3

QUESTION PAPER SERIES CODE

B

Centre Name : _____

Roll No. : _____

Name of Candidate : _____

S A U

Entrance Test for M.Sc. (Biotechnology), 2015

[PROGRAMME CODE : MBT]

Time : 3 hours *Maximum Marks* : 100

INSTRUCTIONS FOR CANDIDATES

Candidates must read carefully 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 30 questions of **1** mark each. All questions are compulsory.

(iv) Part—B (Objective-type) has 120 questions (Q. Nos. **31** to **150**) out of which, please attempt 70 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 70 QUESTIONS IN PART—B. IF YOU ATTEMPT MORE THAN 70 QUESTIONS, ONLY first 70 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 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 appropriate circle.

   ☐ A or B

   Ⓐ
   ●

   Programme Code

   Write Programme Code out of 14 codes given and darken 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 in multiple choice questions.**
10. Write your six-digit Roll Number in small boxes provided for the purpose; and also darken 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
⑩	⑩	⑩	⑩	⑩	●

PART—A

1. Which one of the following is distinct from the others in its composition?

   (a) Microtubules

   (b) Microfilaments

   (c) Plant cell walls

   (d) Nuclear laminae

2. Under the influence of a uniform magnetic field a charge particle is moving in a circle of radius R with constant speed V. The time period of the motion

   (a) depends on R and not on V

   (b) depends on V and not on R

   (c) depends on both R and V

   (d) is independent of both R and V

3. A beam of electrons passes undeflected through mutually perpendicular electric and magnetic fields. If the electric field is switched off, and the same magnetic field is maintained, the electrons move

   (a) along a straight line

   (b) in an elliptical orbit

   (c) in a circular orbit

   (d) along a parabolic path

4. A transformer is used to light a 100 W and 110 V lamp from a 220 V mains. If the main current is 0·5 A, the efficiency of the transformer is approximately

   (a) 10%

   (b) 30%

   (c) 50%

   (d) 90%

5. If the enthalpy change for the transition of liquid water to steam is 30 kJ mol^{-1} at 27 °C, then the entropy change for the process would be

   (a) 100 J mol^{-1} K^{-1}

   (b) 10 J mol^{-1} K^{-1}

   (c) 1·0 J mol^{-1} K^{-1}

   (d) 0·1 J mol^{-1} K^{-1}

6. The resistance of 0·2 M solution of an electrolyte is 50 Ω. The specific conductance of the solution is 1·3 S m^{-1}. If the resistance of the 0·4 M solution of the same electrolyte is 260 Ω, its molar conductivity is

(a) 62·5 S $m^2 mol^{-1}$

(b) 6250 S $m^2 mol^{-1}$

(c) $6{\cdot}25 \times 10^{-4}$ S $m^2 mol^{-1}$

(d) 625×10^{-4} S $m^2 mol^{-1}$

7. A hollow metal sphere of radius 5 cm is charged such that the potential on its surface is 10 V. The potential at the centre of the sphere is

(a) zero

(b) 5 V

(c) 10 V

(d) 20 V

8. A beaker is filled to the brim with water and weighs 950 grams. A pure gold bar is dropped in the beaker upon which 50 ml water spills out of the beaker and the beaker now weighs 1·865 kg. What is the density of gold?

(a) 19·3

(b) 18·3

(c) 17·3

(d) 16·3

9. In a triangle ABC, $\angle B = \pi/2$ and $\angle C = \pi/4$. Let D divides BC internally in the ratio 1:3, then $\frac{\sin \angle BAD}{\sin \angle CAD}$ is equal to

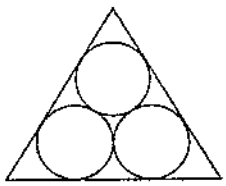
(a) $1/\sqrt{6}$

(b) $1/3$

(c) $1/\sqrt{3}$

(d) $\sqrt{2}/3$

10. The area of the equilateral triangle, in which three coins of radius 1 cm are placed, as shown in the figure, is



(a) $(6+4\sqrt{3})\text{cm}^2$

(b) $(4\sqrt{3}-6)\text{cm}^2$

(c) $(7+4\sqrt{3})\text{cm}^2$

(d) $4\sqrt{3}\,\text{cm}^2$

11. Ten different alphabets are given. Words with five alphabets are formed from these. Then the number of words which has at least one alphabet repeated is

(a) 69760

(b) 30240

(c) 99748

(d) 39520

12. Two events A and B have probabilities 0·25 and 0·50 respectively. The probability that both A and B occur simultaneously is 0·14. Then the probability that neither A nor B occurs is

(a) 0·11

(b) 0·25

(c) 0·39

(d) 0·86

13. The value of Y in the equation $56X + 8Y + 16 = 0$ is

(a) $7X + 2$

(b) $4{\cdot}5X - 2$

(c) $2X - 7$

(d) $-7X - 2$

14. All angles inside an octagon will add up to

(a) 1000°

(b) 1080°

(c) 1260°

(d) 1440°

15. The value of $[\{x^3 \cdot x^{-6}\} / \{x^2 \cdot x^{-3}\}]$ is

(a) x^{-2}

(b) x^{-3}

(c) $x^{4{\cdot}5}$

(d) x^{-4}

16. Which of the following compounds would have the highest boiling point?

(a) $CH_3CH_2CH_2CH_3$

(b) CH_3NH_2

(c) CH_3OH

(d) CH_2F_2

17. A complex compound in which the oxidation number of a metal is zero is

(a) $K_4[Fe(CN)_6]$

(b) $K_3[Fe(CN)_6]$

(c) $[Ni(CO)_4]$

(d) $[Pt(NH_3)_4]Cl_2$

18. 80 g of oxygen contains as many atoms as in

(a) 80 g of hydrogen

(b) 1 g of hydrogen

(c) 10 g of hydrogen

(d) 5 g of hydrogen

19. Which one of the following is a condensation polymer?

(a) PVC

(b) Polyethene

(c) Rubber

(d) Protein

20. What is the color of lead sulfide?

(a) White

(b) Light yellow

(c) Deep red

(d) Deep gray

21. Which one of the following compounds when dissolved in water would give acidic solution?

(a) KCl

(b) $NaHCO_3$

(c) $Ca(OH)_2$

(d) NH_4Cl

22. Which one of the following compounds has five carbon atoms?

(a) Pyridine

(b) Benzene

(c) Urea

(d) Diethyl ether

23. The overall goal of glycolysis, Krebs cycle and the electron transport system is the formation of

(a) nucleic acids

(b) ATP in small stepwise units

(c) ATP in one large oxidation reaction

(d) sugars

24. About 98 percent of the mass of every living organism is composed of just six elements including carbon, hydrogen, nitrogen, oxygen,

(a) calcium and phosphorus

(b) phosphorus and sulphur

(c) sulphur and magnesium

(d) magnesium and sodium

25. Which one of the following is a slime mould?

(a) Anabaena

(b) Rhizopus

(c) Physarum

(d) Thiobacillus

26. In gymnosperms, the pollen chamber represents

(a) the microsporangium in which pollen grains develop

(b) a cell in the pollen grain in which the sperms are formed

(c) a cavity in the ovule in which pollen grains are stored after pollination

(d) an opening in the megagametophyte through which the pollen tube approaches the egg

27. The function of leghaemoglobin in the root nodules of legumes is

(a) expression of nif gene

(b) inhibition of nitrogenase activity

(c) oxygen removal

(d) nodule differentiation

28. An important subcellular site for the formation of glycoproteins and glycolipids is

(a) lysosome

(b) vacuole

(c) golgi apparatus

(d) plastid

29. A mycoplasma is an organism with a diameter between 0·1 and 1·0 μm. What does the organism's size tell you about how it might be classified?

(a) It must be a single-celled fungus

(b) It could be almost any typical bacterium

(c) It could be a typical virus

(d) It could be a very small bacterium

30. Which organelle or structure is absent in plant cells?

(a) Golgi vesicles

(b) Microtubules

(c) Centrosomes

(d) Peroxisomes

PART—B

Answer *any* **seventy** questions

31. All of the following are components of peptidoglycan, *except*

(a) *N*-acetylglucosamine

(b) *N*-acetylmuramic acid

(c) lipopolysaccharide

(d) amino acid

32. Which form of transport occurs only in prokaryotes?

(a) Facilitated diffusion

(b) ABC transport

(c) Siderophore

(d) Group translocation

33. Which one of the following is typically evolved to survive multiple extreme environments?

(a) Extremophiles

(b) Halophiles

(c) Thermophiles

(d) Acidophiles

34. Which one of the following is NOT true about the two strands of DNA in a double helix?

(a) Base-pairing interaction

(b) antiparallel

(c) complementary

(d) catenated

35. Infections that are acquired during a stay in a hospital are called

(a) clinical

(b) nosocomial

(c) gnotobiotic

(d) resistant

36. In biostatistics, group of individuals taken for study is called as

(a) block

(b) population

(c) group

(d) flock

37. Variables whose values can be expressed numerically are called

(a) quantitative variables

(b) qualitative variables

(c) absolute variables

(d) continuous variables

38. Flower colour is a/an

(a) quantitative variable

(b) qualitative variable

(c) absolute variable

(d) continuous variable

39. Number of fruits in a tree is a/an

(a) quantitative variable

(b) discrete variable

(c) absolute variable

(d) continuous variable

40. If, after performing Student's t-test for comparison of means, we obtain $p = 0 \cdot 025$, then we

(a) can reject H_0

(b) can reject H_1

(c) can accept H_0

(d) cannot decide

41. Which one of the following is parametric test?

(a) ANOVA

(b) Kruskal-Wallis

(c) Wilcoxson

(d) Friedman's

42. Which one of the following is the correct way to measure on parametric test?

(a) Mean

(b) Standard deviation

(c) Median

(d) Mode

43. A clinical trial is more valuable when

(a) sensitivity is higher than specificity

(b) specificity is higher than sensitivity

(c) the sensitivity and specificity values are close, even equal, regardless of their values

(d) sensitivity and specificity have higher values

44. In how many ways can 5 students occupy 3 vacant seats?

(a) 30

(b) 40

(c) 50

(d) 60

45. The mean and mode of the numbers 4, 3, 2, 5, 3, 4, 5, 1, 7, 3, 2, 9 are

(a) 5 and 4

(b) 3 and 3

(c) 4 and 5

(d) 4 and 3

46. How many different sequences can be found in a polypeptide of four amino acid residues?

(a) 20^4

(b) 4^{20}

(c) 4^{16}

(d) 16^4

47. Let A be the 2×2 matrix with elements $a_{11} = a_{12} = a_{21} = 1$ and $a_{22} = -1$. Then the eigenvalues of the matrix A^{17} are

(a) 1024 and –1024

(b) $512\sqrt{2}$ and $-512\sqrt{2}$

(c) $256\sqrt{2}$ and $256\sqrt{2}$

(d) $1024\sqrt{2}$ and $1024\sqrt{2}$

48. Consider the following system of equations :

$$2x_1 + x_2 + x_3 = 0$$
$$x_2 - x_3 = 0$$
$$x_1 + x_2 = 0$$

This system has

(a) a unique solution

(b) no solution

(c) infinite number of solutions

(d) two solutions

49. The maximum value of $f(x) = 2x^3 - 9x^2 + 12x + 1$ in the interval [1, 6] is

(a) –36

(b) 6

(c) 1

(d) 2

50. Which one of the following integrals is unbounded?

(a) $\int_0^{\frac{\pi}{4}} \tan x \, dx$

(b) $\int_0^{\infty} \frac{1}{1+x^2} dx$

(c) $\int_0^{\infty} xe^{-x} \, dx$

(d) $\int_0^1 \frac{1}{1-x} dx$

51. What is the value of the definite integral

$$\int_0^4 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{4}-x}\,dx\ ?$$

(a) 0

(b) 1

(c) 2

(d) 8

52. If two fair coins are flipped and at least one of the outcomes is known to be head, what is the probability that both outcomes are head?

(a) 1/3

(b) 1/4

(c) 1/2

(d) 2/3

53. In an experiment, positive and negative values are equally likely to occur. The probability of obtaining at most one positive value in five trials is

(a) 1/32

(b) 2/32

(c) 3/32

(d) 6/32

54. How might solid sodium carbonate be obtained from sodium carbonate solution?

(a) Centrifugation

(b) Filtration

(c) Evaporation

(d) It cannot be extracted

55. What is the best description of blood?

(a) Sol

(b) Foam

(c) Solution

(d) Aerosol

56. Which one of the following dispersions does NOT have liquid continuous phase?

(a) Nanosuspension

(b) Microemulsion

(c) Gel

(d) Foam

57. Which one of the following sequences correctly describes the change in domain structure as more oil is added to a water-in-oil emulsion?

(a) Bicontinuous, spherical, cylinder-like

(b) Spherical, cylinder-like, bicontinuous

(c) Spherical, bicontinuous, cylinder-like

(d) Cylinder-like, spherical, bicontinuous

58. The scattering of light by coarse and colloidal dispersed systems is known as

(a) contrast matching

(b) DLVO theory

(c) Tyndall effect

(d) creaming

59. Which one of the following is NOT a mechanism for the separation of a physically unstable suspension of magnesium hydroxide in water?

(a) Flocculation

(b) Aggregation

(c) Ostwald ripening

(d) Hydrolysis

60. What must be done to a specimen to increase the contrast of the structures being viewed?

(a) Illuminated

(b) Stained

(c) Placed under a cover slip

(d) Thinly sliced

61. The field of view of a microscope with a 10X ocular and a 4X objective is 5 mm. What will be the field of view with a 10X objective?

(a) 3·14 mm^2

(b) 20 mm

(c) 2 mm

(d) 2 mm^2

62. For which of the following specimens would you use a dissecting microscope?

(a) Human skin cells

(b) *E.coli*

(c) Insect mouthparts

(d) Virus

63. Which one of the following is a characteristic of gamma radiation particle?

(a) Positively charged

(b) Negatively charged

(c) Has no charge and no mass

(d) Has low penetrating capability

64. ^{14}C has a half-life of 5730 years, how many grams of a 4·0 g sample would be left after 3·5 half-lives?

(a) 1 g

(b) 0·50 g

(c) 0·38 g

(d) 0·35 g

65. Before it travels through the earth's atmosphere, sunlight is mostly

(a) infrared radiation

(b) visible light

(c) ultraviolet radiation

(d) blue light

66. The difference in the light emitted from a candle, an incandescent light bulb, and the sun is basically from differences in

(a) energy sources

(b) materials

(c) temperatures

(d) phases of matter

67. The sky appears to be blue when the sun is high in the sky because

(a) blue is the colour of air, water and other fluids in large amounts

(b) red light is scattered more than blue

(c) blue light is scattered more than the other colours

(d) blue colour does not reach the earth

68. The ratio of the speed of light in a vacuum to the speed of light in some transparent materials is called

(a) the critical angle

(b) total internal reflection

(c) the law of reflection

(d) the index of refraction

69. A chemical was heated in dry form along with copper oxide and the emanating gasses were directed towards a solution of lime water. It was observed that the lime water turned turbid and affine precipitate was observed. This indicated that the original chemical had

(a) sulphur

(b) carbon

(c) chlorine

(d) nitrogen

70. A small quantity of a chemical was warmed with a small volume of concentrated sulphuric acid. Some gas was observed to emanate but the sample did not get blackened. It can be assumed that the sample is

(a) sucrose

(b) formate

(c) starch

(d) resorcinol

71. To an aqueous solution of a chemical, bromine water was added slowly. Initial discoloration was followed by formation of a yellowish-white precipitate was observed. The original chemical must be

(a) α-naphthol

(b) catechol

(c) hydroquinone

(d) phenol

72. A small quantity of a chemical was heated in a dry test tube till it melted. A solid was observed to form. Few drops of an alkaline copper sulphate solution was added. A purple coloration of the liquid was observed. The original chemical could not be

(a) oxamide

(b) peptide

(c) oxalic acid

(d) malonamide

73. The concentration of hydrogen ions in a solution of pH 3·75 would be

(a) $1{\cdot}8 \times 10^{-4} M$

(b) $10^{-4} M$

(c) $1{\cdot}8 \times 10^{-2} M$

(d) $3{\cdot}75 \times 10^{-1} M$

74. Equal masses of two liquids of densities 6 and 4 (units in kg/m^3) were mixed thoroughly. The density of the mixture would be

(a) 5 units

(b) 5·2 units

(c) 4·8 units

(d) 5·4 units

75. Enzymes help to lower the activation energies of reactions by

(a) covalent interaction with substrates

(b) binding only with solvent molecules

(c) changing reaction equilibria

(d) forming weak interaction with substrates

76. Which is the weakest acid among the following?

(a) H_2S

(b) Phenol

(c) H_2O

(d) NH_4^+

77. Which one of the following amines will form the strongest (stable and non-dissociating) compound with trimethyl boron?

(a) NH_3

(b) $(CH_3)_2NH$

(c) $(CH_3)_3N$

(d) $(C_2H_5)_3N$

78. An example of an epimerization reaction is

(a) conversion of glucose to galactose

(b) conversion of glucose to gluconic acid

(c) conversion of gulonic acid to gulonic acid lactone

(d) conversion of L-erythrose to D-erythrose

79. Which one of the following is NOT a monoterpene?

(a) Camphor

(b) Menthol

(c) Geraniol

(d) Cedrol

80. Which one of the following is a non-cyclic chemical?

(a) Squalene

(b) Progesterone

(c) Cholesterol

(d) Androst 4-ene 3,17-dione

81. An α-1,6-glycosidic bond is found in

(a) amylose

(b) cellulose

(c) chitin

(d) glycogen

82. Careful hydrolysis of diketopiperazines results in the formation of

(a) pyridine

(b) pepper

(c) dipeptide

(d) pyrrole

83. All L-amino acids possess *S*-configuration at the α-carbon, *except*

(a) L-Leucine

(b) L-Isoleucine

(c) L-Cysteine

(d) L-Lysine

84. Levulose is another name for

(a) D-(–)-Glucose

(b) D-(–)-Fructose

(c) D-(–)-Ribose

(d) D-(–)-Mannose

85. Methylation of glycogen and subsequent analysis of methylated glucose units yielded from one mole of glycogen, 10 moles of 2, 3, 4, 6 tetramethyl glucose units. Therefore the number of branches in this sample of glycogen should be

(a) 10

(b) 04

(c) 01

(d) 05

86. A protein was found to contain 0·204% as tryptophan (mol. wt. 204). The minimum molecular weight of the protein would be

(a) 204000

(b) 102000

(c) 100000

(d) 20400

87. In the benzyloxycarbonyl method for the synthesis of peptides, which one of the following is NOT formed?

(a) Toluene

(b) Carbon dioxide

(c) Carbon monoxide

(d) Unreacted amino acid

88. Which one of the following reagents is NOT useful to bind the free sulfhydryl groups in proteins?

(a) Ellman reagent

(b) Parachloromercury benzoate

(c) Iodoacetamide

(d) Ethylchloroformate

89. A bond with maximum covalent character between non-metallic elements is found between

(a) atoms of same size

(b) chemically similar atoms

(c) identical atoms

(d) atoms of widely differing electronegativities

90. The value of n in the molecular formula $Be_nAl_2Si_6O_{18}$ is

(a) 3

(b) 5

(c) 7

(d) 9

91. A follows first-order reaction, $(A) \rightarrow$ product :

Concentration of A changes from 0·1 M to 0·025 M in 40 minutes. Find the rate of reaction of A when concentration of A is 0·01 M.

(a) $1 \cdot 73 \times 10^{-4}\, M\ \text{min}^{-1}$

(b) $3 \cdot 47 \times 10^{-5}\, M\ \text{min}^{-1}$

(c) $3 \cdot 47 \times 10^{-4}\, M\ \text{min}^{-1}$

(d) $1 \cdot 73 \times 10^{-5}\, M\ \text{min}^{-1}$

92. The rate law for a reaction between the substances A and B is given by rate = $k[A]^n[B]^m$. On doubling the concentration of A and halving the concentration of B, the ratio of the new rate to the earlier rate of reaction will be

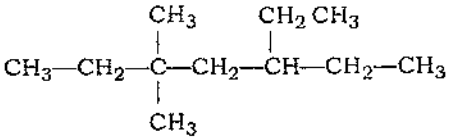
(a) $m+n$

(b) $n-m$

(c) $2^{(n-m)}$

(d) $\frac{1}{2}^{(m+n)}$

93. Which one of the following is the correct IUPAC name of complex compound?



(a) 3,3-Dimethyl-5-ethyl heptane

(b) 3-Ethyl-5,5-dimethyl heptane

(c) 5-Ethyl-3,3-dimethyl heptane

(d) 3,5-Diethyl-5-methyl heptane

94. Which one of he following is formed when glycerol is treated with phosphorus pentachloride?

(a) 1,2,3-Trichloropropane

(b) 1,2-Dichloropropane

(c) Isopropyl chloride

(d) Phosphoglycerate

95. With regard to enzymes, which one of the following statements is wrong?

(a) Enzymes lower the activation energy for the reaction they catalyze

(b) Enzymes are mostly proteins, but some RNAs possess catalytic ability, as do some antibodies

(c) Enzymes affect equilibrium of the reaction they catalyze

(d) Enzymes enhance the rate compared to the uncatalyzed reaction

96. Which one of the following is not an essential amino acid for humans?

(a) Valine

(b) Methionine

(c) Serine

(d) Threonine

97. Protein denaturation does not include

(a) loss of primary structure

(b) loss of secondary structure

(c) loss of tertiary structure

(d) decrease in water solubility

98. Ureotelic organisms do not excrete

(a) urea

(b) uric acid

(c) guanine

(d) ammonia

99. Which one of the following polysaccharides has β-1, 4 glycosidic bonds in its structure?

(a) Cellulose

(b) Starch

(c) Amylose

(d) Dextrin

100. Which one of the following is a mucopolysaccharide?

(a) Glycogen

(b) Starch

(c) Heparin

(d) Chitin

101. Gluconeogenesis refers to a metabolic process by which glucose is made from non-carbohydrate precursors. Which one of the following is NOT a precursor?

(a) Fumaric acid

(b) Oxaloacetic acid

(c) Pyruvic acid

(d) Leucine

102. Arachidonic acid has

(a) 2 double bonds

(b) 3 double bonds

(c) 4 double bonds

(d) no double bond

103. An amino acid precursor for heme is

(a) tyrosine

(b) tryptophan

(c) glycine

(d) leucine

104. The most important buffer in our blood plasma is

(a) phosphate

(b) bicarbonate

(c) citrate

(d) histidines

105. Which one of the following vitamins is NOT obtained from plants?

(a) Vitamin B_{12}

(b) Vitamin B_6

(c) Vitamin B_3

(d) Vitamin E

106. The caloric value for one gram of fat is

(a) 6

(b) 3

(c) 9

(d) 4

107. The most common defects found in DNA after exposure to UV light is

(a) double strand breaks

(b) pyrimidine dimers

(c) purine dimers

(d) base deletions

108. Gel filtration is an example of

(a) ion-exchange chromatography

(b) adsorption chromatography

(c) affinity chromatography

(d) molecular sieve chromatography

109. Which one of the following is NOT true about the cell theory?

(a) Its various parts were described by Schleiden, Schwann, and Virchow

(b) It states that all organisms are composed of cells

(c) It states that all cells come from preexisting cells

(d) It states that bacteria and other small organisms can arise spontaneously

110. Cellular organelles containing hydrolytic enzymes are called

(a) Lysosomes

(b) Peroxisomes

(c) Ribosomes

(d) Mesosomes

111. Na^+ and glucose transport is an example of

(a) facilitated diffusion

(b) ATP driven active transport

(c) symport

(d) antiport

112. Microfilaments are made of

(a) actin

(b) tubulin and actin

(c) desmin

(d) vimentin

113. Which one of the following motor proteins is NOT involved in the vesicular transport along the microtubule?

(a) Kinesin-1

(b) Kinesin-2

(c) Cytoplasmic dynein

(d) Kinesin-13

114. Which one of the following conditions is required to activate CDK during cell cycle?

(a) Dissociation from cyclins

(b) Translocation of CDKs from cytoplasm to nucleus

(c) Association with cyclins

(d) Increased concentration of CDKs in cells

115. The signals to commence DNA replication comes from

(a) S-CDKs

(b) ORC

(c) Destruction of CDC 25C

(d) Destruction of M-CDKs

116. Which one of the following components involves in shortening and thickening of chromosomes during M phase?

(a) Microtubules

(b) Actin and myosin

(c) Condensins

(d) Cohesins

117. Which one of the following is a common second messenger?

(a) cAMP

(b) GTPase

(c) ATP

(d) tRNA

118. Receptor for the NO is

(a) intercellular

(b) intracellular

(c) extracellular

(d) All of the above

119. A pyrimidine ring is NOT found in which of the following bases?

(a) Adenine

(b) Cytosine

(c) Thymine

(d) Uracil

120. The coding/sense strand during transcription is

(a) the newly formed mRNA strand

(b) the DNA strand identical to mRNA strand

(c) the DNA strand complementary to the mRNA strand

(d) the stretch of DNA within the RNA polymerase

121. Work by which of the following scientists showed that DNA is the genetic material in most living organisms?

(a) George Beadle and Edward Tatum

(b) Oswald Avery, Colin McLeod and Maclyn McCarty

(c) Linus Pauling and Frederick Sanger

(d) James Watson and Francis Crick

122. Which one of the following statements is *false*?

(a) Transcription and translation are coupled in prokaryotes

(b) Transcription occurs within the nucleus while translation occurs in the cytosol in eukaryotes

(c) Splicing reactions occur within the cytosol in eukaryotes

(d) Post-translation modifications occur within the golgi bodies and ER

123. A student wants to isolate DNA from the heart of a mouse. Which one of the following steps is NOT required during the isolation procedures?

(a) Use of a homogenizer

(b) Treatment with DNase

(c) Treatment with proteinase K

(d) Treatment with ribonuclease A

124. Which one of the following primers could be used in a reverse transcription PCR?

(a) Oligo (dA)

(b) Oligo (dT)

(c) Oligo (dC)

(d) Oligo (dG)

125. At pH 7, DNA is

(a) electrically neutral

(b) polyanionic

(c) polycationic

(d) polyampholytic

126. As there are 10 bases per turn of helix in the B form of DNA, each base pair rotates by an angle of

(a) 10°

(b) 22°

(c) 34°

(d) 36°

127. The consequence of a silent mutation is

(a) inactivation of a crucial protein

(b) no effect on the function of the protein

(c) improvement in the function of a protein

(d) non-transmission to the next generation

128. Which one of the following neurotransmitters is NOT derived from an amino acid?

(a) Serotonin

(b) Adrenaline

(c) Adenosine

(d) Histamine

129. Which one of the following structures is unique to neurons?

(a) Plasmalemma

(b) Synaptic vesicles

(c) Voltage-gated sodium channels

(d) Nissl granules

130. Which one of the following is an allergic reaction?

(a) Hay fever

(b) Malaria

(c) AIDS

(d) Elephantiasis

131. IgE is secreted by

(a) T lymphocytes

(b) B lymphocytes

(c) Mast cells

(d) Basophils

132. Which of the following cells are NOT involved in natural immunity?

(a) NK cells

(b) Neutrophils

(c) Macrophages

(d) Cytotoxic T cells

133. J-chain is associated with

(a) IgG1

(b) IgM

(c) IgE

(d) IgG4

134. If serum has circulating anti-A blood group antibodies, the blood group of the person would be

(a) A

(b) B

(c) AB

(d) AB, Rh^+

135. Coconut milk factor is

(a) an auxin

(b) a gibberellin

(c) an abscisic acid

(d) a cytokinin

136. Seed dormancy is due to the

(a) ethylene

(b) abscisic acid

(c) IAA

(d) starch

137. The annular and spirally thickened conducting elements generally developed in the protoxylem when the root or stem is

(a) elongating

(b) maturing

(c) differentiating

(d) widening

138. Which one of the following acids is a derivative of carotenoids?

(a) Abscisic acid

(b) Indole butyric acid

(c) Indole-3-acetic acid

(d) Gibberellic acid

139. 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

140. Due to low atmospheric pressure, the rate of transpiration will

(a) increase

(b) decrease rapidly

(c) decrease slowly

(d) remain unaffected

141. Guard cells help in

(a) transpiration

(b) protection against grazing

(c) fighting against infection

(d) guttation

142. Steroid hormones easily pass through the plasma membrane by simple diffusion, because they

(a) enter through pores

(b) contain carbon and hydrogen

(c) are water soluble

(d) are lipid soluble

143. Living cells of animals placed in isotonic solution (0·9% saline) retain their size and shape. This is based on the concept of

(a) facilitated diffusion

(b) diffusion

(c) osmosis

(d) transpiration

144. Transport of food material in higher plants takes place through

(a) tracheids

(b) transfusion tissues

(c) companion cells

(d) sieve elements

145. The word 'vaccination' is derived from the Latin word *vacca*, which means

(a) inject

(b) smallpox

(c) immunize

(d) cow

146. Which one of the following does NOT contain DNA or RNA?

(a) Prokaryote

(b) Virus

(c) Viroid

(d) Prion

147. Organisms which live symbiotically inside a larger organism are known as

(a) organelles

(b) cyanobacteria

(c) mitochondria

(d) endosymbionts

148. If an object and its surroundings absorb or reflect radiation equally, then the object will be

(a) undetectable

(b) reflected

(c) refracted

(d) radiated

149. Which is the counterstain in the Gram stain procedure?

(a) Crystal violet

(b) Methylene blue

(c) Malachite green

(d) Safranin

150. Observations of bacterial flagella during motility are best suited to

(a) bright-field microscopy

(b) dark-field microscopy

(c) SEM

(d) TEM

★ ★ ★

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK