RNA	Blocking DNA

of EF-2	of EF1 alpha	polymerase	replication process

180. First successful vaccine against cancer has been prepared for

Prostate cancer	Breast cancer	cervical cancer	colon cancer

181. If a cell has 'C' as the DNA content and 'n' as chromosome number of chromosomes,then just immediately before the cell division in case of mitosis what would be value of 'C' and 'n'

4c and 2n	2c and 4n	2c and 2n	4c and 4n

182. In a population frequency of A1 is 0.75 and A2 is 0.25. After one generation the phenotype frequency will be

0.5625; 0.375; 0.0625	0.5625; 0.0625; 0.375	0.750; 0.250; 0.350	0.5625; 0.1525; 0.0625

183. Consider the following DNA sequence 5'-ATGGGCATAGACGATATGGTAG-3'. If due to frame shift mutation there is insertion of 'G' between 3 and 4 position Consider a reverse mutation occur in same mutated sequence which reverse mutation will have minimum effect in protein.

Insertion of nucleotide between 6 and 7	Deletion of nucleotide between 5and 7	Deletion of nucleotide between 11 and 12	Insertion of nucleotide between 9 and 11

184. A stretch of double strand DNA contains 1000bp and its base composition is 71% [G+C], How many thymine residue are in this region of DNA

290	145	280	275

185. The m-RNA is 336 nucleotides long, including initiation and termination codon. The number of amino acid in protein translated from the m-RNA will be

110	111	112	113

186. What does Real time PCR actually measures

DNA	RNA	Fluorescence increase of Dye	All

187. In a sample from Indian population, the frequency of M and N alleles are 0.78 and 0.22 respectively. What is the expected frequency of MN phenotype?

0.8	0.02	0.34	0.016

188. Which of the following samples will not have high molecular weight proteins?

serum	plasma	hemodialysis fluid	all the above

189. A group of 212 college students were invited to taste PTC. There were 149 tasters and 63 non-tasters. What is the allele frequency of T and t?

0.55; 0.45	0.25; 0.20	0.045; 0.055	0.020; 0.025

190. Which particle plays a major role in the process of lasing

proton	Krypton	neutron	electron

191. What is the life time of the excited hydrogen atom

10^{-8} sec	10^{-3} sec	10^{-12} sec	10^{-15} sec

192. A rifle bullet weighing 7 g leaves the barrel of a rifle with a velocity of 300 m/s. If the rifle recoils with a velocity of 1 m/s, find the mass of the rifle.

5.3 kg	2.1 kg	8.1 kg	10 kg

193. Two bodies of mass m and 3m are thrown vertically upward with the same velocity. On coming back to earth

they will have zero velocity	they will have same velocity	the body of mass 3m will have three times more velocity than that of mass m	the body of mass 3m will have one-third velocity of that of mass m

194. The mass of the body at the centre of earth is

less than at the surface	remains constant	more than at the surface	zero

195. A body of mass 2 kg is hung on a spring balance mounted vertically in a lift. If the lift decends with an acceleration equal to the acceleration equal to the acceleration due to gravity 'g', the reading on the spring balance will be changed by

2 kg	4 kg	10 kg	zero

196. In the Carnot engine when heat is taken from the source, its temperature

remains constant	does not remain constant	decreases	increases

197. The efficiency of an otto cycle increases as

compression ratio increases	compression ratio decreases	no change in the compression ratio	none of the above

198. A diesel cycle works at

constant volume	constant pressure	constant temperature	none of the above

199. For polyatomic gases such as hydrogen the corresponding degree of freedom would be

two, three	five, six	three, nine	three, four

200. When 10 gram of ice at 0^0 C is converted in to water at the same temperature, the change in entropy will be

1.73	2.93	4.85	2.2

201. If the linear momentum increased by 50%, the kinetic energy will increase by

50%	100%	125%	25%

202. What is the Avogadro's number

1.38×10^{-23} J/mol	8.134 J/mol	1.6×10^{-19} J	6.023×10^{23} per mole

203. What happens when the light intensity incident on a photoelectric surface is doubled?

the frequency of	the number of	the number of	there is no effect

emitted photons is doubled	photons is doubled	photons becomes four times	at all

204. The idea of quantum nature of light has been emerged in an attempt to explain

the thermal radiation of black body	radioactivity	fusion	interference of light

205. The rate constant at 1600C for the first order decomposition of ore is 0.032/min. The half life of the reaction is:

62.5 sec	31.25 sec	5000 sec	none of the above

206. The units of the rate constant for the first order reaction could be:

M^{-1} min^{-1}	M	M min^{-1}	min^{-1}

207. How does the slope of the line on a plot of the Henderson-Hasselbalch equation depend on Kdn?

Kdn increases the slope decreases	Kdn increases the slope is unchanged	Kdn increases the slope increases	There is not enough information to answer this question

208. The strength of an acid is:

directly proportional to the value of the pKa of the acid	inversely proportional to pKa	not related to pKa	equal to 1/pKa

209. The weakest acid in the following list is:

carbonic acid	phosphoric acid	acetic acid	hydrochloric acid

210. In a buffer solution made up of a weak acid and its salt, if the salt concentration is 100 times the concentration of acid, the pH will be:

the same as the pK	one unit below the pK	two units below the pK	two units above the pK

211. Hydrophobic molecules are:

generally nonpolar and relatively insoluble in aqueous solutions	generally polar and relatively insoluble in aqueous solutions	generally nonpolar and relatively soluble in aqueous solutions	generally polar and relatively soluble in aqueous solutions

212. If secreted Immunoglobulin G is resolved on a SDS-PAGE under reducing conditions, how many bands do you expect after staining?

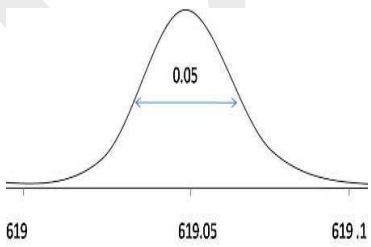
1	2	4	7

213. Which is the most common post-translation modification seen in secreted protein?

Phosphorylation	Signal peptide	Glycosylation	Acetylation

214. The resolution of depicted peak is

10000	12000	15000	20000



215. The molecular weight of a protein is 20 kDa. How many amino acids do you expect in this protein?

700-1000	400-500	less than 250	less than 99

216. Which of the following chromatography method will be preferred to separate alanine and glutamic acid in a mixture of amino acids?

Gel filtration chromatography	Strong cation exchanger	Strong anion exchanger	Affinity chromatography

217. Mass spectrometry derived protein sequences can be used for

identification of novel gene	identification of protein isoforms	identification of post translational modifications	all of the above

218. Protein N terminal acetylation gives the proof of concept for a protein

transcriptional start site	localization	translational start site	all of the above

219. Which amino acid is glycosylated during O-GlcNacylation?

Proline	Serine	Arginine	Asparagine

220. What is the nature of amino acids present in the transmembrane domains of proteins?

hydrophobic	polar	amphipatic	hydrophilic

221. Which is the most common detergent in shampoos?

Pentaerythrityl palmitate	Lauryl sulphate	Triton X 100	NP 40

222. During glycosylation of secretory proteins in Endoplasmic reticulum, which is the carrier molecule for the sugar molecules?

Dolicol pyrophosphate	Dolicol phosphate	Dolicol glycolate	None of the above

223. Which among the following is a purely ketogenic amino acid?

Glycine	Serine	Aspartic acid	Leucine

224. Which of the following amino acids have nearly isobaric mass?

Lysine and Glutamine	Aspartic acid and glutamic acid	Alanine and aspargine	Leucine and tyrosine

225. Which chromatography technique is used for molecular weight determination of molecules?

size exclusion chromatography	hydrophobic interaction chromatography	gel permeation chromatography	affinity chromatography

226. Which one of the following statements is not true?

Trypsin is an endopeptidase	Trypsin cleaves n-terminus to lysine and arginine	Trypsin exhibits autocatalytic activity	Trypsin is synthesized as inactive zymogen precursor

227. Actual mass of a peptide is 575.2364 (m/z); however, the measured mass of the peptide is 575. 2374 (m/z). What is the mass error?

~2 ppm	~5 ppm	~10 ppm	~12 ppm

228. Measured mass of a triply charged peptide is 600 Da (m/z). What is the actual mass of the peptide?

~200 Da	~597 Da	~1800 Da	~603 Da

229. Which chromatography method is based on reversible chemical interactions of high specificity?

reversed phase chromatography	Hydrophobic interaction chromatography	gel permeation chromatography	affinity chromatography

230. Stationary phase in a Reversed-phase chromatography is generally

polar	Non-polar	any one of these	none of these

231. What is peptide mass fingerprinting?

Peptides are fragmented in the mass spectrometer and a short stretch of amino acids are obtained	Peptides are fragmented in the mass spectrometer and the fragment ion masses are used to search the database	protein is digested and the peptide masses are used to search the database	None of the above

232. What is difference between “array” of “PERL” and “tuple” of “PYTHON”?

Array is mutable and tuple is immutable	Array is dynamic and tuple is not	Both of the above	There is no difference

233. What is difference between “array” of “PERL” and “tuple” of “PYTHON”?

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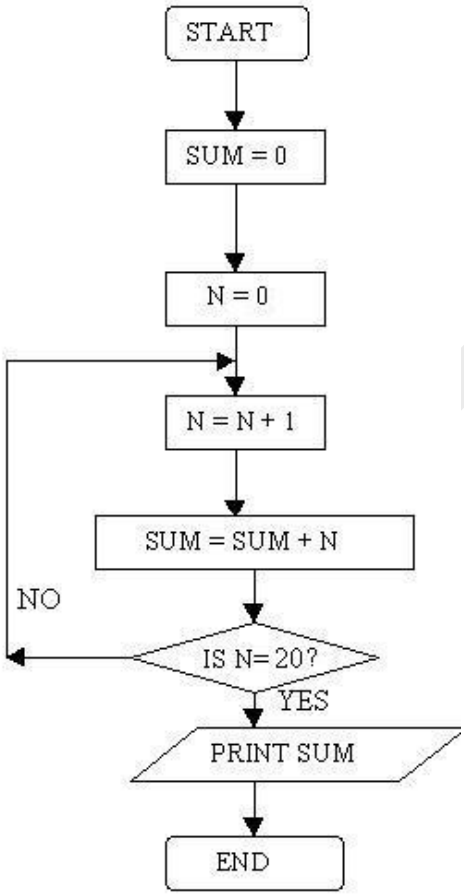
234. Which of the following types of bonds or interactions are least likely to be involved in stabilization of the 3 dimensional folding of most proteins?

Hydrogen bonds	Electrostatic bonds	Hydrophobic interactions	Ester bonds

235. What is the value of "SUM" when it gets printed?



210	155	255	200

236. What is difference between "array" of "PERL" and "tuple" of "PYTHON"?

Array is mutable and tuple is	Array is dynamic	Both of the above	There is no

immutable	and tuple is not		difference

237. What is difference between array of “C language” and “PERL”?

array is static in C and dynamic in PERL	array is static in PERL and dynamic in PERL	array is dynamic in both	array in static in both

238. Difference between Structure and Array in “C language”

both are homogeneous	array in heterogeneous and structure is homogeneous	array in homogeneous and structure is heterogeneous	both are heterogeneous

239. Regular expression “ [^abc] “ will:

match the start of the line with “abc”	match any single character other than “a”, “b”, “c”	match any single character “a”, “b” or “c”	none of the above

240. Arrange in increasing order of memory it allocates:

int<char<float<double	char<int<float<double	char<int<double<float	double<char<float<int

241. What is memory allocated by struct “lib_books”?

41 bits	8 bits	8 bytes	41 bytes

```
struct lib_books
{
char title[20];
```

```
char author[15];
int pages;
float price;
};
```

242. Select the appropriate option according to the given example:

```
$a =~tr/abc/def/;
```

will replace "abc" with "def"	will replace "a" with "d", "b" with "e", "c" with "f"	will replace "def" with "abc"	will replace "d" with "a", "e" with "b", "f" with "c"

243. Which one out of the following is wrong?

$10011011_2 = 155_{10}$	$1057_8 = 22F_{16}$	$1010111100_2 = 1274_8$	$900_{10} = 1605_8$

244. A file is downloaded to a home computer using a 256 kbps modem connected to an Internet Service Provider. If the download completes in 2 minutes, estimate the maximum size of data downloaded

3.75 Kb	3.75 MB	3.75 Mb	3.75 KB

245. The Internet is an example of a

packet switched network	circuit switched network	cell switched network	none of the above

246. A network that provides a constant bandwidth for the complete duration of a message transfer is a

cell switched network	packet switched network	circuit switched network	none of the above

247. What is a 'tuple'?

A row or record in a database table	Another name for a table in an RDBMS.	Another name for the key linking different tables in a database	An attribute attached to a record.

248. Which of the following is not characteristic of an RDBMS?

Queries are possible on individual or groups of tables	Tables are linked by common data known as keys.	It cannot use SQL.	Data are organized in a series of two-dimensional tables each of which contains records for one entity.

249. User ‘Janko’ would like to insert a row into the Emp table, which has 3 columns: empid, lastname, salary. The user would like to enter data for empid 59694, lastname Harry, but no salary. Which statement would work best.

INSERT INTO EMP VALUES (59694,’Harry’);	INSERT INTO EMP (empid, lastname, salary) VALUES (59694,’Harry’);	INSERT INTO EMP VALUES (Select 59694 from ‘Harry’);	INSERT INTO EMP(empid, lastname) VALUES (59694,’Harry’);

250. Which of the following statements contains an error?

select * from EMP	select EMPID	select EMPID	select EMPID

where EMPID = 493945;	from EMP where EMPID = 493945;	from EMP;	where EMPID = 56949 and LASTNAME = 'SMITH';

251. Which of the following is true?

Stack is FIFO data structure	Queue is FIFO data structure	Queue is LIFO data structure	Stack and Queue both are FIFO data structure

252. The keys that can have NULL values are

Primary Key	Unique Key	Foreign Key	Both b and c

253. Computational approaches for protein-protein interactions include

Gene fusion	Gene order conservation	Both a and b	None of the above

254. Generally "decoy database" do not search

True matches	False matches	Both a and b	None of the above

255. Chymotrypsin cleave peptide bonds adjacent to amino acid residues

Trp,Phe,Tyr	Trp,Ser,Tyr	Lys,Phe,Tyr	Tyr,Trp,Arg

256. Which subdomain of protein kinases contain glycine rich loop ?

Subdomain I	Subdomain II	Subdomain VII	Subdomain VIII

257. ROC curve, is a graphical plot of the

Sensitivity vs. specificity	True positive rate vs. false positive rate	Both a and b	None of the above

258. PAM unit, is the amount of evolution which will change, on average,

99% of amino acids	1% of amino acids	100% of amino acids	10 % of amino acids

259. Position-Specific Iterated BLAST search takes as an input a single protein sequence and compares it to a database, using following program

Gapped BLAST	BLAST	BLASTP	BLASTX

260. Unitary Matrix is also known as

Percentage Matrix	Substitution Matrix	Identity Matrix	Inverse Matrix

261. Metaproteomics should be used to classify experiments that deal with all the genes and proteins identified from

Complex communities	Microbial ecosystems	Individual	Both a and b

262. The most highly significant P values of protein sequence alignment will be those close to

0.0	0.01	0.011	0.1

263. Vertebrate collagen typically contain about

35% Gly, 11% Ala, and 21% Pro and 4-Hyp	11% Gly, 35% Ala, and 21% Pro and 4-Hyp	21% Gly, 11% Ala, and 35% Pro and 4-Hyp	none of the above

264. DUST program filters low complexity regions from following

Protein sequences	Nucleic acid sequences	Both a and b	None of the above

265. Proteogenomics utilizes the whole genome MS/MS datasets to better characterize the genomic and proteomic annotations and include following

Correcting translational start sites	Protein-DNA Interaction	Secondary structure Prediction	None of the above

266. Positively charged amino acids are following

K,H,F	W,R,H	K,H,R	None of the above

267. For proteins, the difference between an average and a monoisotopic weight is approximately

0.05%	0.06%	0.08%	0.01%

268. A large negative value for to the standard free-energy change for the reaction reflects a favorable reaction equilibrium, but this does not mean

The reaction will proceed at a slower rate	The reaction will proceed at a rapid rate	The reaction will proceed at a moderate rate	None of the above

269. Cholecalciferol is produced in the skin by UV irradiation of following

7-dehydrocholesterol	1,25-Dihydroxycholecalciferol	Both a and b	None of the above

270. Native DNA are highly viscous at following pH

1.0	5.0	9.0	7.0

271. Average number of protein coding genes in human genome

18,000 - 28,000	32,000 - 48,000	48,000 – 1,00,000	less than 18,000

272. Which of the following is NOT a technique to identify DNA copy number variations

array CGH	FISH	PCR	RIA

273. The study of molecular organization of genomes, their information content and the products they encode is called

Genetics	Genomics	Structural genomics	Metagenomics

274. Identify the pattern of inheritance in a condition where the chance of acquiring a trait is inherited in equal proportions for sons and daughters

Autosomal Dominant	Autosomal Recessive	X-linked Recessive	None of these

275. Which of the following cells contain haploid set of chromosomes?

germ cells	intestinal villi cells	mature red blood cells	nerve cells

276. Which is not TRUE about ncRNA (non-coding RNA) genes?

they code for tRNA and rRNA	they contain an open reading frame	they do not code for any functional protein	none of these

277. How many cycles of PCR are necessary to obtain 10 copies of a gene from a single copy of DNA?

5 cycles	3 cycles	4 cycles	10 cycles

278. In 100% efficient reaction, it takes 5 cycles to produce 32 copies from a single copy of DNA.

How many cycles are required to reach 32 copies when the efficiency of the reaction is 70%?

5 cycles	7 cycles	6 cycles	8 cycles

279. The mechanism of gene transfer into bacteria through phages is known as

conjugation	transduction	transformation	injection

280. Actively transcribed genes are associated with loosely packed regions of chromatin called

heterochromatin	euchromatin	heterodimers	centromeric regions

281. E-value of significant blast alignment should ideally be

less than 1 and more than 0	more than 1	a negative number	none of these

282. Which of the followings is not a domain or motif analysis tool?

BINGO	TMHMM2	PSORT	Coils2

283. Two sequences of are said to be orthologs if

they are from different species that evolved from a common ancestral gene by speciation	they have converged to share similar functional properties	genes related by duplication within a genome, even if they have dissimilar function	all of the above is true

284. Which of the following statements is false?

psi-blast is used to search protein	phi-blast is used to search a protein	blastx is used to search translated	tblasx is used to search translated

database using a protein query	database using a protein query	nucleotide database using a translated nucleotide query	nucleotide database using a translated nucleotide query

285. Which of following is most stable?

primary structure of the protein	secondary structure of the protein	tertiary structure of the protein	quaternary structure of the protein

286. Which among the following is not a measure of variability:

Standard deviation	Range	Median	Coefficient of Variation

287. Which of the following is a measure of Spread

Variance	Mean	p value	Mode

288. All are true of sample size except

It should be representative of population	It should be of adequate size	It gives exactly the same results as exists in population	Sample size should be determined during the planning stage itself

289. Which of the following is non-parametric test?

z-test	‘t’ test	Chi-square test	None of the above

290. To compare the variability in two populations we use this measure

Range	Coefficient of Variation	Median	Standard deviation

291. 10 babies are born in a hospital on same day. All weigh 3.8 Kg each; What would be the standard deviation?

0.38	1	38	0

292. Haemoglobin of 10 people was measured before and after giving them iron tablets for one month. Statistical test which can be used to measure the effect of iron on Haemoglobin is

Paired 't' test	Unpaired 't' test	Sign test	Chi-square test

293. In comparing the difference between two population means, if value of p is 0.31. Then correct interpretation is

There is a significant difference between population means	There is no significant difference between population means	None of the above	All of the above

294. Which of the following is not true for the hormones?

Hormones generally act away from their site of production	All the hormones enter the cells and bind to intracellular receptors	All hormones need not be proteins	Hormones reach the target site through blood vascular system

295. The process by which a protein kinase phosphorylates an amino acid on its homo-dimeric partner is

autophosphorylation	Transphosphorylation	homo-dimerization	*cis*-phosphorylation

296. Glucagon binds to Glucagon receptor and directly activates

cAMP Signal pathways	ras-raf pathways	PI3K/AKT pathways	SMAD pathways

297. G-proteins function by dissociation of the

trimer	dimer	tetrame	all of these

298. Two sequences of are said to be paralogs if

they are from different species that evolved from a common ancestral gene by speciation	they have converged to share similar functional properties	genes related by duplication within a genome, even if they have dissimilar function	all of the above is true

299. Stationary phase in a Reversed-phase chromatography is generally

polar	non-polar	any one of these	none of these

300. Which one of the following statements is not true in the case of trypsin?

It is an serine protease and endopeptidase found in mammals	It cleaves peptide chains at the n-terminal side of lysine or arginine except when either is followed by proline	It exhibits autocatalytic activity	Trypsin is produced in the pancreas as the inactive proenzyme

301. Which one of the following statements is false?

y and b ion fragments containing the amino acid residues R, K, Q, and N may appear to lose ammonia -17	b ion intensity may be higher when the next residue is P or G	y and b ion fragments containing the amino acid residues S and T may appear to lose water -18	Internal cleavages can occur at P and H residues

302. Which one of following is global query cross-database search?

NCBI	Entrez	EMBOSS	ExPASy

303. Which one of database is not a DNA and RNA sequence analysis

Entrez	EMBOSS	Glimmer	Submito

Chemistry

1. De-Broglie relations is

$\lambda = h / p$	$\lambda = h\ p\ c$	$\lambda = h + p$	$\lambda = h - p$

2. The De-Broglie wave length of a particle of mass 6.625×10^{-31} kg moving with a velocity 2×10^{7} *m/s is*

5 Å	5×10^{-11} m	5×10^{-9} m	5×10^{-8} m

3. Molecular orbital with less energy is

σ 1s	σ^* 1s	$\pi_2 P_y$	$\pi_2^* P_y$

4. The octahedral shape arises due to ……. hybridized

sp^3	sp^3d	dsp^3	sp^3d^2

5. The shape of IF_7 molecules is

planar	tetrahedral	pentagonal bipyramidal	linear

6. Which of the following is not a periodic property

Equivalent mass	Atomic radius	Ionization potential	Electronegativity

7. The ionic radius is inversely proportional to ……..

Atomic number	atomic mass	effective nuclear charge	screening constant

8. The highest ionisiaton potential in a period is shown by …….

Alkali metals	halogens	nobel gases	alkaline earth metals

9. The electronegativity of Cl according to pauling's scale is

2.1	1.77	3.87	-1.77

10. If $X_A > X_B$, $X_A - X_B$ is small, than the molecule is

polar covalent	non polar	ionic	d. neutral

11. The element generally existing as liquid at room temperature

Thallium	Indium	Gallium	Aluminium

12. An additive to petrol to prevent knocking

Diethyl lead	diethyl zinc	diethyl lithium	tetraethyl lead

13. Souring agents in the preparation of soft drink is

H_3PO_3	$H_4P_2O_4$	H_3PO_4	HPO_3

14. Chemical involved in Holme's signals are

CaC_2 and Ca_3P_2	CaC_2 and Ca_2P_3	. Ca_2C and Ca_2P_3	Ca_2C and Ca_3P_2

15. The outer electronic configuration of 17^{th} groups is

$ns^2\ np^2$	. $ns^2\ np^3$	$ns^2\ np^4$	$ns^2\ np^5$

16. Which is pink in colour

Ti^{3+}	Co^{2+}	. Cu^{2+}	Ni^{2+}

17. Highly magnetic substance, as a compared to ordinary metals are called as

Paramagnetic substance	diamagnetic substance	ferromagnetic substance	non magnetic substance

18. Silver coins contain

Ag and Zn	Ag and Cu	Ag and Ni	Ag,Cu and Zn

19. A powerful oxidizing agent is

$K_2Cr_2O_7$	$CuSO_4$	$ZnCO_3$	$AgNO_3$

20. Compound used in ointment for skin diseases is

$AgNO_3$	Hg_2Cl_2	$ZnCO_3$	$ZnSO_4$

21. Which element in lanthanides is radioactive

Cerium	Holmium	Promethium	Lutetium

22. The oxidation state exhibited by lanthanides other than +3 are

+1 and +2	+4 and +5	+2 and +4	+5 and +6

23. The major constituents of mish metal are

Ce -45% and Fe – 20% and impurities	Ce -45-50% , La - 25% and Nd-5%	Ce-60% and La - 40%	Ce -50% , La -40% and Nd-10%

24. The oxide of lanthanides used in gas lamp materials are

CeO_2 and Nd O_2	Ce O_2 and ThO_2	ThO_2 and SmO_2	LuO_2 and CeO_2

25. Lanthanide contraction is due to

perfect shielding 4 f electrons	imperfect shielding 4 f electrons	perfect shielding 3d electrons	imperfect shielding 3d electrons

26. Which one of the following complex does not give white precipitate with $AgNO_3$?

[Co $(NH_3)_6$] Cl_3	[Co$(NH_3)_6$ Cl] Cl_2	[Co$(NH_3)_6Cl_2$]Cl	[Co$(NH_3)_6Cl_3$]

27. IUPAC name of [Co $(NH_3)_6$] Cl_3

Cobalt ammonia chloride	Cobalt hexa ammonia chloride	Cobalt (III) hexa ammonia chloride	Hexa amine cobalt(III) chloride

28. The isomerism not exhibited by coordination compound is

Chain isomerism	ionisation isomerism	coordination isomerism	ligand isomerism

29. $dx^2 – y^2$ and dz^2 orbitals are called

e_g orbitals	axial orbitals	t_{2g} orbital	e_g orbitals and axial orbitals

30. An anti tumour drug is

$Al(oxine)_3$	trans $[Pt(NH_3)Cl_2]$	$[Pt(NH_3)Cl_2]$	$K_4[Fe(CN)_6]$

31. The phenomenon of radioactivity is not affected by

number of atoms	pressure	temperature	both b and c

32. Radiation with very short wavelength and very high energy is

α	β	γ	δ

33. In A gas 'X' is passed through water to form a saturated solution. The aquesous solution treatment with $AgNO_3$ gives a white precipitate.The saturated aqueous solution also dissolves magnesium ribbon with evolution of a colourless gas Y.Identify X and Y:

$X=CO_2, Y=Cl_2$	$X= Cl_2, Y= CO_2$	$X= Cl_2$, $Y= H_2$	$X= H_2$, $Y=Cl_2$

34. $_{15}P^{32}$ is used in

. brain scan	detection of eye tumour	kidney	blood clot

35. Atom bomb is based on

nuclear fission	nuclear fusion	spallation	reduction

36. Bragg's equation is

$2\lambda = nd \sin\theta$	$n\lambda = 2d \sin\theta$	$nd = 2\lambda \cos\theta$	$2\lambda = 2d \sin\theta$

37. The number of caesium ion per unit in CsCl crytal system is

4	8	6	1

38. The number of positive ions are slight excess than the number of negative ion in

Frenkel defect	Schottky defect	Line defect	Metal excess defect

39. Pure Si and Ge are …….. at room temperature

Insulator	Semi conductors	Super conductors	Conductors

40. Which one of the following property is directly measured Bragg's spectrometer method?

Ionisation current	Intensity of reflected beam	Angle of incidence	Inter atomic distance

41. It is impossible to transfer heat from a cold body to a hot body by a machine without doing some work. This statement is

Kelvin statement	Kelvin–Plank statement	Clausius statement	Planck ststement

42. Entropy change in the vapourisation of liquid is give by

Octet rule	Phase rule	Entropy rule	Trouon's rule

43. The Gibbs free energy G is mathematically defined as

G = H + TS	G = S- TH	G = H-TS	G = E- TS

44. The temperatures TC of the cold reservoirs and the temperatures TH of the hot reservoirs for four Carnot heat engines are

engine 1: TC = 400K and TH = 500K

engine 2: TC = 500K and TH = 600K

engine 3: TC = 400K and TH = 600K

engine 4: TC = 600K and TH = 800K

Rank these engines according to their efficiencies, least to greatest

2, 1, 4, 3	1, 2, 4, 3	1, 2, 3, 4	1 and 2 tie, then 3 and 4 tie

45. In which one of the process, the entropy increased

vapour condenses to liquid	Vapour condeses to solid	Solid sublimes to vapour	Liquid changes to solid

46. In equilibrium reaction, if Δng is positive then

Kc = Kp	Kc < Kp	Kp> Kc	Kc = 0

47. For the equilibrium reaction, $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$

Kp >Kc	Kp < Kc	Kp =Kc	Kp = O

48. The relationship between Kp and Kc in the equilibrium
$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$ is

Kp = Kc x RT	Kp = Kc x $(RT)^2$	Kp x RT = Kc	Kp$(RT)^{-2}$

48. In a chemical equilibrium increasing the concentration of the reactants will favour the

Forward reaction	Reverse reaction	Attainment of equilibrium	No change

49. Consider the following equilibrium:
Br2(g) + Cl2(g) ⇌ 2BrCl(g) at 400 K.

At equilibrium there were found to be 0.015 mols of BrCl, 0.256 mols Cl2 and 0.560 mols Br2 calculate the value of Kc the equilibrium constant at this temperature.

$2.50X10^5$	1.57×10^{-3}	.0.2	0.4

51. The unit of the zero order rate constant is

sec^{-1}	mol-lit^{-1}-sec^{-1}	lit- mol^{-1} sec^{-1}	lit^2 – mol^2-sec^{-1}

52. The slope of Arrhenius plot is having a value.....

k / 2.303	Ea / R	-Ea / 2.303 R	-2.303 Ea / R

53. The $t_{1/2}$ of a reaction 12.5 days. The percentage of radioactive element left after 50 days is

50%	12.5%	6.25%	37.5%

54. If 25% of a radioactive element is left after 40 days, then its half life period is

4 days	10 days	20 days	80 days

55. Then number of moles of water 1 liter is

50.5	55	55.05	55.55

56. Palladium metal can take up a large volume of hydrogen. It is an example of

Dissolution	Absorption	Adsorption	Desorption

57. The finely divided iron is used as catalyst in

lead chamber process	Haber's process	contact process	Solvay process

58. Bergius process issued for

Hydrogenation of vegetable oils	manufacture of chlorine	synthesis of petrol from coal	manufacture of sulphuric acid

59. The concept of electrical double layers was proposed by

Brown	Graham	Helmholtz	Tyndall

60. The light sensitive material used in photographic plates is

AgCl	$AgNO_3$	AgBr	AgI

61. The value of enthalpy of neutralisation of strong acid by strong base is

57.32 KJ $equiv^{-1}$	-57.32 KJ $equiv^{-1}$	72.57 KJ $equiv^{-1}$	- 72.23 KJ $equiv^{-1}$

62. The interionic attraction theory was put forward by

Onsager	Arrhenius	Huckel	Debye – Huckel – Onsager

63. The unit of molar conductance is

$ohm^{-2}m\ mole^{-1}$	$ohm^{-1}m\ mole^{-1}$	$ohm^{-2}m^3\ mole^{-1}$	$ohm^{-1}m^2\ mole^{-1}$

64. Methyl orange cannot be used for the titration of

CH_3 COOH Vs NaOH	HCl Vs NH_4OH	HCl Vs NaOH	HNO_3 vs KOH

65. 1 Faraday =

. 96000 colombs	495 volts	96495 coulombs	96495 volts

66. The Nernst equation is

E^0 = E- [(2.303 RT) / nF] log K	$E = E^0$- [(2.303 RT) / nF] log K	. E^0 = E+ [(2.303 RT) / nF] log K	E^0 = E- (2.303 RT) log K

67. The emf or cell potential is measured in the unit of

amperes	. coulomb	volt	ohm

68. Which one of the following does not enhanced the corrosion

High temperature	moist air	high pressure	acidic environment

69. Caustic soda is commercially prepared by

Castner – Kellner process	. Haber's process	Solvay process	Contact process

70. The standard emf of Zn- Cu voltaic cell is

2.1 V	. 1.2V	2.8 V	1.1 V

71. Which among the following is polar?

CH_3- CH_3	CH_2= CH_2	CH_3- CH_2 – Cl	C_6H_6

72. Which is the following exhibits geometrical isomerism?

2-methyl -2- butene	2-methyl propane	propylene	2-butene

73. What is the only essential condition for optical activity?

presence of a symmetric carbon atom	presence of one sp3 carbon atom	presence of chirality	absence of sp3 carbon atom

74. Which among the following is not a chiral molecule?

$CH_3CHOHCOOH$	$RCHNH_2COOH$	CH_3CHDOH	mesotartaric acid

75. Which one of the following has the highest boiling point?

$CH_3CH_2CH_2CH_2CH_3$	$CH_3CH_2CH_2CH_2OH$	CH3CH2OCH2CH3	$CH_3CH_2CH_2$ Cl

76. Lucas reagent is a mixture of

con.HCl + hydrated $ZnCl_2$	con.HCl + anhydrous $ZnCl_2$	con.HNO_3 + hydrated $ZnCl_2$	con. HNO_3+ anhydrous $ZnCl_2$

77. Which one of the following is not reduced to alcohol by Bouveault Blanc reduction?

aldehyde	ketone	. ester	alkane

78. The Fenton's reagents is

$FeSO_4$+H_2O	$FeSO_4$+H_2O_2	alkaline $KNMO_4$	acidfied $KNMO_4$

79. Higher ether can be prepared from lower members by the action of

conc.H_2SO_4	AgOH	Sodium alkoxide	Grignard reagent

80. The compound obtained by treating diethyl ether with strong HCl is

ethyl hydrogen chloride	Ethyl chloride	ethyl alcohol	diethyloxonium chloride

81. Which of the following is headed to get anisol?

$C_6H_5ONa+CH_3OH$	$C_6H_5OH+CH_3Cl$	$C_6H_5ONa+CH_3I$	$C_6H_5OH+CH_3OH$

82. Which one of the following ethers is used in perfumer?

dimethyl ether	diethyl ether	ethyl methyl ether	methyl phenyl ether

83. Which of the following is ortho and para directing group?

$-OCH_3$	. –CHO	$-NO_2$	– COOH

84. Chloral belong to a group of

alcohol	aldehyde	Propanal	Ester

85. Aldehydes without α - hydrogen undergo

Polymerization	Cannizzaro reaction	Claisen reaction	Aldol condensation

86. Which of the following does not give haloform test?

CH_3CHO	$C_2H_5COC_2H_5$	$CH_3COC_2H_5$	$CH_3- CH_2- CH_3$

87. The reagent of Clemmenson reduction is

$N_2H_4/NaO\ C_2H_5$	$FeSO_4+H_2O_2$	$LiAlH_4$	Zn-HgHCl

88. Benzaldehyde is used in the preparation of

DDT	BHC	malachite green	Aspirin

89. Which of the following cannot convert acetic to acetyl chloride?

PCl_5	$SOCl_2$	HCl	both a and b

90. …… reduces Fehling's solution

HCHO	HCOOH	$CH_3CO\ CH_3$	both a and b

91. Preparation of salicylic acid from phenol is known as

phthalein reaction	esterification	Kolbe's reduction	Claisen reaction

92. Acetic acid is less acidic than formic acid because of the

Inductive effect of -CH_3 group	steric effect of CH_3 group	electron attracting nature of CH_3 group	resonance effect of CH_3 group

93. The oil of winter green is

methyl acetate	methyl oxalate	methyl salicylate	methyl formate

94. Nitro methane with halogen in the presence of alkali produces

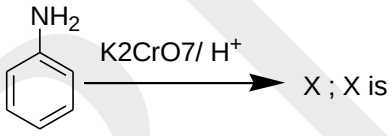
nitrolic acid	chloro methane	Trichloro nitro methane	Methyl nitrite

95. Nitro benzene on reduction in acid medium gives

phenyl hydrazine	phenyl hydroxylamine	aniline	azo benzene

96. Basic strength of amines is in the order of

$NH_3 > CH_3NH_2 > (CH_3)_2NH$	$(CH_3)_2NH > CH_3NH_2 > NH_3$	$CH_3NH_2 > (CH_3)_2NH > NH_3$	$NH_3 > (CH_3)_2NH > CH_3NH_2$

97. 

p- benzoquinone	bezylamine	N-phenyl acetamide	acetanilide

98. Geomberg reaction is used to prepare

chlorobenzene	nitrobenzene	Benzonitrile	Biphenyl

99. The helical structure of proteins is stabilised by

peptide bond	oxygen bond	hydrogen bond	nitrogen bond

100. Proteins on hydrolysis yeild

carbohydrates	Alcohols	Amino acids	Ketones

101. Starch when heated to 200 – 250 ° C changes into

Dextrin	glucose	Fructose	Cellulose

102. At a particular pH a protein solution becomes neutral. This is called

Isoelctric point	boiling point	melting point	ignition point

103. Cephalins have been implicated in the process of

Metabolism	organization of the body	blood purification	blood coagulation

104. $CHCl_3$ is not used as an anesthetic now, because

It is costly	it produces irreversible loss of sensation	it form toxic carbonyl chloride with oxygen	it requires stabilizer

105. Which is used for rheumatic fever, narrowing of heart wall, bronchitis and pneumonia?

Atropine	Primaquine	penicillin	Paracetamol

106. Mordant dyes are also called as

Alizarin	. indigo	malachite green	aniline yellow

107. Sodium benzoate is used as a / an

sweetening agent	antioxidant	food preservative	edible colourant

108. Hot drink cups are made up of

Polythene	polystyrene	PVC	Poly propylene

109. The type of hybridization of nitrogen in NH_4^+ ion is

. sp^3	sp^3d^2	sp^2	sp^3d

110. The trent in anionic radii among the halide ions is

$I^- > Br^- > Cl^- > F^-$	$F^- > Cl^- > Br^- > I^-$	$I^- > Cl^- > F^- > Br^-$	$Cl^- > F^- > I^- > Br^-$

111. Which element does not exhibit +1 oxidation state?

Ga	B	In	Tl

112. Philosopher's wool is

ZnO	ZnCO	. HgO	CuO

113. Lunar caustic ia

NaOH	Na_2CO_3	$Cu(NO_3)_2$	Ag NO_3

114. .... is used as fuel in nuclear plant

U-232	Pu -238	U- 235	Pu-241

115. Charge of ferricyanide complex ion is

. +3	-6	-3	0

116. β - ray emission results in

increase in number of protons	increase in number of electron	decrease in number of neutrons	Both a and c

COMPUTER SCIENCE

1. Which of the following is a temporary memory?

RAM	ROM	Both RAM and ROM	None of the above

2. Which of the following is a permanent memory?

RAM	ROM	Both RAM and ROM	None of the these

3. Computer software consists of _____program

System	Application	Operating system	All of these

4. Most of the memory system have _____properties

Electro-pneumatic	Electrostatic properties	Magnetic properties	All of these

5. Transfer of information from main storage is typically n times faster than the transfer from auxiliary storage, where n is about

5	10	100	200

6. The process of transferring data intended for a peripheral device into a disk (or intermediate store) so that it can be transferred to peripheral at a more appropriate time or in bulk is known as ___

Multiprogramming	Spooling	Caching	Virtual programmin

7. In C programming language which of the following types of operators have the highest precedence?

Relational operators	Equality operator	Logical operators	Arithmetic operators

8. AC variable must start with

An alphabet	A number	A special symbol	A keyword

9. A user can interact with the compiler through_____

interpreter	translator	memory	None of these

10. Modem stands for

A type of secondary memory	Modulator-demodulator	Main frame operating device memory	None of these

11. By algorithm, we can do

Systematic steps to solve a problem	Communication with computer	Reorganize the computer	Computer speed goes fast

12. An algorithm

May contain infinite steps	May contain fixed and finite steps	May contain single step	All three are incorrect

13. In algorithm a step is frequently repeated, this is called____

Repeated sequence	Normal sequence	Serial sequence	None of these

14. By using loops, algorithm steps becomes____

Clear and short	Complex and long	Clear and long	None of these

15. Which of the following word signifies using two or more CPU's?

Time sharing	Batch processing	Multiprogramming	Multiprocessing

16. The arranging of data in a logical sequence is called

Sorting	Classifying	Reproducing	Summarizing

17. An application suitable for sequential processing is

Processing of grades	Payroll processing	Both a and b	All of above

18. Which of the following memories needs refreshing?

SRAM	DRAM	ROM	All of the above

19. Which of the following cannot be checked in a switch-case statement?

Character	Integer	Float	None of these

20. Which is the correct order of mathematical operators?

Addition, Substraction, Multiplication, Division	Division, Multiplication, Addition, Substraction	Multiplication, Addition, Division, Substraction	Addition, Division, Modulus, Subtraction

21. Which of the following is not logical operator?

&	&&	II	!

22. A function that calls itself for its processing is known as

Inline function	Nested function	Overloaded function	Recursive function

23. We declare a function with _____ if it does not have any return type

Long	Double	Void	Int

24. Arguments of a functions are separated with

Comma	Semicolon	Colon	None of these

25. Variables inside parenthesis of functions declarations have ___ level access

Local	Global	Module	Universal

26. Observe following function declaration and choose the best answer
int divide (int a, int b = 2)

Variable b is of integer type and will always have value 2	Variable a and b are of int type and the initial value of both variables is 2	Variable b is international scope and will have value 2	Variable b will have value 2 if not specified when calling function

27. The keyword endl

Ends the execution of program where it is written	Ends the output in cout statement	Ends the line in program. There can be no statements after endl	Ends current line and starts a new line in cout statement

28. Strings are character arrays. The last index of it contains the null-terminated character

\n	\t	\0	\1

29. The result of a Relational operation is always

Either True or Flase	Is less than or is more than	Is equal or less or more	All of these

30. Which of the following is not a valid relational operator?

==	=>	<=	>=

31. What is the final value of x when the code intx; for (x=0; x<10; x++) {} is run?

10	9	0	1

32. When does the code block following while {x<100) execute?

When x is less than one hundred	When x is greater than one hundred	When x is equal to one hundred	While it wishes

33. Which is not a loop structure?

for	Do while	while	Repeat until

34. How many times is do while loop guaranteed to loop?

0	Infinitely	1	Variable

35. Which of the following is known as insertion operator?

++	--	<< answer	>>

36. Regarding the use of new line character (/n) and endl manipulator with cout statement

Both ways are exactly same	Both are similar but endl additionally performs flushing of buffer	Endl can't be used with cout	\n can't be used with cout

37. Which of the following is output statement in C++?

Printe	Write	Cout	Cin

38. Which of the following is input statement in C++?

Cin	input	get	None of above

39. By default, the standard output device for C++ programs is

Printer	Mointor	Modem	Disk

40. By default, the standard input device for C++ program is

Keyboard	Mouse	Scanner	None of these

41. Which of the following is extraction operator in C++?

++	--	<<	>> answer

42. Which of the header file must be included to use stringstream?

<iostream>	<string>	<sstring>	<sstream>

43. Which of the following header file does not exist?

<iostream>	<string>	<sstring>	<sstream>	

44. Which of the following is not a reserve keyword in C++?

Mutable	default	readable	volatile

45. The size of following variable is not 4 bytes in 32 bit systems

int	Long int	Short int	float

46. Looping in a program means

Jumping to the specified branch of program	Repeat the specified lines of code	Both of above	None of above

47. Which of the following is not a looping statement in C?

While	Until	do	for

48. Which of the following is not a jump statement in C++?

break	goto	exit	switch

49. Which of the following is selection statement in C++?

Break	goto	exit	switch

50. The continue statement

Resumes the program if it is hanged	Resumes the program if it was break was applied	Skips the rest of the loop in current iteration	All of the above

51. If the type specifier of parameters of a function is followed by an ampersand {&, that function call is

Pass by value	Pass by reference	All the above	None of these

52. Overloaded function are

Very long functions that can hardly run	One function containing another one or more functions inside it	All the above	None of the above

53. What is the correct value to return to the operating system upon the successful completion of a program?

-1	1	0	Programs do not return a value

54. What is the only function all C++ programs must contain?

Start {}	System {}	Main{}	Program{}

55. What punctuation is used to signal the beginning and end of code blocks?

{}	< and >	BEGIN and END	{ and }

56. What punctuation ends most lines of C++ code?

{dot}	{semi-colon}	{colon}	{single quote}

57. Which of the following is a correct comment?

/comments/	**comment**	/*comment*/	{Comment}

58. Which of the following is not a correct variable type?

float	real	int	double

59. Which of the following is the correct operator to compare two variables?

:=	=	equal	== answer

60. Which of the following is the Boolean operator for logical and?

&	&&	!	!!

61. A variable is/are

String that varies during program execution	A portion of memory to store a determined value	Those numbers that a frequently required in programs	None of these

62. Which of the following can not be used as identifiers?

Letters	Digits	Undersocres	Spaces

63. Which of the following identifiers is invalid

Papername	Writername	Typename	Printname

64. Which of the following cannot be used as valid identifier?

Bitand	Bittand	Biand	Band

65. Which of the following is not a valid escape code?

\t	\v	\f	\w

66. Regarding #difine which of the following statement is false?

It is not C++ statement but the directive for the preprocessor	This does not require a semicolon at the end of line	It is a C++ statement that declares a constant in C++	None of the above

67. In an assignment statement

The value must always be a variable	The value might be a constant, a variable, an expression or any combination of these	The assignment always takes place from right to left and never the other way	All of above

68. The directives for the preprocessors begin with

&	//	#	<

69. The file iostream includes

The declarations of the basic standard input-output library	The streams of includes and outputs of program effect	Both of these	None of these

70. There is a unique function in C++ program by where all C++ programs start their execution

Start {}	Begin{}	Main{}	Output{}

71. Every function in C++ are followed by

Parameters	Parenthesis	Curly braces	None of these

72. Which of the following is false?

Cout represents the	Cout is declared in the	Cout is declared	None of the above

standard output stream in c++	iostream standard file	within the std namespace	

73. Every statement in C++ program should end with

Full stop	comma	semicolon	colon

74. A block comment can be written by

Starting every line with double slashes	Starting with /* and ending with */	Starting with //* and ending with *//	Starting with <! And ending with -!>

75. When writing comments you can

Use code and /* comment on the same line	Use code and // comments on the same line	Use code and //* comments on the same line	Use code and <!- comments on the same line

76. SQL* Plus will finish the statement and execute it when the user types in this:

A left slash (\) followed by [enter]	A colon (:) followed by [enter]	A semicolon (;) followed by [enter]	A period (.) followed by [enter]

77. Which of the following is not an oracle-supported trigger?

Before	during	after	Instead of

78. After a table has been created, its structure can be modified using the SQL

UPDATE TABLE [TableName]	MODIFY TABLE [TableName]	Alter Table [TableName]	CHANGE TABLE[TableName]

79. What oracle backup and recover file contains user and system data?

Control file	Datafile	Online ReDo file	Offline ReDo file

80. When using SQL*Plus, Oracle commands, column names, table names and all other database elements:

Are case insensitive	Are case sensitive	Must always be in lower case	Must always be in upper case

81. What is the type of oracle backup in which all uncommitted changes have been removed from the datafiles?

Full backup	Consistent backup	Inconsistent backup	Differential backup

82. You have linked SQL* plus to an external text editor. To invoke the text editor for use within SQL* Plus, which command do you use?

Open [filename]	Show [filename]	Alter [filename]	Edit [filename]

83. The default extension for an oracle SQL* Plus file is

.txt	.pls	.ora	.sql

84. To obtain the structure of an oracle table, the command to use is:

STRUCTURE [tablename]	DESCRIBE [tablename]	DESCRIBE STRUCTURE [tablename]	DESC TABLE [table name]

85. To see the contents of the SQL* Plus buffer, type:

CONTENTS	BUFFER	CURRENT	LIST

86. The function of the sorter in a computer system is to ___

Read one column at a time	Compare data on different cards	Read one row at a time	All of these

87. Compiler and interpreters are example of ___

System software	Application software	Both system and application software	None of these

88. Which of the following translates source programs into object programs

Assembler	Interpreter	Compiler	Absolute assembler

89. In algorithm, the option is chosen according to position by ____

Simple sequence	Decision sequences	Direction sequences	Repeated sequences

90. Algorithm and flow chart are both ____

Different procedures	The same procedures	Different ways show the same procedure	All three are correct

91. Which of the following store command to retrieve data from databse?

forms	reports	queries	tables

92. Which of the following database object produces the final result to present

forms	reports	queries	tables

93. Which of the following is not a type of relationship that can be applied in access database

One to one	One to many	Many to many	All of the above can be applied

94. If you write criteria values vertically (one in a row) it will mean

OR conditions	AND conditions	NOT condition	None of above

95. The ___ button on the tool box display data from a related table

Sub form sub report	Relationships	Select objects	More controls

96. It is a sign or symbol that specifies, operator, and values that produce a result

operator	query	expression	None of the above

97. It is a database object to view, change and analyze data in different ways

query	form	report	None of the above

98. Which of the following database object is created first before any other created?

Table	Form	Report	Query

99. This form displays multiple records, one per row, in the form window

Datasheet	Tabular	Columnar	Justified

100. In the form wizard dialog box, the fields from the selected table are displayed in this list box.

All fields	All records	Available records	Available fields

101. Can you find the biggest number formed by four one

a. 1111	b. 11+11	c. 11* 11	d. 11^{11}

102. Which of these numbers is the odd-one-out?

a. 43	b. 26	c. 50	d. 37

103. A logical value has a valu

a. 1	b. 0	c. True or false	d. Any value

104. Internet refers to

a.Network of	b. single large	c. Connection of	d. none of these

networks	network	two intranet	

105. Browser is a

a. Hardware	b. Software	c. Intermediate between both	d. None of these

106. Find out the logical operator?

a. AND	b. +=	c. ++	d. %

107. Which of the following statements will add 5 to the current value of A?

a. A = A += 5	b. 5 += A	c. A += 5A	d. += 5 A

108. In a C expression, how is a logical AND represented?

a. @@	b. ||	c. AND	d. &&

109. Which of the following is correct extension of a java file?

a. .jav	b. .java	c. .JAVA	d. .class

110. The java compiler reads the java source file and converts it to a file having an extension:

a. class	b. .java	c. .prg	d. .file

Life Science

1. Which of the following sub particles surround the nucleus?

Protons	Neutrons	Electrons	All of these

2. Which of the following depicts in short hand the structure of the atom of each element?

Periodic table	Sub-shell	Energy level	Orbitals

3. A substance consisting entirely of atom of the same atomic number is called—

Bond	Element	Orbit	Shell

4. Molecular weight measures a molecule's—

Size	Density	pH	All of these

5. Methane illustrates a non-polar covalent bond, which means that the atoms share all of the—

Electrons	Protons	Neutrons	All of these

6. Mostly all the sugars in plants are

D-sugar	L-sugar	C. Arabinose	D. None of these

7. Amylose is the example of

Glucose	Fructose	Sucrose	None of these

8. The conversion of fat into carbohydrates is an example of

Glycolysis	TCA	Glyconeogenesis	All of the above

9. Carbohydrate concentration in plasma membrane is

5%	10%	15%	20%

10. The simplest unit of organic molecule which can exist freely is called

Monomers	Polymers	Oligomers	Heteropolymers

11. Which among the following is not a saturated fatty acid?

Palmitic acid	Stearic acid	Oleic acid	Myristic acid

12. Glycine and Valine are the example of ____ amino acids

Aliphatic	Aromatic	Heterocyclic	None of these

13. Triglycerides may be

Only solid	Only liquid	Solid or Liquid	None of these

14. Natural lipids are readily soluble in

Oil	Water	Mercury	None of these

15. Amino acids are amphoteric in nature, because they show

Ring structure	Acidic Properties	Basic Properties	None of these

16. Which of the following codons does not select any amino acid

UAA	UAG	UGA	All of these

17. Who coined the word Enzyme

Freidrich W. Kuhne	James B. Summer	Tranbe	E. Strasburger

18. Protein part of enzyme is called__

Prosthetic group	Apoenzyme	Holoenzyme	All of these

19. Which one of the following is not a simple protein

Albumins	Globulins	Prolamins	Glycoproteins

20. The process in which a particular nucleotide sequence on m-RNA is translated into a particular amino acid sequence with the help of the ribosomes, is called

Inversion	Transduction	Translation	Transcription

21. Which one of the following is a sulphur containing amino acid

Cysteine	Leucine	Valine	Alanine

22. Which one of the following is an aromatic amino acid

Phenylalanine	Histidine	Lysine	Valine

23. The specific region of the enzymic protein which is involved in biochemical reaction is known as

Substrate	Fermentation	Conjugated protein	Active centre

24. The Nucleolus is rich in

Protein	Carbohydrate	DNA	None of these

25. Cellulose is strongly

Hydrophobic	Hydrophilic	Both (A and B)	None of these

26. Who were awarded Nobel Prize for the discovery of double helical model of DNA

J.D. Watson	F.H. Crick	Both (A and B)	Watson and Shutton

27. The length of one helix of DNA is___Å

25	3.4	10	34

28. The distance between two base pairs of DNA is ___Å

25	3.4	10	34

29. The bond between the two strands of DNA is

Carbon	Hydrogen	Oxygen	Nitrogen

30. Adeosine Triphosphate (ATP) is

A protein	A hormone	A molecule which contains high energy phosphate bond	All of the above

31. One of the following is known as amber

UAA	AUG	UGA	UAG

32. Who discovered nucleic acid

Robert Hook	Robert Brown	Yamada	None of these

33. Which among the following is a purine base

Thymine	Cytosine	Uracil	None of these

34. DNA strand is not involved in the synthesis of

Protein	t-RNA	m-RNA	New DNA strand

35. The diameter of the DNA molecule around the axis is__Å

10	20	3.4	34

36. Who discovered the DNA for the first time

Watson and Crick	Altman	Meischer	None of these

37. Which one of the following is mainly involved in Genetic engineering

DNA	Plamid	RNA polymerase	Chromomere

38. The backbone of DNA of the two helices of polynucleotide chains consist of

Hydrogen bond	Imaginary axis	De-oxyribose sugar	De-odyribose phophate

39. Evidence for the general nature of the genetic code came from many types of experiments, including genetic experiments on the effects of

Deletion	Insertion	Both A &B	None of these

40. The codes which do not code for amino acid code for

Phosphate	Sugar	Nonsense codon	Start and Stop signals

41. Which of the following initiates transcription of m-RNA on DNA template

Sigma factor	t-RNA	Both (A & B)	Core enzyme

42. Which of the following is not a stop codon

AUG	UAA	UAG	UGA

43. Gene expression can be regulated al/or during

Transcription	m-RNA processing	m-RNA turnover	All of these

44. The Notch signaling mechanism is an example of

Ectacrine signalling	Juxtacrine Signalling	Both (A & B)	Epicrine signalling

45. The type(s) of programmed cell death is/are

Apoptosis	Autophagic	Both (A & B)	Cell progression

46. Which of the following proteins plays important role in aging

Collagen	Elastin	Myosin	Actin

47. Which of the following processes makes direct use of oxygen

Glycolysis	Krebs cycle	Electron transport system	All of the above

48. Net gain of ATP in glycoslysis

4	2	6	8

49. The enzyme that converts proteins into polypeptides

Pepsin	Renin	Trypsin	Chymotrypsin

50. The protein are broken down by the enzyme

Lipase	Amylase	Pepsin	Amylopsin

51. Chemically each chromosome is a

Protein	Nucleic acid	Nucleo Protein	None of these

52. The amino acids occurring in natural protein which does not show chirality is

Phenylalaine	Tyrosine	Glycine	Lysin

53. Growth hormone is produced by

Bones	Pituitary gland	Thyroid gland	Adrenal gland

54. RNA controls the synthesis of

Amino acid	Nucleotide	Cytoplasm	Enzyme

55. DNA differ from RNA in the nature of

Sugar alone	Purine alone	Pyrimidine alone	Sugar and pyrimidine

56. Messenger RNA is

Mixture of RNA and DNA	An expression of the information in DNA	A controlling factor for specificity in protein synthesis	Synthesized in the nucleus and transferred to the cytoplasm

57. RNA is composed of

Ribonucleotides	Deoxyribonucleotides	Both	None of these

58. Pyrimidines of RNA are respresented by

Uracil and cytosine	Adenine and guanine	Adenine and cytosine	Thymine and cytosine

59. In DNA guanine pairs with

Cytosine	Thymine	Uracil	Adenine

60. In DNA the sugar is

Deoxyribose	Ribose	Xylose	Arabinose

61. Strands of DNA are bound by

Hydrogen	Oxygen	Carbon	Nitrogen

62. Which of the following is a poly-saccharide

Glucose	Maltose	Glycogen	Sucrose

63. Conversion of glucose into glucogen in liver is called

Glycogenolysis	Glycogenesis	Glycolysis	Glyconeogeneis

64. Amino acids not synthesized in body are called

Non-essential	Essential	Active	Inactive

65. In which part of the gut are proteins ultimately degraded into amino acids

Colon	Small intestine	Stomach	Caecum

66. Proteins are stored in

Blood	Liver	Muscles	None of these

67. Which of the following is first digested in stomach

Carbohydrate	Fat	Protein	Nucleic acid

68. Central Bacteriophage consist of

DNA	RNA	Both	None of these

69. Most common reason for genetic change from one generation to next generation among humans is

Mutation	Segregation	Recombination	Environmental

70. Activity of Receptor tyrosine kinase is regulated by

Phosphorylation	Dephosphorylation	Methylation	Acetylation

71. DNA fragmentation is a characteristic feature of

Cell Death	Mutation	Cancer growth	Cell division

72. If mutation changes codon in such a way that they is no effect on functioning and overall structure of protein. This type of mutation is termed

Silent	Missense	Transition	Frameshift

73. In meiosis crossing over occur during

Prophase-I	Prophase-II	Metaphase	Anaphase

74. The most probable amino acid occurring at bents and turns of polypeptide is

Proline	Leucine	Phenyalanine	Trypotophan

75. Major cause of evolution of genes and protein is

Gene duplication and divergence	Point mutation	Chromosomal aberrations	Sexual reproduction

76. Genes between related organism exhibits high variation. The variations could maximally occur in

Intron	Exons	Promoters	Polyadenylation site

77. A series of amino acids joined together will make a

Polysaccharide	DNA	Sugar	Protein

78. What is the protein found in red blood cells that carries oxygen

Hemoglobin	Pepsin	Myosin	Actin

79. Among the following which amino acid has two buffering zone

Glycine	Alanine	Glutamic acid	Glutamine

80. Among the following which amino acid do not absorb wavelength of 250-300 nm

Cystine	Phenylalanine	Tryptophan	Histidine

81. ‘Taq’ enzyme utilized in PCR is a

RNA polymerase	Reverse transcriptase	DNA polymerase	Ligase

82. Which statement is correct for globular proteins

Always contain α helix	Always contain β sheets	Contains both α andβ helix	Contains more revere turns

83. Flow cytometer is used to measure the number of

Cells	DNA	RNA	Protiens

84. A sucrose is composed of

Glucose and galactose	Fructose and galactose	Glucose and Fructose	Mannose and fructose

85. Which mole do not have SP^3 hybridization

CH_4	NH_3	H_2O	CH_2O

86. ___ act as a genetic material in most of the organisms

DNA	Protein	DNA and RNA	None of these

87. Histones are rich in

Lysine	Arginine	Both	None of these

88. What may the function of 'Deoxyribonucleoside triphosphates' in DNA replication

Act as substrate	Gives energy	Both	None of these

89. Transcription unit includes

A promoter	Structural gene	Terminator	All of these

90. The t-RNA was proposed by

Watson	Crick	Stahl	Kim

91. The longest RNA is

t-RNA	r-RNA	m-RNA	s-RNA

92. DNA act as a template for synthesis of

DNA	RNA	Both	None of these

93. Two strands of DNA are

Similar	Parallel	Anti-parallel	Complemtary and anti-parallel

94. Chromosome region with active gene is called

Genome	Histones	Euchromatin	Heterochromatin

95. Reverse transcription represented y

RNA→RNA→Protein	DNA↔RNA→Protein	Both	none of these

96. m-RNA synthesis is catalyzed by RNA polymerase

I	II	III	All of these

97. The genetic materials of virus are

DNA	RNA	DNA or RNA	Both

98. Okazaki fragments are concerned with

DNA replication	DNA fragementation	Synthesis of DNA	All of these

99. During the replication of DNA Okazaki fragments formed together and form____strand

Leading	Lagging	Both	None of these

100. The central dogma of molecular biology

DNA-RNA-Protein	RNA- DNA- Protein	DNA-m-RNA-Protein	Protein-RNA-DNA

101. A codon consists of _____

Single	Two	Three	Four

102. Transfer RNA molecule occur in

Chromosome	Ribosome	Nucleplasm	Cytoplasm

103. Tobacco mosaic virus consist of

s-RNA	ss-RN	ds-RNA	s-DNA

104. The operator switch in operan concept is turned on or off by a protein called

Regulator	Repressor	Suppressor	Promoter

105. Tryptophan operon consists of ___ genes

3	4	5	6

106. Protooncogenes are

Noncancerious, present in normal cells	Noncancerious present in abnormal cells	Cancerous present in normal cells	a cancerious present in proliferating cells

107. DNA polymerase used in PCR is derived from

Thermus aquaticus	Salmonella typhimurium	Escheritia coli	None

108. If a enzyme cuts at the 3’ or 5’ end of DNA chain, it is a/an

Endonuclease	Exonuclease	Polymerase	Ligase

109. Ligase form

Hydrogen bond	Covalent bond between sugar and phosphate	Phosphodiester bond	Both b and c

110. Plasmid was discovered by

Hayes	Paul berg	Herbet Boyer	Nathans

111. An ex situ conservation method for organism among the following is

Gene bank	Gene library	Gene cloning	None

112. Frederick Sanger's DNA sequencing method is called

Dideoxynucleotide	Chan termination	RFLP	Both a and b

113. Gene therapy is also called

Molecular surgery	DNA prolifing	Only a and b	All

114. PCR technique serve the purpose of

Early diagnosis of disease	DNA fingerprinting	Amplification of DNA	all

115. The first human hormone produced through rDNA technology was

Insulin	ACTH	STH	none

116. First genetically engineered microbes commonly called superbug' are

Pseudomonas flourescence	Pseudomonas Putidae	Trichoderma	None

117. First genetically engineered clone sheep which contain human protein gene

Polly	Dolly	Molly	None

118. Genetically identical individuals are

Cybrids	Hybrids	Clones	None

119. Clone sheep dolly has been made by

Gene transfer	Somatic cell cloning	Protein transfer	Gene knocking

120. Longest gene known is

Globin	Insulin	Duchenne Muscular Dystrophy	Plasmid

121. Coding sequence present in DNA are called

Intron	Exon	Junk DNA	Cyton

122. The cell was first proposed by

Leeuwen hoek	Robert hook	Sutton and boveri	None of these

123. DNA replication occurs in____ phase

G_1	G_2	S	M

124. Nucleolus is rich in ___

DNA only	RNA only	DNA and RNA	DNA, RNA and Protein

125. Inter phase is also known as___

Metaphase	Resting phase	Diakinesis	Cytokinasis

126. Which among the following is the longest phase of the cell-division

Metaphase	Anaphase	Prophase of meiosis-I	Prophase of mitosis

127. On the Origin of Species was published in

a. 1689	b. 1759	c. 1859	d. 1901

128. Which are the four most abundant elements in living cells?

a. carbon, oxygen, nitrogen, sulfur	b. carbon, oxygen, hydrogen, nitrogen	c. carbon, oxygen, sulfur, phosphorus	d. carbon, sulfur, hydrogen,magnesium

129. Molecules that are too large to pass through the pores of a cell membrane may enter the cell by a process known as

a. Hydrolysis	b. Pinocytosis	c. Cyclosis	d. Synthesis

130. The outward appearance (gene expression) of a particular trait in an organism is referred to as

a. a genotype	b. a phenotype	c. an allele	d. a chromosome

131. Which of the following is not an amino acid?

a. Glutamic acid	b. Aspartic acid	c. Glutamine	d. Palmitic acid

132. The conversion of one molecule of glucose to two molecules of pyruvate results in the net formation of

a. six molecules of water	b. two molecules of ATP	c. three molecules of ATP	d. thirty-eight molecules of ATP

133. The enzymes of glycolysis are located in the:

a. mitochondrion	b. nucleus	c. cytoplasm	d. lysosomes

134. Pairs of electrons carried in the form, FADH2 and NADH+H, collectively contain enough free energy to rephosphorylate

a. 6 ATP	b. 5 ATP	c. 4 ATP	d. 3 ATP

135. How many ATP molecules can be derived from each molecule of acetyl CoA that enters the Krebs' Cycle?

a. 6	b. 12	c. 18	d. 38

136. Approximately how much energy is liberated when one gram of carbohydrate is completely oxidised?

a. 4 kJ	b. 8 kJ	c. 16 kJ	d. 24 kJ

Mathematics

1. What is the unit digit in 7^{105}

1	5	7	9

2. 7589-? = 3434

4242	4155	1123	11023

3. 3251+587+369-? = 3007

1250	1300	1375	1200

4. 666÷6÷3 =?

37	333	111	84

5. Which one of the following numbers is completely divisible by 45?

181560	331145	202860	2033550

6. Which one of the following numbers is completely divisible by 99?

3572404	135792	913464	114345

7. If the number 5 * 2 is divisible by 6, then * = ?

2	3	6	7

8. Which of the following numbers is divisible by 24?

35718	63810	537804	3125736

9. Which one of the following numbers is exactly divisible by 11?

235641	245642	315624	415624

10. How many 3 digit numbers are divisible by 6 in all?

149	150	151	166

11. The sum of even numbers between 1 and 31 is :

6	128	240	512

12. The smallest prime number is

0	1	2	3

13. How many prime numbers are less than 50?

16	15	14	18

14. Which of the following is a prime number?

33	81	93	97

15. Which one of the following is not a prime number?

31	61	71	91

16. Which one of the following is a prime number?

161	221	373	437

17. The smallest 3-digit prime number is

103	107	109	None of these

18. If 60% of 3/5 of a number is 36, then the number is:

80	100	75	90

19. Which of the following numbers is divisible by each one of 3, 7, 9 and 11?

639	2079	3791	37911

20. How many of the following numbers are divisible by 132?

4	5	6	7

21. (51 + 52 +……..+ 100) = ?

2525	2975	3225	3775

22. 252 can be expressed as a product of primes as:

2×2×3×3×7	2×2×2×3×7	3×3×3×3×7	2×3×3×3×7

23. Find the highest common factor of 36 and 84

4	6	12	18

24. 100 +50×2=?

100	150	200	300

25. Income of a company doubles after every one year. If the initial income was Rs. 4 lakhs. What would be the income after 5 years?

Rs. 1.24 crores	Rs. 1.28 crores	Rs. 2.56 crores	None of these

26. On sport day, if 30 children were made to stand in a column, then 16 columns could be formed. If 24 children were made to stand in a column, then how many columns could be formed?

20	22	29	45

27. A class starts at 10 a.m. and lasts till 1.27 p.m. Four periods are held during this interval. After every period, 5 minutes are given free to the students. The exact duration of each period is

42 minutes	48 minutes	51 minutes	53 minutes

28. A light was seen at intervals of 13 seconds. It was seen for the first time at 1 hr 54 min 50 sec a.m. and the last time at 3 hrs 17 min. 49 sec a.m. How many times was the light seen?

360	375	378	384

29. A man earns Rs. 20 on the first day and spends Rs. 15 on the next day. He again earn Rs. 20 on the third day and spends Rs. 15 on the fourth day. If he continues to save like this, how soon will be have Rs. 60 in hand?

On 17^{th} day	On 27^{th} day	On 30^{th} day	On 40^{th} day

30. The total monthly salary of 4 men and 2 women is Rs. 46,000. If a woman earns Rs. 500 more than a man, what is the monthly salary of a woman?

Rs. 6500	Rs. 7500	Rs. 8000	Rs. 9000

31. David got two and a half times as many marks in English as in History. If his total marks in the two subjects are 140, the marks obtained by him in English are

40	75	90	100

32. One-third of Rahul's savings in National Savings Certificate is equal to one-half of his savings in Public Provident Fund. If he has Rs. 1,50,000 as total savings, how much has he saved in Public Provident Fund?

Rs. 30,000	Rs. 60,000	Rs. 50,000	Rs. 90,000

33. If a-b and $a^2 + b^2 = 29$, find the value of ab.

10	12	15	18

34. If x2-1/x +1 =4, x =?

0	1	5	None of these

35. If 2 tables and 3 chairs cost Rs. 3500 and 3 tables and 2 chairs cost Rs. 4000, then how much does a table cost?

Rs. 500	Rs. 750	Rs. 1000	Rs. 1500

36. In a group of buffaloes and ducks, the number of legs is 24 more than twice the number of heads. What is the number of buffaloes in the group?

2	8	10	12

37. A man has some hens and cows. If the number of heads be 48 and the number of feet equals 140, then the number of hens will be?

22	23	24	26

38. √53824 = ?

202	232	242	332

39. The square root of 64009 is

253	347	363	800

40. David obtained 76, 65, 82, 67 and 85 marks (out of 100) in English, mathematics, Physics, Chemistry and Biology. What are his average marks?

65	69	72	None of these

41. The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero?

0	1	10	19

42. Find the average of all the numbers between 6 and 34 which are divisible by 5?

18	20	24	30

43. The average of first five multiples of 3 is

3	9	12	15

44. The average of the first nine prime number is

9	11	11 1/9	11 2/9

45. The average of first 50 natural number is

12.25	21.25	25	25.5

46. The mean of 1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2 is

10	20	30	40

47. The average of all odd numbers upto 100 is

49	49.5	50	51

48. The average of ten numbers is 7. If each number is multiplied by 12, then the aver of the new set of number is

7	19	82	84

49. In a school with 600 students, the average age of the boys is 12 years and that of the girls is 11 years. If the average age of the school is 11 years 9 months, then the number of girls in the school is

150	250	350	450

50. The total age of A and B is years more than the total age of B and C, C is how many years younger than A?

12	24	C is elder than A	None of these

51. The sum of the present ages of a father and his son is 60 years. Six years ago, father's age was five times the age of the son. After 6 years, son's age will be

12 years	14 years	18 years	20 years

52. The total age of A and B is 12 years more than the total age of B and C. C is how many years younger than A ?

12	24	C is elder than A	None of these

53. The sum of the ages of 5 children born at the intervals of 3 years each is 50 years. What is the age of the youngest child?

4 years	8 years	10 years	None of these

54. The ratio 5:4 expressed as a percent equals?

12.5%	40%	80%	125%

55. 3.5 can be expressed in terms of percentage as

0.35%	3.5%	35%	350%

56. Half of 1 percent written as a decimal is

0.005	0.05	0.02	0.2

57. What is 15 percent of Rs. 34?

Rs. 3.40	Rs. 3.75	Rs. 4.50	Rs. 5.10

58. What percent of 7.2 kg is 18 gms?

.250%	.25%	2.5%	25%

59. What percent of Rs. 2650 is Rs. 1987.50?

60%	75%	80%	90%

60. What percent is 3% of 5%?

15%	30%	50%	60%

61. I gain 70 paise on Rs. 70. My gain percent is :

0.1%	1%	7%	10%

62. A shopkeeper \sold an article for Rs. 2090.42. Approximately, what will be the percentage profit if he sold that article for Rs. 2602.58?

15%	20%	25%	30%

63. A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?

Rs. 1090	Rs. 1160	Rs. 1190	Rs. 1202

64. A shopkeeper expects a gains of 22 ½ % on his cost price. If in a week, his sale was of Rs. 392, what was his profit?

Rs. 18.20	Rs. 70	Rs. 72	Rs. 88.25

65. The ratio of the cost price and the selling price is 4:5. The profit is

10%	20%	25%	30%

66. A trader mixes three varieties of groundnuts costing Rs. 50, Rs. 20 and Rs. 30 per kg in the ratio 2 :4 : 3 in terms of weight, and sells the mixture at Rs. 33 per kg. what percentage of profit does he make?

8%	9%	10%	None of these

67. A dishonest dealer uses a scale of 90 cm instead of a metre scale and claims to sell at cost price. His profit is

9%	10%	12%	None of these

68. A shopkeeper cheats to the extent of 10% while buying as well as selling, by using false weights. His total gain is

10%	11%	20%	21%

69. A fair price shopkeeper takes 10% profit on his goods. He lost 20% goods during theft his loss percent is

8	10	11	12

70. 8597 - ? = 7429 - 4358

5426	5706	5526	5476

71. (4300731) - ? = 2535618

1865113	1775123	1765113	1675123

72. 3 + 333 + 3.33 = ?

362.3	372.33	702.33	702

73. (?) + 3699 + 1985 -2047 = 31111

34748	27474	30154	27574

74. 4500 × ? = 3375

2/5	3/4	1/4	3/5

75. If 1400 × x = 1050. Then, x = ?

1/4	3/5	2/3	3/4

76. $(1000)^9 \div 10^{24} = ?$

10000	1000	100	10

77. $35 + 15 \times 1.5 = ?$

75	51.5	57.5	5.25

78. $5358 \times 51 = ?$

273258	273268	273348	273358

79. If A : B = 5:7 and B:C = 6:11, then A:B:C is :

55 : 77 : 66	30 : 42 : 77	35 : 49 : 42	None of these

80. If A : B = 3: 4 and B : C = 8 : 9, then A : C is :

1 : 3	3 : 2	2 : 3	1 : 2

81. Which one of the following ratios is greatest?

7:15	15:23	17:25	21:29

82. If a quarter kg of potato costs 60 paise, how many paise will 200 gm cost?

48 paise	54 paise	56 paise	72 paise

83. 36 men can complete a piece of work in 18 days. In how many days will 27 men complete the same work?

12	18	22	24

84. In a camp, there is a meal for 120 men or 200 children. If 150 children have taken the meal, how many men will be catered to with the remaining meal?

20	30	40	50

85. If a dairy farm, 40 cows eat 40 bags of husk in 40 days. In how many days one cow will eat one bag of husk?

1	1/40	40	80

86. 3 pumps working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?

9	10	11	12

87. If 8 men can rep 80 hectares in 24 days, then how many hectares can 36 men reap in 30 days.

350	400	425	450

88. Which of the following trains in the fastest

25 m/sec	1500 m/min	90 km/hr	None of these

89. A person crosses a 600 m long street in 5 minutes. What is his speed in km per hour?

3.6	7.2	8.4	10

90. A man walking at the rate of 5 km/hr crosses a bridge in 15 minutes. The length of the bridge (in meters) is

600	750	1000	1250

91. How long will a boy take to run a square field of side 35 metres, if he runs at the rate of 9 km/hr?

50 sec	52 sec	54 sec	56 sec

92. A car is running at a speed of 108 Kmph. What the distance will it cover in 15 seconds ?

45 metres	55 metres	450 metres	None of these

93. A truck covers a distance of 550 metres in 1 minutes whereas a bus covers a distance of 33 kms in 45 minutes. The ratio of their speeds is :

3:4	4:3	3:5	50:3

94. The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 kms in 4 hours, then the speed of the first train is :

70 km/hr	75 km/hr	84 km/hr	87.5 km/hr

95. A salesman travels a distance of 50 km in 2 hours and 30 minutes. How much faster, in kilometers per hour, on an average, must he travel to make such a trip in 5/6 hour less time?

10	20	30	None of these

96. A person has to cover a distance of 6 km in 45 minutes. If he covers one-half of the distance in two-thirds of the total time; to cover the remaining distance in the remaining time, his speed (in km/hr) must be :

6	8	12	15

97. Mac travels from A to B a distance of 250 miles in 5 ½ hours. He returns to A in 4 hours 30 minutes. His average speed is :

44 mph	46 mph	48 mph	50 mph

98. A boy goes to his school from his house at a speed of 3 km/hr and returns at a speed of 2 km/hr. If he takes 5 hours in going and coming, the distance between his house and school is:

5 km	5.5 km	6 km	6.5

99. A train moves with a speed of 108 kmph. Its speed in metres per second is :

10.8	18	30	38.8

100. A speed of 14 metres per second is the same as :

28 km/hr	46.6 km/hr	50.4 km/hr	70 km/hr

MICROBIOLOGY

1. Louis Pasteur established the modern era of food microbiology in 1857 when he showed that microorganisms cause _____ spoilage

a)beer	b)wine	c)milk	d)grain

2. Which of the following is NOT an intrinsic factor in food spoilage?

a)pH	b)Moisture content	c)Available nutrients	d)Temperature

3. All the cells chromosomes are contained in the cell nucleus for

a)procaryotes only	b)eucaryotes only	c)both procaryotes and eucaryotes	d)lysozyme is synthesized

4. When flagella exist, their movement is powered by ATP in

a)procaryotes only.	b)eucaryotes only.	c)both procaryotes and eucaryotes	d)fungi only

5. Cell walls, when they exist, usually contain peptidoglycan in

a)eucaryotes only	b)procaryotes only	c)milk	d)Eboth procaryotes and eucaryotes

6. Lysosomes of the cell are where

a)glycogen is stored as an energy source	b)lysozyme is synthesized	b)endocytosed material is degraded	d)secretory proteins are transported to the surface

7. The mitochondria is the site of

a)energy production	b)lipid synthesis	c)protein synthesis	d)ATP

8. The diploid state of a microorganism refers to the times when cells contain _____ copy (ies) of each chromosome and occurs after mitotic cell division.

a)one	b)two	Dcthree	d)four

9. Which of the following microorganisms has not been linked to UTI's

a) *E. coli*	b) *Pseudomonas*	c) *Klebsiella*	*d)Haemophilus*

10. The Tzanck test is not used on which of the following viruses?

a)VZV	b) HSV-2	c) HHV-8	d)HSV-1

11. Which of the following viruses is not a single strand linear RNA virus?

a)beer Togavirus	b) Retrovirus	c) Bunyavirus	d)Picornavirus

12. Which of the following viruses is not a double strand linear DNA virus?

a) Poxvirus	b) Adenovirus	c)Papovavirus	d)Herpesvirus

13. One group of fungi is called the 'Imperfect fungi'. What does the term mean?

(a) Fungi that do not produce a zygospore in their life cycle.	(b) Fungi in which sexual reproduction has not been observed.	(c) Fungi that cause diseases.	(d) Fungi that demonstrate both asexual and sexual reproduction

14.Fungi are classified according to…

(a) the type of conidia produced	b) their mycelial resemblance.	(c) their morphological similarities.	(d) similarity in their growth patterns.

15. Which of the following is not fungal related?

a)Chlamydiae	b) *Tinea nigra*	*c)Candida albicans*	d) *Cryptococcus*

16. he Tsetse fly is a transmission factor for which of the following organisms?

a) *Trichomonas vaginalis*	b) *Trypanosoma gambiense*	c)*Entamoeba histolytica*	d) *Toxoplasma*

17. The Ixodes tick is a transmission factor for which of the following organisms?

a) *Trichomonas vaginalis*	*b)Leishmania donovani*	c) *Babesia*	d) *Giardia lamblia*

18. Which of the following signs and symptoms is not linked to Haemophilus influenzae?

a) Otitis media	b) Pneumonia	c)Malaria	d)Epiglottis

19. Which of the following microorganisms stain well?

a)Escherichia coli	*b)Legionella pneumophila*	*c)Treponema*	*d)Chlamydia*

20. Which of the following pairs of words is mismatched?

(a) *Plasmodium vivax* – malaria.	(b)*Amoeba*spp.– severe diarrhea.	(c) AIDS – *Giardia lamblia.*	(d) *Escherichia coli*– tuberculosis

21. Which of the following is not a gram-negative bug?

a) *Clostridium perfringens*	b) *Vibrio cholerae*	*c)Escherichia coli*	*d)Bordetella pertussis*

22. An example of the phylum Rhizopoda is …

(a) *Parameciums*pp.	(b) *Amoeba proteus*.	(c) *Plasmodium vivax*	(d) *Escherichia coli*

23. Which of the following structures contains genes for enzymes and antibiotic resistance?

a) Plasmid	b)Pilus	c)Capsule	d)Plasma Membrane

24. The protists are of medical importance because…

(a) several cause diseases in humans.	(b) some are used in the manufacture of antibiotics.	c) protists enter symbiotic relationships with many organisms.	(d) some are used for the manufacture of soap.

25. Myocarditis is caused by:

A) Measles virus	(B) Influenza virus	(C) E.B Virus	(D) Trophozoite form

26. Double standard RNA is seen in:

(A) Retro virus	(B) HIV virus	(C) Reo virus	(D) Rhabdo virus

26. Which of the following describes prokaryotic cell membranes?

A) Selectively permeable	b) contains proteins and phospholipids	c) Regulates passage of biomolecules	d) all of the above.

27. NAM means

a) N-acetyl murein	b) N-acetyl muramic acid	c) N-acetoyl muramic acid	d) None of the above.

28. One of the following is the Gram Positive bacterium

a) Escherichia coli	b) Salmonella typhi	c) Bacillus subtilis	d) All of the above

29. Component responsible for bacterial endospore resistance is,

a) Ca-dipicolinate	b) Na-dipicolinate	c) colinic acid	d) all of the above.

30. Volutin granules are also called as

a) Babe's Granules	b) PHB Granules	c) Volatile Granule	d) None of the above.

31. A "hair" like structure involved in chemotactic response of bacterium is called as

a) Flagella	b) Pilli	c) fimbriae	d) all of the above

32. A capsule is similar with respect to pilli

a) Permit attachment to surfaces .	b) are made of proteins	c) Contains dextran fibers	d) All of the above

33. NAM means

a) N-acetylglycosamine	b) N-acetylglucosamine	c) N-acetyl gluconamine	d) None of the above.

34. A periplasmic space within the cell wall is found in _____bacteria and the space

a) Gram negative; Peptidoglacan	b) Gram positive : lipids	c) Gram negative ; outer membrane	d) Gram positive : porin proteins

35. A physics student asked to a microbiology student "Whether periodic or circular motion is involved in motility of bacteria" As a microbiology student what would be your reply?

a) May be circular motion	b) May be periodic motion	c) Question is fundamentally wrng	d) It is difficult to answer the question.

36. One of the following is the Gram negative bacterium

a) *Bacillus subtilis*	b) *Escherichia coli*	c) *Staphylococcus aureus*	d) All of the above.

37. Bacterial cells are prokaryotic. In comparison to a typical eukaryotic cell, they would have

a) smaller size	b) smaller nucleus	c) no plasma membrane	d) no internal membranous compartments

37. Which of the following not correctly matches component with its function?

a) Lysosomes... Motility	b) Mitochondria... Energy production	c) Ribosome…Protein synthesis	d) Chloroplast…Photosynthesis

38. Phycology is the study of

a) Bacteria	b) Protozoa	c) Algae	d) Fungi

39. Algae utilize in biofertilizer production is

a) Blue green algae	b) Green Algae	c) Brown algae	d) Yellow green Algae

40. Archaebacteria used in biogas production is

a) Methanogene	b) Thermoacidophiles	c) Halophiles	d) All of these

41. Bacteria which tolerate high salt concentration are called as

a) Barophile	b) Mesophiles	c) Halophiles	d) None of these

42. The cell wall of algae is mead up of

a) Peptidoglacan	b) Chitin	c) Lignin	d) Pectin

43. Mycology is study of

a) Bacteria	b) Fungi	c) Virus	d) Protozoa

44. Viruses have all characteristics, except

a) has either DNA or RNA	b) are obligatory parasite	c) has metabolic machinery	d) are non cultivable on Laboratory media

45. Which of the following is not a prokaryotic

a) Bacterium	b) Paramecium	c) Cyanobacteria	d) Rickettsia

46. A book Micrographia is written by,

a) Robert hoek	b) Robert Koch	c) Fracastaro	c d) Aristotle

47. Bacteria are

a) Prokaryotic, unicellular	b) Eukaryotic unicellular	c) Prokaryotic multicellular	d) Eukaryotic multicellular

48. Which one is photosynthetic organism?

a) Fungi	b) algae	c) Protozoa	d) Viruses

49. Find out obligate intracellular parasite

a) Viruses	b) Algae	c) both a &b	d) None of above

50. For the fragrance of soil, which organism is responsible?

a) Bacteria	b) Algae	c) Fungi	d) Actinomycetes

51. . Methanogens are…

a) Bacteria	b) Archaebacteria	c) Protozoa	d) Algae

52. Absorption of water from soil is property of…

a) Algae l	b) Bacteria	c) Protozoa	d) Fungi

53. The contraversy of spontaneous generation was solved by

a) Louis Pasteur	b) Koch	c) Joseph Lister	d) Antony Van Leeuwenhoek

54. The use of cotton for filtration was firstly given by…

a) Robert Koch	b) Louis Pasteur	c) Spallanzan	d) Aristotle

55. Use of phenolic solution as disinfectant during surgery was given by

a) Joseph Lister	b) John Needham	c) Robert Koch	d) Antony Van Leeuwenhoek

56. The discoverer of penicillin was

a)Alexander Fleming	b) Robert Koch	c) Louis Pasteur	d) None of above

57. Growth rate > death rate is found in

a) Lag phase	b) Log phase	c) Stationary phase	d) Decline phase

58. Industrial fermentation require organism of

a) Lag phase	b) Log phase	c) Both a &b	d) None of above

59. Bacterial cell can reproduce by

a) Binary fission	b) Mitosis	c) Meiosis	d) All of above

60. Bacterial cell wall mainly composed by

a) Peptidoglycan	b) Lipids	c) Protein	d) Vitamin

61. For the attachment to surface, bacteria use

a) Flagella	b) Pili	c) Both a &b	d) None of above

62. Total cell count determination means counting of

a) Only living cell	b) Only non living cell	c) Both living &non living cells	d) None of above

63. PHB granules are used for storage of

a) Carbohydrates	b) Sulphur	c) Lipids	d) Phosphate

64. Photosynthetic bacteria contain

a) Chlorosome	b) Chloroplast	c) Both a &b	d) None of above

65. Bacterial ribosomes are

a) 80s	b) 70s	c) 40s	d) 60s

69. Space microbiology is also referred as

a) Endomicrobiology	b)Exomicrobiology	c) Geomicrobiology	d) None of these

70. Robert Koch especially studied Etiology of Tuberculosis in human and identified

a) *Micobacterium leprae*	b) *Micobacterium tuberculosis*	c) *Bacillus tuberculosis*	d) *Micobacterium bovis*

71. Joseph Lister design the solution of ____ to wounds by means dressing

a) Phenolic	b) Dettol	c) Alcoholic	d) Acidic

72. “In the field of observation chance favors only the prepared mind” this statement

a) Antonie van Leeuwenhoek	b) Louis Pasteur	c) Alexander Fleming	d) Darwin

73. The Pioneer of antisepsis in surgery was

a) Needham	b)Lister	c) Koch	d) Pasteur

73. Who among the following was not involved in disproving Spontaneous Generation?

Aristotle	b) Spallanzai	c) J.F. Tyndall	d) Jan Baptista

74. A nutrient material prepared in laboratory for the growth of microorganism is called as __

a) Culture media	b) Inoculum	c) Culture media	d) Suspension

75. The time required for cell division is called as _____

a) Generation time	b)Generation rate	c)Generation time	d)Reproduction

76. Generation time of *E. coli* is ____ minute.

a) 20	b)10	c) 15	d) 05

77. Bacterial cell do not immediately reproduce in new medium for little period is called as _____ phase.

a) Stationary	b) Logarithmic	c) Lag	d) Death

78. In what phase of typical bacterial growth curve dose the cell destroy rate exceed than the cell multiplication rate __

a)Lag phase	b) Exponential phase	c) Stationary phase	d) Death phase

79. When quantity of bacteria is very small, following plating method is used _

a) Pour plate	b) Streak plate	c) Spread plate	d) filtration

80. ____ method used to know bacterial suspension population from the defined area

a) Direct microscopic count	b) Most probable number	c) both (a) &(b)	d) None of these

81. The instrument used to measure turbidity is a __

a) Autoclave	b)Spectrophotometer	c) Incubator	d) Fermenter

82. For filamentous bacteria and moulds, are usually measured by ___ method

a) Turbidometric	b) Dry weight	c) All of these	d) None of these

83. Bacteria reproduced by __

a) Fragmentation	b) Binary fission	c) Budding	d) all of these

84. Which of the following describes prokaryotic cell membranes?

A) Selectively permeable	b) contains proteins and phospholipids	c) Regulates passage of biomolecules	d) all of the above.

85. One of the following is the Gram Positive bacterium

a) Escherichia coli	b) Salmonella typhi	c) Bacillus subtilis	d) All of the above

86. Component responsible for bacterial endospore resistance is,

a) Ca-dipicolinate	b) Na-dipicolinate	c) colinic acid	d) all of the above.

87. Volutin granules are also called as,

a) Babe's Granules	b) PHB Granules	c) Volatile Granule	d) None of the above.

88. A "hair" like structure involved in chemotactic response of bacterium is called asa)

a)Flagella	b) Pilli	c) fimbriae	d) all of the above

89. A capsule is similar with respect to pilli -

a) Permit attachment to surfaces	b) are made of proteins	c) Contains dextran fibers	d) All of the above.

90. The common characteristic of most members of the microbial world is their…

(a) abundance.	(b) small size.	(c)economic importance.	(d) ability to cause disease

91. An antigen is a substance that…

a) is produced by the bacteria to keep other microbes away.	(b) forms complementary reactions for the survival of bacteria.	(c) elicits the production of specific antibodies.	(d) bacteria use for digestion of other organisms.

92. The person best known for his microscopy work on microorganisms is…

(a) Antony van Leeuwenhoek.	(b) Louis Pasteur.	(c) John Tyndall.	(d) Darwin.

93. The simple staining technique in bacteriology is frequently used to ...

(a) differentiate between bacterial classes or groups.	b) determine the size, shape and arrangement of bacteria.	(c) demonstrate rickettsias located within the host cells.	(d) identify disease causing bacteria

94. Microbial growth is measured by …

(a) an increase in the number of cells in a population.	(b) the amount of heat produced by the organism in culture	c) the type of toxin produced by the microbe.	(d) the size of the cells in a population.

95. The ‘titer’ of the virus, or the ‘endpoint’, is the dilution at which … of the inoculated hosts are affected or killed.

(a) 100%	(b) 80%	(c) 50%	(d) 10%

96. Nucleoids are associated with…

(a) viruses.	(b) genetic information.	c) prokaryotes.	(d) fungi only

97. Bacteria that obtain their energy from inorganic compounds containing iron, nitrogen, or sulphur and not from decaying organic matter are …

(a) chemolithotrophic.	(b) heterotrophic.	(c) autotrophic.	(d) parasitic.

98. The presence of viruses in the blood stream is referred to as…

(a) cell tropism.	(b) a monocytic condition.	(c) viremia.	(d) viral contamination.

99. Each virus particle, is called a … when it is on the outside of its host cell.

(a) virion	(b) capsid	(c) phage	(d) nucleoid

100. The shape of a virus is determined by the…

(a) nucleocapsid that forms its head.	(b) type of nucleic acid it contains	(c) shape of the capsid protein.	(d) number of nucleic acids in the cell

Physics

1. Which of the following quantities is scalar?

Dipole moment	Electric force	Electric field	Electric potential

2. Four charges +q, +q, -q and –q respectively are placed at the corners A, B, C and D of a square of side a. The electric potential at the centre O of the square is

$\frac{1}{4\pi\varepsilon_0}\frac{q}{a}$	$\frac{1}{4\pi\varepsilon_0}\frac{2q}{a}$	$\frac{1}{4\pi\varepsilon_0}\frac{4q}{a}$	Zero

3. A) If a glass rod is rubbed with a silk cloth, it acquires positive charge while the silk cloth acquires equal amount of negative charge
B) If an ebonite rod is rubbed with fur, it becomes negatively charged while the fur cloth acquires equal amount of positive charge

A is true	B is true	A and B is false	A and B is true

4. The working of Van de Graaff generator is based on the principle of

Electrostatic induction	Action of points	None of these	Electrostatic induction and action of points

5. The force experienced by an electron of mass m is

$q = \frac{v}{a}$	$q = \frac{v}{a}$	None of these	F = ma

6. The unit of resistance is

Ω	Ω^{-1}	q^{-1}	$\Omega^{-1}q^{-1}$

7. An example of semiconductor is

Aluminium	Quartz	Germanium	nichrome

8. A toaster operating at 240V has a resistance of 120Ω. The power is

400 W	2 W	480 W	240 W

9. In case of insulators, as the temperatue decreases, resistivity

Decreases	Increases	Remains constant	Becomes zero

10. Which of these is not a feature of dry cell

Small size, easily	Internal resistance is	Chemical reactions	Easily rechargeable

portable	small	are reversible	

11. Electromagnetic induction is not used in

Transformer	AC generator	Room heater	Choke coil

12. Lenz's law is in accordance with the law of

Conservation of charges	Conservation of flux	Conservation of energy	Conservation of momentum

13. The self-inductance of a straight conductor is

Zero	infinity	Very large	Very small

14. Transformer works on

AC only	DC only	Both AC and DC	AC more effectively than DC

15. Which of the following cannot be stepped up in a transformer?

Input current	Input voltage	Input power	all

16. The power loss is less in transmission lines when

Voltage is less but current is more	Both voltage and current are more	Voltage is more but current is less	Both voltage and current are less

17. Which of the following devices does not allow d. c. to pass through?

Resistor	Capacitor	Inductor	All the above

18. The unit Henry can also be written as

$Vs\ A^{-1}$	$Wb\ A^{-1}$	$\Omega\ s$	All the above

19. Cathode rays are

A stream of electrons	A stream of positrons	A stream of uncharged particles	The same as canal rays

20. According to Bohr's postulates, which of the following quantities take discrete values?

Kinetic energy	Potential energy	Angular momentum	Momentum

21. The ratio of the radii of the first three Bohr orbit is,

1:4:9	1:2:3	1:8:27	1:1/2:1/3

22. According to Rutherfold atom model, the spectral lines emitted by an atom is,

Line spectrum	Continuous spectrum	Band spectrum	Continuous absorption spectrum

23. The elliptical orbits of electron in the atom were proposed by,

J.J.Thomson	Bohr	Sommerfeld	de Broglie

24. X-ray is

Phenomenon of conversion of kinetic energy into radiation	Conversion of momentum	Conversion of energy into mass	Principle of conservation of charge

25. Moseley's law led to the discovery of new elements like,

Hafnium (72)	Rhenium (75)	Both	None of these

26. Bragg's law for X-ray diffraction is,

□□ = 2□ sin □	□□ = 2□	□□ = 2□ cos □	□□ = 2□ /cos □

27. The energy of different subshells of single shell is in the order,

s<p<d<f	s>p>d>f	s<p>d<f	None of these

28. At the threshold frequency, the velocity of electrons is,

zero	Maximum	Minimum	infinite

29. The photoelectric effect, can be explained on the basis of,

Corpuscular theory of light	Wave theory of light	Electromagnetic theory of light	Quantum theory of light

30. The wavelength of matter wave is independent of,

mass	velocity	momentum	charge

31. If the kinetic energy of the moving particle is E, then the de Broglie wavelength is.

$\lambda = \frac{h}{\sqrt{2mE}}$	$\lambda = \frac{\sqrt{2mE}}{h}$	$\lambda = h\sqrt{2mE}$	$\lambda = \frac{h}{h\sqrt{2E}}$

32. Which of the following numbers is given to four significant figures?

0.00020	0.0020	2.000	2000

33. An auto travels at the rate of 25 km/h for 4.0 minutes, then at 50 km/h for 8.0 minutes, and finally at 20 km/h for 2.0 minutes. Find (a) the total distance covered in km and (b) the average speed for the complete trip in m/s.

(a) 540 km, (b) 642 m/s	(a) 12.5 km, (b) 38.6 m/s	(a) 10.7 km, (b) 126 m/s	(a) 9.0 km, (b) 10.7 m/s

34. A body with initial velocity 8.0 m/s moves along a straight line with constant acceleration and travels 640 m in 40 s. For the 40 s interval, find (a) the average velocity, (b) the final velocity, and (c) the acceleration.

(a) 4.0 m/s, (b) 8.0 m/s, (c) 0.6 m/s2	(a) 24 m/s, (b) 16 m/s, (c) 0.20 m/s2	(a) 16 m/s, (b) 24 m/s, (c) 0.40 m/s2	(a) 0.4 m/s, (b) 160 m/s, (c) 16 m/s2

35. A bottle dropped from a balloon reaches the ground in 20 s. Determine the height of the balloon if (a) it was at rest in the air and (b) it was ascending with a speed of 50 m/s when the bottle was dropped.

(a) 98 km, (b) 2960 km	(a) 196 km, (b) 1960 km	(a) 0.49 km, (b) 1000 km	(a) 2.0 km, (b) 0.96 km

36. A bug starts at point *A*, crawls 8.0 cm east, then 5.0 cm south, 3.0 cm west, and 4.0 cm north to point *B*. (a) How far north and east is *B* from *A*? (b) Find the displacement from *A* to *B* both graphically and algebraically

(a) 5.0 cm - EAST, 1.0 cm – SOUTH (b) 5.10 cm - 11.3° SOUTH OF EAST	(a) 11.0 cm - EAST, 1.0 cm - SOUTH, (b) 11.1 cm - 5.2° SOUTH OF EAST	(a) 5.0 cm - EAST, 1.0 cm - NORTH, (b) 5.1 cm - 11.3° NORTH OF EAST	(a) 5.0 cm - EAST, 9.0 cm - SOUTH, (b) 10.1 cm - 60.9° SOUTH OF EAST

37. Compute algebraically the resultant of the following coplanar forces: 100 N at 30 degrees, 141.4 N at 45°, and 100 N at 240°. Check your result graphically.

0.341 kN at 0°	0.335 kN at 45°	0.15 kN at 65°	0.15 kN at 25°

38. A ball is thrown upward at an angle of 30 °; to the horizontal and lands on the top edge of a building that is 20 m away. The top edge is 5.0 m above the throwing point. How fast was the ball thrown?

11 m/s	20 m/s	16 m/s	5230 m/s

39. What displacement at 70 °; has an *x*-component of 450 m? What is its y-component?

(a) 1.3 km, (b) 1.2 km	(a) 0.48 km, (b) 0.16 km	(a) 0.15 km, (b) 0.45 km	(c) 0.42 km, (b) 0.42 km

40. A marble dropped from a bridge strikes the water in 5.0 s. Calculate (a) the speed with which it strikes and (b) the height of the bridge.

(a) 1.96 m/s, (b) 49 m	(a) 49 m/s, (b) 120 m	(a) 123 m/s, (b) 245 m	(a) 24.5 m/s,(b) 24.5m

41. A young South African girl has a mass of 40.0 kg. (a) What is her weight in newtons? (b) If she came to the United States, what would her weight be in pounds as measured on an American scale? Assume g = 9.81 N/kg.

(a) 453 N; (b) 88.2 lb	(a) 392 N; (b) 88.2 lb	(a) 486 N; (b) 80.5 lb	(a) 392 N; (b) 80.5 lb

42. (a) What is the magnitude of the gravitational force that the Earth exerts on the Moon? (b) What is the magnitude of the gravitational force that the Moon exerts on the Earth?

3.12 × 1018 N; (b) twice the force of Earth	(a) 1.98 × 1020 N; (b) inversely proportional to the force of Earth	(a) 1.98 × 1020 N; (b) the same	(a) 1.98 × 1020 N; (b) twice the force of Earth

43. A sailboat is tied to a mooring with a line. The wind is from the southwest. Identify all the forces acting on the sailboat.

1) the force of gravity; 2) the force of the tide; 3) the force of the wind; 4) the force of the line tied to the mooring	1) the force of gravity; 2) the force of water opposing gravity and the force of water currents; 3) the force of the wind; 4) the force of the line tied to the mooring	1) the force of the water currents; 2) the force of the wind; 3) the force of the line tied to the mooring	1) the force of gravity; 2) the force of the water currents; 3) the weight of the boat

44. A box slides down an incline with uniform acceleration. It starts from rest and attains a speed of 2.7 m/s in 3.0 s. Find (a) the acceleration and (b) the distance moved in the first 6.0 s

(a) 2.22 m/s2, (b) 16 m	(a) 8.1 m/s2, (b) 2.7 m	(a) 0.3 m/s2, (b) 32.4 m	(a) 0.90 m/s2, (b) 16 m

45. Calculate the velocity of a satellite that is in a circular orbit with a radius of 7.5 x 10^7 m measured from the center of the earth.

2940 m/s	2130 m/s	1680 m/s	7470 m/s

46. A jetliner traveling at 600 km/h is turning in a circle of radius 2.5 km. What is its centripetal acceleration?

144,000 m/s^2	144 m/s^2	11 m/s^2	4.8 m/s^2

47. A 3.0-kg block is at rest on a horizontal floor. If you push horizontally on the 3.0-kg block with a force of 12.0 N, it just starts to move. (a) What is the coefficient of static friction? (b) A 7.0-kg block is stacked on top of the 3.0-kg block. What is the magnitude F of the force, acting horizontally on the 3.0-kg block as before, that is required to make the two blocks start to move?

(a) 0.41 ; (b) 98 N	(a) 0.37; (b) 68 N	(a) 0.25; (b) 98 N	(a) 0.41 ; (b) 40 N

48. The coefficient of static friction between a block and a horizontal floor is 0.40, while the coefficient of kinetic friction is 0.15. The mass of the block is 5.0 kg. If a horizontal force is slowly increased until it is barely enough to make the block start moving, what is the net force on the block the instant that it starts to slide?

12 N	35 N	49 N	20 N

49. A rock is swung on the end of a rope in a horizontal circle at constant speed. The rope breaks. Immediately after the rope breaks, the ball will

fall straight down to the ground.	move inward toward the center of the circle.	move outward normal to the circle from the point the rope broke.	move outward tangent to the circle from the point the rope broke.

50. Typically, a tennis ball hit during a serve travels away at about 51 m/s. If the ball is at rest mid-air when struck, and it has a mass of 0.058 kg, what is the change in its momentum on leaving the racket?

3000 kg·m/s	880 kg·m/s	3.0 kg·m/s	29 kg·m/s

51. A 40,000-kg freight car is coasting at a speed of 5.0 m/s along a straight track when it strikes a 30,000-kg stationary freight car and couples to it. What will be their combined speed after impact?

6.7 m/s	2.9 m/s	2.1 m/s	5.0 m/s

52. Two balls of equal mass, moving with speeds of 3 m/s, collide head-on. Find the speed of each after impact if (a) they stick together, (b) the collision is perfectly elastic.

(a) 3 m/s, (b) 0 m/s	(a) 6 m/s, (b) 6 m/s	(a) 0 m/s, (b) each rebounds at 3 m/s	(a) 1.5 m/s, (b) 1.5 m/s

53. A force of 200 N acts tangentially on the rim of a wheel 25 cm in radius. (a) Find the torque. (b) Repeat if the force makes an angle of 40°; to a spoke of the wheel.

(a) 50 N·m (b) 32 N·m	(a) 500 N·m (b) 38 N·m	(a) 4.0 N·m (b) 50 N·m	(a) 314 N·m (b) 3200 N·m

54. A 500-g wheel that has a moment of inertia of 0.015 kg · m^2 is initially turning at 30 rev/s. It coasts to rest after 163 rev. How large is the torque that slowed it?

0.04 N·m	0.26 N·m	0.09 N·m	4.50 N·m

55. An ice skater is in a fast spin with her arms held tightly to her body. When she extends her arms, which of the following statements is *not* true?

She increases her moment of inertia.	She decreases her angular speed.	Her moment of inertia remains constant.	Her total angular momentum remains constant.

56. A 90-g ball moving at 100 cm/s collides head-on with a stationary 10-g ball. Determine the speed of each after impact if (a) they stick together, (b) the collision is perfectly elastic

(a) 90 cm/s, (b) 80 cm/s; 1.8 m/s	(a) 100 cm/s, (b) 80 cm/s; 20 cm/s	(a) 900 cm/s, (b) 90 cm/s; 90 cm/s	(a) 50 cm/s, (b) 1110 cm/s; 180 cm/s

57. A turntable rotates through 10 radians in 4 seconds. The turntable experiences uniform acceleration. If the turntable started from rest, what is its angular velocity at the end of the 4 seconds?

2.5 rad/s	5 rad/s	40 rad/s	we cannot calculate

			the answer since the angular acceleration was not given.

58. The torque exerted on the moon by the gravitational pull of the earth is

normal to the direction of the moon's path.	parallel to the direction of the moon's path.	tangent to the imaginary line connecting the earth and the moon.	zero.

59. Just before striking the ground, a 2.0-kg mass has 400 J of KE. If friction can be ignored, from what height was it dropped?

200 m	20.0 m	40.8 m	40.0 m

60. At sea level a nitrogen molecule in the air has an average translational KE of 6.2×10^{-21}J. Its mass is 4.7×10^{-26}kg. (a) If the molecule could shoot straight up without striking other air molecules, how high would it rise? (b) What is the molecule's initial speed?

(a) 14 km, (b) 0.51 km/s	(a) 1.35 x 1046, b) 2.64 x 105	(a) 132 km, (b) 0.36 km/s	(a) 7.9 x 10-9, (b) 0.26 km/s

61. Compute the power output of a machine that lifts a 500-kg crate through a height of 20.0 m in a time of 60.0 s.

1.63 KW	0.082 kW	98 kW	0.167 kW

62. Sam pushes a 10.0-kg sack of bread flour on a frictionless horizontal surface with a constant horizontal force of 2.0 N starting from rest. (a) What is the kinetic energy of the sack after Sam has pushed it a distance of 35 cm? (b) What is the speed of the sack after Sam has pushed it a distance of 35 cm?

(a) 0.70 J; (b) 0.37	. (a) 7.0 J; (b) 0.37	(a) 0.70 J; (b) 0.21	(a) 7.0 J; (b) 3.5 m/s

m/s	m/s	m/s	

(a) 3.5 J; (b) 3.5 m/s

63. A 1000-kg auto travels up a 3.0 percent grade at 20 m/s. Find the horsepower required, neglecting friction.

5880 hp	263 hp	7.9 hp	4.4 hp

64. A 4.0-kg object is lifted 1.5 m. (a) How much work is done against the Earth's gravity? (b) Repeat if the object is lowered instead of lifted. How large a force is required to accelerate a 1300-kg car from rest to a speed of 20 m/s in a distance of 80 m?

(a) 59 J, (b) -59 J	(a) 6 J, (b) -6 J	(a) -9 J, (b) 59 J	(a) 39 J, (b) -39 J

65. A proton (m = 1.67 x 10^{-27}kg) that has a speed of 5.0 x 10^{6} m/s passes through a metal film of thickness 0.010 mm and emerges with a speed of 2.0 x 10^{6}m/s. How large an average force opposed its motion through the film?

1.8 x 10-9 N	7.5 x 10-10 N	3.3 x 10-10 N	3.5 x 10-11 N

66. A 200-kg cart is pushed slowly up an incline. How much work does the pushing force do in moving the cart up to a platform 1.5 m above the starting point of friction is negligible?

1.96 kJ	2.94 kJ	0.30 kJ	44.1 kJ

67. A bead slides on a wire. How large must height h_1 be if the bead, starting at rest at *A*, is to have a speed of 200 cm/s at point *B*? Ignore friction.

10.2 cm	20.4 cm	40.8 cm	78.4 cm

68. A pendulum is timed as it swings back and forth. The clock is started when the bob is at the left end of its swing. When the bob returns to the left end for the 90th return, the clock reads

60.0s. (a) What is the period of vibration? (b) What is the frequency of vibration?

(a) 1.50 s, (b) 0.667 Hz	(a) 0.667 s, (b) 1.50 Hz	(a) 60 s, (b) 0.0167 Hz	(a) 0.0167 s, (b) 60 Hz

69. A 300-g mass at the end of an ideal spring vibrates up and down in such a way that it is 2.0 cm above the tabletop at its lowest point and 16 cm above at its highest point. Its period is 4.0 s. Determine (a) the amplitude of vibration, (b) the spring constant, (c) the speed and acceleration of the mass when it is 9 cm above the table top, (d) the speed and acceleration of the mass when it is 12 cm above the table-top.

(a) 8.0 cm (b) 0.24 N/m (c) 0.14 m/s; zero (d) 0.099 m/s, 2.47 m/s2	(a) 9.0 cm (b) 2.96 N/m (c) -0.22 m/s; zero (d) 0.15 m/s, 1.2 m/s2	(a) 7.0 cm (b) 0.74 N/m (c) 0.11 m/s; zero (d) 0.099 m/s, 0.074 m/s2	(a) 14.0 cm (b) 740 N/m (c) 0.121 m/s; zero (d) 0.07 m/s, 0.074 m/s2

70. A 300-g mass at the end of a spring executes SHM with a period of 2.4 s. Find the period of oscillation of a 133-g mass attached to the same spring.

1.6 s	0.033 s	24.7 s	0.41 s

71. A certain Hookean spring is stretched 20 cm when a given mass is hung from it. What is the frequency of vibration of the mass if pulled down a little and released?

1.1 Hz	44 Hz	0.11 Hz	7.80 Hz

72. A string 180 cm long resonates in three segments to transverse waves sent down it by a 270 Hz vibrator. What is the speed of the waves on the string?

486 m/s	225 m/s	324 m/s	32400 m/s

73. The higher the frequency of a wave

the smaller its speed.	the shorter its wavelength	the greater its amplitude.	the longer its period.

74. Standing waves are produced by the superposition of two waves with

the same amplitude, frequency, and direction of propagation.	the same amplitude and frequency, and opposite propagation directions.	the same amplitude and direction of propagation, but different frequencies.	the same amplitude, different frequencies, and opposite directions of propagation.

75. Two successive transverse pulses, one caused by a brief displacement to the right and the other by a brief displacement to the left, are sent down a Slinky that is fastened at the far end. At the point where the first reflected pulse meets the second advancing pulse, the deflection (compared with that of a single pulse) is

quadrupled.	doubled.	canceled.	halved.

76. The intensity of an isotropic sound wave is

directly proportional to the distance from the source.	inversely proportional to the distance from the source.	directly proportional to the square of the distance from the source.	inversely proportional to the square of the distance from the source

77. The average person can hear sound waves ranging in frequency from about 20 Hz to 20 kHz. Determine the wavelengths at these limits, taking the speed of sound to be 340 m/s.

17 m, 1.7 cm	0.059 m, 58.8 cm	6800 m, 6.8 x 106	17m, 0.0017 cm

78. Of these properties of a wave, the one that is independent of the others is its

amplitude	wavelength	speed	frequency

79. The speed of waves in a stretched string depends upon which one of the following?

The tension in the string	The amplitude of the waves	The wavelength of the waves	The gravitational field strength

80. A moving van and a small car are traveling in the same direction on a two-lane road. The van is moving at twice the speed of the car and overtakes the car. The driver of the car sounds his horn, frequency = 440 Hz, to signal the van that it is safe to return to the lane. Which is the correct statement?

The car driver and van driver both hear the horn frequency as 440 Hz.	The car driver hears 440 Hz, but the van driver hears a lower frequency	The car driver hears 440 Hz, but the van driver hears a higher frequency.	Both drivers hear the same frequency and it is lower than 440 Hz.

81. A long, narrow pipe closed at one end does not resonate to a tuning fork having frequency of 300 Hz until the length of the air column reaches 28 cm. (a) What is the speed of sound in air at the existing room temperature? (b) What is the next length of column that will resonate to the fork?

(a) 0.68 km/s, (b) 56 cm	(a) 0.27 km/s, (b) 14 cm	(a) 0.34 km/s, (b) 84 cm	(a) 0.13 km/s, b) 7.3 cm

82. A locomotive moving at 30.0 m/s approaches and passes a person standing beside the track. Its whistle is emitting a note of frequency 2.00 kHz. What frequency will the person hear (a) as the train approaches and (b) as it recedes? The speed of sound is 340 m/s.

(a) 1.84 kHz (b) 2.19 kHz	(a) 2.19 kHz (b) 1.84 kHz	(a) 2.18 kHz (b) 2.18 kHz	(a) 1.82 kHz (b) 1.82 kHz

83. What is the speed of sound in air when the air temperature is 31° C

0.313 km/s	0.362 km/s	0.35 km/s	0.332 km/s

84. A sound has an intensity of 5.0×10^{-7} W/m^2. What is the intensity level?

57 dB .	5.0 x 106 dB	6.99 dB	50 dB

85. The intensity of a sound wave is directly proportional to

the frequency.	the amplitude.	the square of the amplitude.	the square of the speed of sound

86. A metal cube, 2.00 cm on each side, has a density of 6600 kg/m^3. Find its apparent mass when it is totally submerged in water.

0.439 g	8.01 g	12.2 g	44.8 g

87. A certain town receives its water directly from a water tower. If the top of the water in the tower is 26.0 m above the water faucet in a house, what should be the water pressure at the faucet? (Neglect the effects of other water users.)

0.255 kPa	255 kPa	2.65 kPa	127 kPa

88. A solid piece of aluminum (ρ = 2.70 g/cm^3) has a mass of 8.35 g when measured in air. If it is hung from a thread and submerged in a vat of oil (ρ = 0.75 g/cm^3), what will be the tension in the thread?

0.059 N.	0.082 N	0.023 N	0.105 N

89. A pipe of varying inner diameter carries water. At point 1 the diameter is 20 cm and the pressure is 130 kPa. At point 2, which is 4.0 m higher than point 1, the diameter is 30 cm. If the flow is 0.080 m^3/s, what is the pressure at the second point?

93 kPa	91 kPa	135 kPa	39 kPa

90. The speed of glycerin flowing in a 5.0 cm i.d. pipe is 0.54 m/s. Find the fluid's speed in a 3.0 cm i.d. pipe that connects with it, both pipes flowing full.

1.5 m/s	0.9 m/s	0.19 m/s	0.32 m/s

91. A large open tank of nonviscous liquid springs a leak 4.5 m below the top of the liquid. What is the theoretical velocity of outflow from the hole? If the area of the hole is $0.25cm^2$, how much liquid would escape in exactly 1 minute?

(a) 9.4 m/s, (b) 0.0141 m3	(a) 88.3 m/s, (b) 0.000235 m3	(a) 3.0 m/s, (b) 2540 m3	(a) 4.7 m/s, (b) 50.8 m3

92. A container is filled with gas at a pressure of 4.0 × 105 Pa. The container is a cube, 0.10 m on a side, with one side facing south. What is the magnitude and direction of the force on the south side of the container due to the gas inside?

2.0 kN southward	4.0 kN northward	2.0 kN northward	4.0 kN southward

93. At a height of 10 km (33000 ft) above sea level, atmospheric pressure is about 210 mm of mercury. What is the resultant normal force on a 600 cm^2 window of an airplane flying at this height? Assume the pressure inside the plane is 760 mm of mercury. The density of mercury is 13 600 kg/m^3.

6.1 kN	4.4 x 103	1.2 x 103	4.4 kN

94. A glass tube is bent into the form of a U. A 50.0 cm height of olive oil in one arm is found to balance 46.0 cm of water in the other. What is the density of the olive oil?

920 kg/m3	1080 kg/m3	230 kg/m3	0.920 kg/m3

95. If two equal charges, each of 1 C, were separated in air by a distance of 1 km, what would be the force between them?

9.0 kN repulsion	9.0 x 109 repulsion	1.0 x 10-6 repulsion	9.0 x 1015 repulsion

96. One charge of (+5.0μC) is placed at exactly x = 0, and a second charge (+7.0μC) at x = 100 cm. Where can a third be placed so as to experience zero net force due to the other two?

at x = 5.5 cm	at x = 0.42 cm	at x = 0.35 cm	at x = 46 cm

97. A proton (q = e, m_p = 1.67 x 10^{-27}kg) is accelerated from rest through a potential difference of 1.0 MV. What is the final speed?

1.4 x 107 m/s	1.4 x 104 m/s	3.5 x 1016 m/s	1.4 x 10-1 m/s

98. An electron has a speed of 6.0 x 10^5 m/s as it passes point *A* on its way to point *B*. Its speed at *B* is 12 x 10^5 m\s. What is the potential difference between *A* and *B*, and which is at the higher potential?

0.17 V, B	4.1 V, B	3.1 V, B	3.1 x 10-10 V, B

99. A straight wire 15 cm long, carrying a current of 6.0 A, is in a uniform field of 0.40 T. What is the force on the wire when it is (a) at right angles to the field and (b) at the 30° to the field?

(a) 36 N (b) 0.36 N	(a) 0.36 N (b) 0.18 N	(a) 2.25 N (b) 0.16 N	(a) 0 N (b) 0.72 N

100. Two long parallel wires are 4 cm apart and carry currents of 2 A and 6 A in the same direction. Compute the force between the wires per meter of wire length.

6.0 x 10-7 N/m, attraction	6.0 x 10-5 N/m, attraction	2.5 x 10-6 N/m, attraction	6.0 x 10-5 N/m, repulsion

101. A flat coil with radius 8.0 mm has 50 loops of wire. It is placed in a magnetic field *B* = 0.30 T in such a way that the maximum flux goes through it. Later, it is rotated in 0.020 s to a position such that no flux goes through it. Find the average emf induced between the terminals of the coil.

0.15 V	15 mV	18.8 V	3.0 mV

102. An electron is traveling horizontally east in Earth's magnetic field. What is the direction of the magnetic force on the particle?

Up	Down	West	Zero

103. An ideal solenoid 50 cm long has 4000 loops wound on it. Compute *B* in its interior when a current of 0.25 A exists in the winding.

10.0 mT	2.5 mT	2.5 x 10-5 T	0.63 mT