10

QUESTION PAPER SERIES CODE
A

Centre Name : _____

Roll No. : _____

Name of Candidate : _____

S A U

Entrance Test for M.Phil./Ph.D. (Biotechnology), 2015

[PROGRAMME CODE : PBT]

Time : 3 hours *Maximum Marks* : 70

INSTRUCTIONS FOR CANDIDATES

Candidates must carefully read the following instructions before attempting the Question Paper :

(i) Write your Name, Roll Number and Centre Name in the space provided for the purpose on the top of this Question Paper and in the OMR/Answer Sheet.

(ii) This Question Paper has Two Parts : Part—A and Part—B.

(iii) Part—A (Objective-type) has 20 questions of **1** mark each. All questions are compulsory.

(iv) Part—B (Objective-type) has 100 questions (Q. Nos. **21** to **120**) out of which, please attempt 50 questions only. Each question carries **1** mark.

(v) **One-fourth of marks assigned to any question will be deducted for wrong answers in both Part—A and Part—B.**

(vi) *PLEASE DO NOT ATTEMPT MORE THAN 50 QUESTIONS IN PART—B. IF YOU ATTEMPT MORE THAN 50 QUESTIONS, ONLY first 50 WILL BE EVALUATED.*

(vii) **Please darken the appropriate Circle of 'Question Paper Series Code' and 'Programme Code' on the OMR/Answer Sheet in the space provided.**

(viii) Part—A and Part—B (Multiple choice) questions should be answered on OMR/Answer Sheet. Choose the one correct option out of the four options given for each question.

(ix) Answers written by the candidates inside the Question Paper will **NOT** be evaluated.

(x) Calculators and Log Tables may be used. Mobile Phones are **NOT allowed**.

(xi) Pages at the end have been provided for Rough Work.

(xii) **Return the Question Paper and the OMR/Answer Sheet** to the Invigilator at the end of the Entrance Test.

(xiii) **DO NOT FOLD THE OMR/ANSWER SHEET.**

INSTRUCTIONS FOR MARKING ANSWERS IN THE 'OMR SHEET'

Use BLUE/BLACK Ballpoint Pen Only

1. **Please ensure that you have darkened the appropriate Circle of 'Question Paper Series Code' and 'Programme Code' on the OMR Sheet in the space provided.**

   Example :

   Question Paper Series Code

   Write Question Paper Series Code A or B and darken the appropriate circle.

   [ ] A or B

   ● Ⓑ

   Programme Code

   Write Programme Code out of 14 codes given and darken the appropriate circle.

   Write Programme Code [ ]

MEC	○	MAM	○	PCS	○
MSO	○	MLS	○	PBT	●
MIR	○	PEC	○	PAM	○
MCS	○	PSO	○	PLS	○
MBT	○	PIR	○		

2. Use only Blue/Black Ballpoint Pen to darken the Circle. Do not use Pencil to darken the Circle for Final Answer.
3. Please darken the whole Circle. ●
4. Darken ONLY ONE CIRCLE for each question as shown below in the example :

   Example :

Wrong	Wrong	Wrong	Wrong	Correct
● ⓑ ⓒ ●	Ⓐ ⓑ ⓒ ⓓ	Ⓐ ⓑ ⓒ Ⓓ	◉ ⓑ ⓒ ●	ⓐ ⓑ ⓒ ●

5. Once marked, no change in the answer is allowed.
6. Please do not make any stray marks on the OMR Sheet.
7. Please do not do any rough work on the OMR Sheet.
8. Mark your answer only in the appropriate circle against the number corresponding to the question.
9. **One-fourth of marks assigned to any question will be deducted for wrong answers.**
10. Write your six-digit Roll Number in small boxes provided for the purpose; and also darken the appropriate circle corresponding to respective digits of your Roll Number as shown in the example below.

    Example :

    ROLL NUMBER

1	3	5	7	2	0
●	①	①	①	①	①
②	②	②	②	●	②
③	●	③	③	③	③
④	④	④	④	④	④
⑤	⑤	●	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	●	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨
⓪	⓪	⓪	⓪	⓪	●

PART—A

1. Using SDS polyacrylamide gel electrophoresis, we can

   (a) estimate the biological activity of proteins

   (b) separate proteins on the basis of shape

   (c) separate proteins on the basis of charge

   (d) separate proteins on the basis of size

2. Which of the following statements about the functions of cell membranes is not correct?

   (a) Cell membranes maintain the shape of cells.

   (b) Cell membranes retain the contents of cells.

   (c) Cell membranes are impermeable to most molecules.

   (d) Cell membranes are permeable to most inorganic ions.

3. Which of the following reactions is required for proofreading during DNA replication by DNA polymerase III?

   (a) 3′–5′ exonuclease activity

   (b) 5′–3′ exonuclease activity

   (c) 3′–5′ endonuclease activity

   (d) 5′–3′ endonuclease activity

4. How does the mismatch repair system distinguish between the parental DNA strand and the newly synthesized strand containing the mismatched base?

   (a) Thymine in the parental strand of the helix is methylated at GATC

   (b) Thymine in the new strand of the helix is methylated at GATC

   (c) Guanine in the parental strand of the helix is methylated at GATC

   (d) Guanine in the new strand of the helix is methylated at GATC

5. How many different transfer RNA molecules are present in a cell (not including those present in the mitochondria)?

   (a) 64

   (b) 61

   (c) 20

   (d) More than 20, less than 61

6. The protein, which inhibits blood clotting, is

(a) thrombin

(b) plasmin

(c) antithrombin

(d) tissue plasminogen activator

7. The normal immunological role of the $CD8^+$ T cell is to

(a) help B-lymphocytes to develop into plasma cells

(b) kill virus-infected cells

(c) secrete antibodies

(d) kill bacteria

8. The molecules which provide stimulation for the cell to enter cell cycle, are

(a) cyclins

(b) cyclin-dependent kinases

(c) cytokine growth factors

(d) tyrosine kinases

9. Which of the following proteins is not part of the apoptosome, which initiates apoptosis by the intrinsic pathway?

(a) Apaf–1

(b) Bcl–2

(c) Cytochrome c

(d) Procaspase–9

10. Cytochrome P450 is located in the

(a) mitochondrial inner membrane

(b) cytoplasm

(c) mitochondrial matrix

(d) endoplasmic reticulum

11. In the hexaploid wheat, the haploid (n) and basic (x) numbers of chromosomes are

(a) $n = 21$ and $x = 7$

(b) $n = 7$ and $x = 21$

(c) $n = 21$ and $x = 21$

(d) $n = 21$ and $x = 14$

12. Which one of the following pairs is not correctly matched?

(a) IAA—Cell wall elongation

(b) Abscisic acid—Stomatal closure

(c) Gibberellic acid—Leaf fall

(d) Cytokinin—Cell division

13. Which one of the following animals is correctly matched with its particular named taxonomic category?

(a) Housefly—Musca, an order

(b) Tiger—Tigris, the species

(c) Cuttlefish—Mollusca, a class

(d) Humans—Primata, the family

14. Which one of the following enzymes carries on the initial step in the digestion of milk in humans?

(a) Trypsin

(b) Pepsin

(c) Renin

(d) Lipase

15. Where will you look for the sporozoites of the malarial parasite?

(a) Salivary glands of freshly moulted female Anopheles mosquito

(b) Saliva of infected female Anopheles mosquito

(c) Red blood corpuscles of humans suffering from malaria

(d) Spleen of infected humans

16. Which second messenger signals the release of Ca^{++} from the endoplasmic reticulum?

(a) Cyclic AMP

(b) Cyclic GMP

(c) 1,2-diacylglycerol

(d) Inositol triphosphate

17. Andrew Fire and Craig Mello won the Nobel Prize in 2006 for their work, begun in the late 1990s, on RNA interference. Which of the following organisms did they work on?

(a) *E. coli*

(b) Fruit flies

(c) Roundworms

(d) Plants

18. Which one of the following enzymatic activities is of a ribozyme?

(a) Aminoacyl *t*-RNA synthase

(b) Peptidyl transferase

(c) Releasing factors 1 and 2

(d) Ribosome recycling factor

19. In glycolysis reaction

(a) glucose-6-phosphate is split into glyceraldehyde-3-phosphate and dihydroxyacetone phosphate

(b) fructose-1 : 6-bisphosphate is split into glyceraldehyde-3-phosphate and dihydroxyacetone phosphate

(c) fructose-6-phosphate is split into glyceraldehyde-3-phosphate and dihydroxyacetone phosphate

(d) glucose-6-phosphate is isomerized to fructose-1 : 6-bisphosphate

20. The Na^+/K^+ pump

(a) uses energy to pump Na^+ outside the cell and K^+ inside

(b) uses energy to pump Na^+ inside the cell and K^+ outside

(c) uses energy to bind both Na^+ and K^+ in turn

(d) does not involve conformational alterations

PART—B

21. What percentage of the human genome represents the protein encoding regions?

(a) 1%

(b) 2%

(c) 3%

(d) 5%

22. An acid with a pK of 8·0 is present in a solution of pH 6·0. The ratio of deprotonated to the protonated form of the acid would be

(a) 0·001

(b) 0·01

(c) 0·1

(d) 1·0

23. Which one of the following diseases is not connected to misfolded protein?

(a) Huntington's

(b) Alzheimer

(c) Crohn's

(d) Parkinson's

24. Which one of the following reagents can be used to determine the N-terminus amino acid in proteins?

(a) Dansyl chloride

(b) Cyclohexanedione

(c) Ellman reagent

(d) Iodoacetamide

25. A bifunctional reagent useful in coupling proteins is

(a) glyceraldehyde

(b) glutaraldehyde

(c) parachloromercuribenzoate (PCMB)

(d) cyanogen bromide

26. The semiconservative mechanism of DNA replication was suggested by the results of the experiments of

(a) Hershey and Chase

(b) Watson and Crick

(c) Meselson and Stahl

(d) Cohen and Boyer

27. The sequence recognized by the restriction enzyme *EcoRI* is

(a) 5′-GAATTC-3′

(b) 5′-GCGC-3′

(c) 5′-GGATCC-3′

(d) 5′-GTATTC-3′

28. The P_{50} for the binding of O_2 by Hb is

(a) 1 torr

(b) 15 torr

(c) 26 torr

(d) 100 torr

29. In an enzyme-catalyzed reaction, V_{max} is a function of

(a) K_1

(b) K_{-1}

(c) K_{cat}

(d) K_m

30. Which one of the following is not a post-translational modification?

(a) Phosphorylation of serine

(b) Phosphorylation of tyrosine

(c) Sulphation of tyrosine

(d) Glycosylation of asparagine

31. An ω-3 fatty acid means

(a) there is a double bond at the γ-carbon next to carboxyl group

(b) there are 3 double bonds in the fatty acid

(c) there is a double bond on the 3rd carbon from the non-carboxyl end

(d) the double bond wherever it is trans in configuration

32. Which one of the following membrane proteins does not use α-helices to span the membrane?

(a) Bacteriorhodopsin

(b) Porin from *E. coli*

(c) G-protein coupled receptors

(d) Glycophorin A of RBC

33. Which one of the following is not a second messenger?

(a) cAMP

(b) IP_3

(c) Nitric oxide

(d) Calmodulin

34. The intermediate formed in the conversion of 3-phosphoglyceric acid to 2-phosphoglyceric acid is

(a) 1,2-BPG

(b) 2,3-BPG

(c) 1,3-BPG

(d) 2,2-BPG

35. Acetyl CoA enters TCA cycle in the first reaction where it adds across oxaloacetic acid to form citric acid. In which of the subsequent cycles, does its carboxyl group get removed (i.e., decarboxylated)?

(a) 1

(b) 2

(c) 3

(d) 4

36. Cyanide causes death by inhibiting mitochondrial electron transport at

(a) NADH oxidase step (complex I)

(b) succinate dehydrogenase step (complex II)

(c) cytochrome-c oxidase step (complex III)

(d) cytochrome aa_3 oxidase (complex IV)

37. Prostaglandins are biosynthesized from

(a) palmitoleic acid

(b) linolenic acid

(c) arachidonic acid

(d) linoleic acid

38. Urea excreted by ureotelic organisms comes mostly from

(a) urea cycle

(b) degradation of uric acid

(c) nitric oxide synthase (NOS) action on arginine

(d) degradation of uracil

39. Which one of the following secondary metabolites is not an acetogenin?

(a) Rubber

(b) Cholesterol

(c) Diterpene

(d) Acetoacetic acid

40. How many pairs of chromosome does *Drosophila melanogaster* possess?

(a) 16

(b) 20

(c) 4

(d) 6

41. Which one of the following is used for the human cancer-related experiments as an *in vivo* model?

(a) Bacteria

(b) Yeast

(c) *Drosophila melanogaster*

(d) Zebra fish

42. A component of animal cell membrane that functions to stiffen the membrane and thus regulate its fluidity is

(a) cholesterol

(b) cellulose

(c) pectin

(d) carbohydrate

43. Which of the following statements is incorrect regarding transport protein?

(a) They are present in cell membrane.

(b) They serve to carry polar molecule across the hydrophobic cell membrane.

(c) They are required to transport amino acids across the cell membrane.

(d) They are required to transport hydrophobic steroids across the cell membrane.

44. How does the protein from cytosol transport to the endoplasmic reticulum?

(a) Gated transport

(b) Transmembrane transport

(c) Vesicular transport

(d) ATP-gated channel

45. Intermediate filaments are found in

(a) mitotic spindle

(b) centrosomes

(c) cilia

(d) desmosomes

46. Which of the following CKI inhibits cyclinD-CDK4/6 complex?

(a) INK4 family of inhibitor

(b) CIP1 family of inhibitor

(c) TGF-β

(d) Cell-division-cycle phosphatase (CDC25)

47. Which of the following processes occurs only in S phase of the cell cycle?

(a) Organelle replication

(b) Cell growth

(c) DNA replication

(d) Chromosomes segregation

48. Most of the protein kinases

(a) bind cAMP

(b) add phosphate groups to their substrate proteins

(c) polymerize amino acids

(d) bind cGMP

49. During the muscle contraction, hydrolysis of the ATP results in the change of

(a) conformation of actin

(b) conformation of myosin

(c) structure of the myofibrils

(d) structure of the sarcoplasmic reticulum

50. Which one of the following enzymes inhibits activity of cAMP?

(a) Adenylyl cyclase

(b) Phospholipase C-β

(c) Phosphodiesterase

(d) Protein kinase A

51. Replication occurs during which phase of cell cycle?

(a) G_0 phase

(b) G_1 phase

(c) S phase

(d) M phase

52. When the distance between the –10 and –35 elements in the promoter is increased by 10 bases, it will

(a) have no effect on transcription

(b) reduce the rate of transcription

(c) increase the efficiency of transcription

(d) fail to initiate transcription

53. When a mutation is introduced in the inducer-binding domain of the *lac* repressor, no amount of allolactose is capable of inducing the *lac* operon. In such cells, β-galactosidase gene can be induced by

(a) growing the cells in a glucose-free media

(b) using synthetic inducers such as IPTG

(c) cotransfecting the cells with a plasmid containing $lacI^+$ gene

(d) introducing more lactose transporters on the plasma membrane

54. Which among the following is an example of natural amino acid?

(a) Hydroxyproline

(b) Pyrrolysine

(c) Gamma-aminobutyric acid

(d) Phosphoserine

55. Depurination refers to

(a) breakage of the phosphodiester bond

(b) incorporation of hypoxanthine in the DNA

(c) deamination of adenine/guanine residues

(d) breakage of the N-glycosidic bond

56. In prokaryotes, stop codons are recognized by/through

(a) terminator tRNA (contain no amino acid)

(b) release factors

(c) ribosome recycling factor

(d) mRNA secondary structures (hairpin loop)

57. During the isolation of DNA from plant tissues, what type of detergent best serves the purpose?

(a) Non-ionic detergent

(b) Anionic detergent

(c) Cationic detergent

(d) Zwitterionic detergent

58. Topoisomerases assist in replication through

(a) identifying the origin of replication

(b) relaxing the double-stranded DNA

(c) creating single strand by melting DNA

(d) joining the short Okazaki fragments after replication

59. Amino acids that are capable of stabilizing the structure of DNA within the cell include

(a) glutamine and aspartate

(b) histidine and lysine

(c) phosphoserine and phosphothreonine

(d) acetylated lysine

60. If the optical density of an undiluted sample of 4 kb DNA is 0·05, the concentration would be

(a) 2·5 ng/μl

(b) 0·25 μg/ml

(c) 2·5 μg/μl

(d) 50 μg/ml

61. Replication occurs only on DNA with a linking number of

(a) −1

(b) 0

(c) 1

(d) 10·5 (for B-DNA)

62. A peptide bond is formed within which site of the ribosome?

(a) P site

(b) A site

(c) E site

(d) 30S subunit

63. The equivalent structure for dorsal lip of blastopore in birds is called

(a) Muller cells

(b) Eimer's organ

(c) layer of Langerhans

(d) Hensen's node

64. During refractory period, the cell remains

(a) apolarized

(b) depolarized

(c) hyperpolarized

(d) repolarized

65. The optic organelle of an earthworm is called the

(a) neurofibril

(b) light cells of Hess

(c) ommatidia

(d) Eimer's organs

66. Which of the following genetic loci is rearranged first during the ontogeny of B cells?

(a) Gamma chain

(b) Mu chain

(c) Kappa chain

(d) Lambda chain

67. For flow cytometric analysis of T and B cell populations, which mixture of antibodies you may use?

(a) Anti-CD19-FITC, anti-IgG-FITC

(b) Anti-CD3-FITC, anti-TCR-PE

(c) Anti-TNF-PE, anti-CD19-FITC

(d) Anti-IgG-FITC, anti-CD3-PE

68. Which of the following membrane lipids is generally expressed in the inner side of the lipid bi-layer in a healthy lymphocyte?

(a) Phosphatidylserine

(b) Phosphatidylcholine

(c) Cholesterol

(d) Phosphatidylinositol

69. Which of the following molecules may have no effector role in cell-mediated cytotoxicity?

(a) TNF

(b) FasL

(c) Perforin

(d) CD25

70. Activated T helper cells were stained with anti-CD4 antibody. The antibody would stain

(a) CD4 molecules expressed on cell membrane

(b) CD4 molecules in cytoplasm

(c) CD4 molecules on membrane as well as in cytoplasm

(d) CD4 molecules inside nucleus

71. Thymic selection is associated with

(a) an immediate atrophy of thymus

(b) killing of some B cells

(c) killing of some NK cells

(d) killing of some T cells

72. Activation tagging in plants is used for

(a) gene discovery

(b) promoter identification

(c) SNP identification

(d) knock down known gene

73. In 2D-DIGE method

(a) it requires less number of technical replicates/gels to be run than normal 2D gel electrophoresis

(b) there is no requirement of fluorescent dyes or scanners

(c) there is no requirement of mass spectrometry to detect the spots

(d) None of the above

74. Tilling

(a) requires plant tissue culture

(b) can be done even if the genome sequence of the plant is unknown

(c) locates and detects induced mutation

(d) None of the above

75. Metabolomics

(a) is a branch of analytical biochemistry

(b) requires various separation and detection techniques

(c) has less accuracy, but wider scope

(d) All of the above

76. Which of the following statements is not true regarding molecular farming?

(a) No risks of product contamination with human endotoxins or pathogens.

(b) Cost-effective production of recombinant proteins on an agricultural scale.

(c) Production time scale is short.

(d) Minor differences in glycosylation pattern of animal and plant protein exists.

77. Which of the following is not a technique to analyze protein-protein interaction?

(a) Yeast two-hybrid

(b) Yeast one-hybrid

(c) Pull down assay

(d) BiFC

78. Mutation-selection balance model applies to

(a) deleterious alleles

(b) dominant alleles

(c) recessive alleles

(d) synthetic lethal alleles

79. If selection favors homozygotes over heterozygotes

(a) genetic variation will decline

(b) genetic variation will increase

(c) genetic variation will not change

(d) allele frequency of most common allele will become 1

80. If two parents, both heterozygous carriers of the autosomal recessive gene causing cystic fibrosis, have five children, what is the probability (p) that exactly three will be normal?

(a) $p = 0 \cdot 26$

(b) $p = 0 \cdot 75$

(c) $p = 0 \cdot 25$

(d) $p = 0 \cdot 16$

81. The paradigm in vertebrates is that secondary sexual differentiation (male vs. female characteristics) is dependent on male or female hormones that are produced. Recently, D. Zhao and colleagues studied three chickens that were bilateral gynandromorphs, with the right side of the body being clearly female and the left side of the body clearly male [*Nature* 464 : 237 (2010)]. You are given this model chicken. What biological questions would you like to answer using this model chicken?

(a) Sex determination

(b) Sexual differentiation

(c) Male-female behavioural differences

(d) Hormonal biology

82. You discovered a new organism and isolated its chromatin. This chromatin was subjected to short micrococcal nuclease digestion that yielded DNA fractions consisting of 600 bp, 1200 bp and 1800 bp. Can you predict nucleosome size from this data?

(a) 200 bp

(b) 300 bp

(c) 600 bp

(d) Size cannot be predicted from the given data

83. Assume India's Mars Mission discovered a new life on Mars. This new organism's DNA is constituted of 6 nucleotides which form three specific base-pairs. However, it has only 20 amino acids like lifeforms on the earth. If the codon in this Martian lifeform follows, a two letter code, do you think that 6 nucleotides with a two letter code can accommodate 20 different amino acids? If yes, how many codons would be possible?

(a) No

(b) Yes, 64 codons

(c) Yes, 216 codons

(d) Yes, 36 codons

84. Changes in the nucleotide sequence of DNA which aren't passed to offspring occur in

(a) eggs

(b) neurons

(c) diploid and haploid cells

(d) sperms

85. What will be the genotypic ratio of the cross between Pp and pp?

(a) 1 : 2 : 1

(b) 3 : 1

(c) 1 : 1

(d) 1 : 1 : 1

86. The difference between *Homo sapiens* and *Homo erectus* was

(a) *Homo sapiens* originated in Africa while *Homo erectus* was in Asia

(b) *Homo eructus* were much smaller in size than *Homo sapiens*

(c) *Homo eructus* stayed in Africa while *Homo sapiens* did not

(d) the size of the brain of *Homo eructus* was smaller to *Homo sapiens*

87. Which of the following are not examples of analogous structures?

(a) Wings of bat and butterfly

(b) Wings of bat and forelimb of cattle

(c) Thorn and spine

(d) Tendril of Lathyrus and tendril of Gloriosa

88. The Ames test shows that nitrous acid is a mutagen because it greatly increases the mutation rate for *S. typhimurium* strain TA1535 (in a dose-dependent manner). However, it does not increase the mutation rate for TA1537. The best conclusion is

(a) nitrous acid is not likely to be carcinogenic

(b) nitrous acid probably causes insertion mutations in DNA

(c) nitrous acid probably causes substitution mutations in DNA

(d) nitrous acid probably causes nonsense mutations in DNA

89. Homologous chromosomes which are similar in both the sexes are called

(a) sex chromosomes

(b) autosomes

(c) allosomes

(d) androsomes

90. When two waves are out of phase by —— wavelength, they produce destructive interference, canceling each other's amplitude and resulting in contrast in the image.

Select the correct option to fill in.

(a) one-tenth

(b) one-quarter

(c) one-half

(d) one-sixth

91. Increasing the refractive index of the medium between the object and the objective lens increases

(a) refraction

(b) reflection

(c) magnification

(d) resolution

92. If you are using a microscope with a 10× ocular lens and a 100× objective, what is the total magnification?

(a) 10-fold

(b) 100-fold

(c) 110-fold

(d) 1000-fold

93. X-ray diffraction and phase-contrast microscopy both involve

(a) wave interference

(b) observation of living specimens

(c) differential stains

(d) simple stains

94. The use of antibodies linked to fluorophores is known as

(a) fluorescence

(b) immunofluorescence

(c) X-ray diffraction

(d) atomic force microscopy

95. Which form of microscopy can be used with DNA microarrays to observe differences in gene expression?

(a) Atomic force microscopy

(b) SEM

(c) TEM

(d) Confocal flouorescence microscopy

96. The process in which bacteriophages carry host DNA from one cell to another is known as

(a) conjugation

(b) transformation

(c) recombination

(d) transduction

97. Which of the following drugs is a non-ribosomal-peptide antibiotic?

(a) Erythromycin

(b) Penicillin

(c) Tetracycline

(d) Vancomycin

98. Which one of the following energy-yielding processes occurs only in Archaea?

(a) Fermentation

(b) Sulfur oxidation

(c) Hydrogen oxidation

(d) Methanogenesis

99. UV rays cause

(a) deletion of pyramidines

(b) dimerization of pyramidines

(c) substitution of purine for pyramidine

(d) cross linking of purine with pyramidine

100. Weakest force is

(a) van der Waals' interaction

(b) covalent bond

(c) ionic bond

(d) hydrogen bonding

101. Covalent bonding between two molecules requires

(a) electron with opposite spins

(b) no effect of spins

(c) electron with same spins

(d) electron of the same orbital

102. Radioactive substances emit the following, except

(a) gamma rays

(b) beta rays

(c) alpha rays

(d) X-rays

103. Hertz is a unit of

(a) loudness

(b) intensity

(c) frequency

(d) power

104. In case of alpha decay, the mass number of a radioactive atom

(a) decreases by 4

(b) decreases by 2

(c) increases by 4

(d) increases by 2

105. Thermodynamic probability is —— to mathematical probability.

Select the correct option to fill in.

(a) directly proportional

(b) inversely proportional

(c) not related

(d) equal

106. During osmosis

(a) diluted solution is concentrated

(b) salts are filtered out

(c) salts are concentrated

(d) more concentrated solution becomes diluted

107. When the heart rate increases

(a) the duration of the diastole decreases

(b) the duration of the diastole increases

(c) the blood volume increases

(d) the blood pressure decreases

108. What type of interaction acts between water molecules in liquid water?

(a) Oxygen bonds

(b) Hydrogen bonds

(c) Sulfide bonds

(d) Covalent bonds

109. Transmembrane protein can be extracted by using

(a) detergents

(b) phosphate-buffered saline

(c) phosphate-buffered saline with EDTA

(d) chelating agents

110. The best conductor of electricity is

(a) graphite

(b) coal

(c) coke

(d) diamond

111. What is the mode in the following distribution?

25, 17, 23, 23, 24, 25, 23

(a) 25

(b) 23

(c) 24

(d) 17

112. The graph, which shows a parametric test generally represents

(a) median and standard error

(b) mean and mode

(c) mean and standard deviation

(d) mean and range

113. A physician wants to calculate a measure of linear association between two continuous variables. Which of the following should he use?

(a) Simple Linear Regression

(b) Multivariate Analysis (MVA)

(c) Pearson's Correlation Coefficient

(d) Rank Correlation Coefficient

114. If a graph is made comparing cold intensity with the temperature will be

(a) perfect positive correlation

(b) perfect negative correlation

(c) zero correlation

(d) $r = 0$

115. Another name of type–I error is

(a) level of significance

(b) alpha error

(c) beta error

(d) *P*-value

116. Education and marital status of patients are best studied by

(a) association

(b) proportion

(c) percentages

(d) correlation

117. The area under normal curve within 3 SD of means is

(a) 99·99%

(b) 99·73%

(c) 68·26%

(d) 95·44%

118. The value of X^2 is always

(a) negative

(b) greater than one

(c) zero

(d) positive

119. Marks of boys in a school is an example of

(a) ordinal data

(b) continuous variable

(c) discrete variable

(d) random variable

120. Which of the following methods, if utilized, would certainly result in an ultrametric tree?

(a) Maximum parsimony

(b) Maximum likelihood

(c) UPGMA

(d) Neighbor-joining

★ ★ ★

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK