3

QUESTION PAPER SERIES CODE
A

Centre Name : _____

Roll No. : _____

Name of Candidate : _____

S A U

Entrance Test for M.Sc. (Biotechnology), 2014

[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) *PLEASE DO NOT ATTEMPT MORE THAN 70 QUESTIONS IN PART—B. IF YOU ATTEMPT MORE THAN 70 QUESTIONS, ONLY first 70 WILL BE EVALUATED.*

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

(vii) 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.

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

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

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

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

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

INSTRUCTIONS FOR MARKING ANSWERS IN THE 'OMR SHEET'

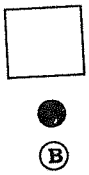
Use BLUE/BLACK Ballpoint Pen Only

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.



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. There will be no negative marking in evaluation.
10. Write your six digits 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
⓪	⓪	⓪	⓪	⓪	●

PART—A

1. The sum total of all chemical reactions occurring in the body is called

   (a) anabolism

   (b) catabolism

   (c) metabolism

   (d) carboxylation

2. Insects have

   (a) 2 pairs of legs

   (b) 3 pairs of legs

   (c) 4 pairs of legs

   (d) 1 pair of legs

3. Lysosomes are reservoirs of

   (a) hydrolytic enzymes

   (b) secretory glycoproteins

   (c) RNA and proteins

   (d) fats

4. Mitotic spindle fibers are composed of

   (a) microtubules

   (b) centromeres

   (c) centrosomes

   (d) kinetochores

5. Maximum energy per unit mass is produced by oxidation of

   (a) carbohydrates

   (b) proteins

   (c) fats

   (d) minerals

6. Which of the following metabolites links glycolytic pathway and Krebs cycle pathway?

(a) Pyruvic acid

(b) Glucose

(c) Acetyl CoA

(d) ATP

7. An antidiuretic substance

(a) increases free water reabsorption

(b) increases water release

(c) increases Na^+ reabsorption

(d) decreases urea synthesis

8. The ultimate source of energy in an ecosystem is

(a) glucose

(b) ATP

(c) nucleic acid

(d) sunlight

9. Identify X in the following reaction :

$$_0n^1 + {}_7N^{14} \rightarrow {}_1H^1 + X$$

(a) Oxygen

(b) Carbon

(c) Nitrogen

(d) Boron

10. According to Pauli exclusion principle, each orbital in an atom can be occupied by

(a) two electrons with opposite spin

(b) two electrons with parallel spin

(c) one electron and one positron

(d) an unlimited number of electrons

11. The maximum number of electrons that can be accommodated in the *p*-orbitals is

(a) 3

(b) 4

(c) 6

(d) 8

12. Gibbs free energy of a spontaneous process

(a) is negative

(b) is positive

(c) is zero

(d) can be either negative or positive

13. During a neutron scattering experiment, the neutron beam interacts with the

(a) atomic nuclei

(b) outer shell electrons

(c) electrons in an ionized atom

(d) proton alone

14. Heat produced in an electrical circuit is

(a) directly proportional to the square of resistance

(b) directly proportional to the square of current

(c) inversely proportional to current

(d) inversely proportional to resistance

15. Which of the following bonds is the most ionic?

(a) Cs—Cl

(b) Al—Cl

(c) C—Cl

(d) H—Cl

16. The molecule which has zero dipole moment is

(a) CH_2Cl_2

(b) BF_3

(c) NF_3

(d) ClO_2

17. When the pH of a solution is 2, the hydrogen ion concentration in moles per liter is

(a) 1×10^{-14}

(b) 1×10^{-2}

(c) 1×10^{-7}

(d) 1×10^{-12}

18. Carbon reacts with metal to form

(a) carbide

(b) carbonate

(c) hydroxide

(d) oxide

19. Which of the following will turn limewater milky?

(a) CO_2

(b) CO

(c) NO_2

(d) Cl_2

20. Isomers have the same

(a) structural formula

(b) chemical properties

(c) molecular formula

(d) physical properties

21. The number of possible alcohol isomers for $C_4H_{10}O$ is

(a) 4

(b) 2

(c) 3

(d) 5

22. The molecule in which the distance between the two adjacent carbon atoms is largest is

(a) ethane

(b) ethene

(c) acetylene

(d) benzene

23. $\int_{-1}^{2} \left| t^2 - t \right| dt$ is

(a) $\frac{7}{6}$

(b) $\frac{5}{6}$

(c) $\frac{9}{6}$

(d) $\frac{11}{4}$

24. In a class of 80 students, there are 25 girls and 55 boys; out of which 10 students are rich and the rest are poor. In 80 students, 20 are of fair complexion. Find the probability of getting a rich girl of fair complexion.

(a) $\frac{5}{512}$

(b) $\frac{5}{525}$

(c) $\frac{4}{512}$

(d) None of the above

25. If $\frac{dy}{dx} = xe^{x-y}$, then y is

(a) $x + \log(x + 1)$

(b) $x^2 + \log(x + 1)$

(c) $x + \log(x - 1)$

(d) $x - \log(x + 1)$

26. Rahul is two years younger than Rekha, and Pawan is three years older than Rekha. The product of Rahul's age and Pawan's age is 66. How old is Rekha?

(a) 6 years

(b) 7 years

(c) 8 years

(d) 11 years

27. $\log [(xyz) / 100]$ is same as

(a) $1/100 [\log x + \log y + \log z]$

(b) $\log x \cdot \log y \cdot \log z - 2$

(c) $\log x - \log y - \log z + \log 100$

(d) $\log x + \log y + \log z - 2$

28. The mean of 12 numbers is 48. Removing one of the numbers causes mean to decrease to 45. The removed number is

(a) 81

(b) 93

(c) 92

(d) 80

29. The expression $\cos 80^\circ \cos 70^\circ + \sin 80^\circ \sin 70^\circ$ is equivalent to

(a) $\cos 10^\circ$

(b) $\cos 150^\circ$

(c) $\sin 10^\circ$

(d) $\sin 150^\circ$

30. A solid sphere of wax with diameter 10 cm was carved out of a cube of wax having each side of 15 cm. Remaining material was melted and molded into another solid sphere. Which of the following values is nearest to the radius of the new sphere?

(a) 5·77 cm

(b) 6·89 cm

(c) 8·77 cm

(d) 8·99 cm

PART—B

Answer *any* **seventy** questions

31. A line makes an angle 30° with X-axis. The slope of the line is

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

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

(c) $1/3$

(d) $2/3$

32. Two dice are tossed simultaneously. What is the probability of getting a sum at least 10?

(a) $1/4$

(b) $1/6$

(c) $1/3$

(d) $2/3$

33. $\vec{A} \cdot (\vec{A} \times \vec{B})$ equals to

(a) 1

(b) 0

(c) $\vec{A}$

(d) $\vec{B}$

34. A system of 5 linear equations in 5 unknowns is said to be consistent, if it has

(a) at least 1 solution

(b) 5 solutions

(c) maximum 5 solutions

(d) no solution

35. If $f(x) = [x]$ denotes the greatest integer function defined on the interval (0, 4), then the function f is discontinuous at

(a) 2 points

(b) 3 points

(c) 5 points

(d) all points of the interval

36. The function $f(x) = 2x + 6$ is

(a) only one-one

(b) only onto

(c) one-one as well as onto

(d) neither one-one nor onto

37. The function $f(x) = |x - 1|$ is differentiable at

(a) $x = 1$

(b) $x = 0, 1$

(c) all points except $x = 0$

(d) all points except $x = 1$

38. The value of the integral $\int_0^{\pi/2} \sin^2 x \cos^2 x \, dx$ is

(a) 1/16

(b) 1/8

(c) $\pi/16$

(d) $\pi/8$

39. $\lim_{x \to 0} \frac{x - \sin x}{x^3}$ equals to

(a) 0

(b) 1

(c) 1/6

(d) 1/3

40. The derivative of $2^{\sin x}$ is

(a) $\sin x \, 2^{\sin x - 1}$

(b) $\sin x \cos x \, 2^{\sin x - 1}$

(c) $\log 2 \cos x \, 2^{\sin x - 1}$

(d) $\log 2 \cos x \, 2^{\sin x}$

41. The glancing angle of a Bragg reflection from a set of crystal planes separated by 97·3 pm is 19·85 degree. The wavelength of the X-ray is

(a) 32 pm

(b) 64 pm

(c) 66 pm

(d) 48 pm

42. How many normal modes of vibration are there for N_2O?

(a) 9

(b) 3

(c) 4

(d) 6

43. Which one of the following is related to phosphorescence?

(a) Internal conversion

(b) Intersystem crossing

(c) Solvent relaxation

(d) None of the above

44. Circular dichroism can help to detect which of the following?

(a) Change in handedness

(b) Change in mass

(c) Change in colour

(d) Change in viscosity

45. Resolution of a light microscope can be increased by

(a) reducing the wavelength

(b) increasing the wavelength

(c) decreasing the refractive index

(d) changing the aperture of the lens

46. Flux is amount of material passing through

(a) a unit area per unit time

(b) a unit volume per unit time

(c) a unit volume

(d) a unit area

47. The number of times the DNA helix crosses itself on a planar projection is

(a) twist

(b) writhe

(c) linking number

(d) supercoiling number

48. Diffusion constant is

(a) inversely proportional to temperature

(b) inversely proportional to particle radius

(c) directly proportional to viscosity

(d) directly proportional to square of temperature

49. To test a categorical vs. categorical variable, which one of the following tests is used?

(a) Paired *t*-test

(b) Unpaired *t*-test

(c) Chi-square test

(d) ANOVA test

50. Which one of the following tests is a non-parametric test?

(a) Student's *t*-test

(b) Mann-Whitney *U* test

(c) McNemar test

(d) ANOVA test

51. In which one of the following statistical study designs, the outcome is not known?

(a) Cross-sectional study

(b) Case control study

(c) Case report study

(d) Cohort study

52. Following are the marks obtained in Mathematics class by the students :

15 students obtained 30 marks
20 students obtained 40 marks
15 students obtained 50 marks

What is the mean of the marks obtained by that class?

(a) 50

(b) 40

(c) 45

(d) 35

53. A bag has 5 white balls and 3 black balls. What are the chances of getting 2 black balls, when 2 balls are taken out of the bag at a time?

(a) 3/8

(b) 2/7

(c) 3/28

(d) 8/15

54. How many different sequences may be generated for a natural tetrapeptide?

(a) 160000

(b) 80000

(c) 8000

(d) 80

55. Which one of the following is not a type of chi-square test?

(a) Goodness of fit

(b) Contingency

(c) Paired

(d) Homogeneity

56. Variance is

(a) square root of standard deviation

(b) square of standard deviation

(c) square of standard error of the mean

(d) square root of standard error of the mean

57. In a pie chart, the data has been presented in the form of

(a) bar

(b) column

(c) line

(d) circle

58. If you divide a given data into quartiles, how many different quartiles will you get?

(a) 4

(b) 3

(c) 1

(d) 2

59. The cross AaBb × aabb is called as

(a) dihybrid cross

(b) backcross

(c) test cross

(d) reciprocal cross

60. Full pod shape (C) is dominant to constricted pod shape (c) and yellow pod colour (G) is dominant to green pod colour (g) in pea plants. What is the genotype of a yellow plant with a constricted pod?

(a) CCgg

(b) CCGG

(c) CcGg

(d) ccGG

61. How many chromosomes and chromatids are there in metaphase I of meiosis in human beings?

(a) 46, 46

(b) 23, 92

(c) 23, 46

(d) 46, 92

62. If a fruit fly is a normal diploid for its autosomes but has one *X* and no *Y* chromosome, to what sex does it belong?

(a) Male

(b) Female

(c) Intersex

(d) Metafemale

63. In an interrupted mating experiment, gene a first appears at 12 minutes, gene b first appears at 7 minutes and gene c first appears at 5 minutes. What is the order in which these genes are present in the bacterial genome?

(a) a b c

(b) c b a

(c) c a b

(d) b c a

64. Segmental genes in *Drosophila* are turned on by

(a) σ factors

(b) autoregulation

(c) morphogens

(d) homeotic genes

65. The largest molecule in a cell is

(a) DNA

(b) lipid

(c) protein

(d) RNA

66. Zinc finger nucleases are used in

(a) DNA replication

(b) *in vitro* transcription

(c) gene targeting

(d) chemical processing of zinc

67. The subunit of prokaryotic ribosomes is

(a) 50S + 30S

(b) 60S + 40S

(c) 70S + 30S

(d) 60S + 30S

68. The distribution of intrinsic proteins in the cell membrane is

(a) symmetrical

(b) asymmetrical

(c) uniform

(d) random

69. The major amino acid(s) in histone is/are

(a) aspartic acid

(b) lysine

(c) arginine, histidine and lysine

(d) histidine alone

70. All of the following hormones can cross cell membrane, except

(a) estrogen

(b) insulin

(c) progesterone

(d) thyroxine

71. The major interaction responsible for stabilizing plasma membrane is

(a) ionic bond

(b) covalent bond

(c) hydrophobic interaction

(d) hydrophilic interaction

72. Which of the following stains is used to visualize mitochondrion?

(a) Janus green

(b) Acetocarmine

(c) Haematoxylin

(d) Orange G

73. Membrane around the vacuole is called

(a) tonoplast

(b) cytoplast

(c) amyloplast

(d) vacuoloplast

74. Modification of proteins and lipids as glycopeptides and lipoproteins occurs in

(a) ribosome

(b) Golgi apparatus

(c) smooth endoplasmic reticulum

(d) proteasome

75. Lysosomal membrane is rich in

(a) cardiolipin

(b) sterols

(c) sialic acid

(d) proteolytic enzyme

76. Microfilaments are made up of

(a) actin

(b) tubulin and actin

(c) desmin

(d) vimentin

77. Cilia and flagella of eukaryotic cells are made up of

(a) keratin

(b) tubulin

(c) actin

(d) lamin

78. The non-sister chromatids twist around and exchange segments with each other during

(a) leptotene

(b) diakinesis

(c) diplotene

(d) pachytene

79. At pH 7·4, glutamic acid will have

(a) one positive charge and two negative charges

(b) one negative charge and two positive charges

(c) two negative charges and one uncharged group

(d) two positive charges and one uncharged group

80. If the average length of a covalent bond is 2 angstrom, the extended length of a 100-amino acid polypeptide chain, in angstrom unit, would be

(a) 200

(b) 198

(c) 598

(d) 400

81. The pH of 1 *M* HCl solution when diluted 100 million times would be

(a) 8

(b) close to 8

(c) between 2 and 3

(d) close to 7

82. Who among the following scientists is associated with the discovery of vitamins?

(a) Karl Folkers

(b) Frederick Hopkins

(c) Herbert Evans

(d) Fritz Lipmann

83. Which one of the following phenomena is the best and 'exceptionless' description of the living state?

(a) Growth

(b) Reproduction

(c) Metabolism

(d) Consciousness of environment

84. Secondary structure of a protein differs from other-level structures with respect to hydrogen bond in the sense that

(a) the hydrogen bonds are between the side chain groups

(b) the hydrogen bonds, at least in alpha helical regions, are along the chain within the primary structure

(c) it lacks any hydrogen bond

(d) the hydrogen bonds do not stabilize any structure

85. Starch, unlike cellulose, is stained by iodine. This can be ascribed to the presence of

(a) glycosidic bonds in starch

(b) helical secondary structure due to α-glycosidic bonds

(c) 1,4-glycosidic bonds

(d) β-1, 4-glycosidic bonds

86. The first-order reactions occurring within cells of our body are characterized by the following, except

(a) the reaction velocity is proportional to the initial concentration of the substrate

(b) the concentration of the substrate reduces by half in equal durations of time at any place along the decay curve

(c) the reaction velocity is independent of the initial concentration of the substrate

(d) half-life and decay constant are constant

87. The most abundant enzyme in the biosphere is

(a) ornithine decarboxylase

(b) pyruvate carboxylase

(c) PEP carboxy kinase

(d) ribulose 1,5-*bis*-phosphate carboxylase

88. A post-translational modification would be

(a) methylation of cytosine

(b) sulphation of tyrosine

(c) N-glycosylation of asparagine

(d) cleavage of signal peptide in ER

89. Which of the following is the correct order of development in a mammal?

(a) Zygote, Blastula, Gastrula, Morula

(b) Zygote, Morula, Gastrula, Blastula

(c) Zygote, Morula, Blastula, Gastrula

(d) Zygote, Blastula, Morula, Gastrula

90. The lens of the eye is derived from

(a) embryonic endoderm

(b) embryonic mesoderm

(c) embryonic ectoderm

(d) archenteron

91. An example of energy reserve found in annelids, such as earthworm, is

(a) lactate

(b) phosphoarginine

(c) phosphocreatine

(d) lombricine

92. Fermentation reactions carried out by a cell occur in

(a) cytosol

(b) mitochondrial matrix

(c) intermembrane space of mitochondria

(d) extracellular space

93. Functional characteristics that have arisen as a result of common evolutionary descent are said to be

(a) homogeneous

(b) homologous

(c) contiguous

(d) parallel traits

94. Science dealing with the application of laws of heredity towards the improvement of human race is called

(a) euthenics

(b) eugenics

(c) euphenics

(d) ethnology

95. In humans and in most mammals, an initial 'deciduous' set of teeth is replaced by a completely new set of 'permanent' teeth. However, in most other vertebrates and in the mammals, such as kangaroos and elephants, teeth are replaced continuously. Such animals are known as

(a) regenerative

(b) heterodont

(c) polyphyodont

(d) acrodont

96. The first feature of infection of a malaria within the erythrocyte is characterized by the presence of

(a) signet ring

(b) haemozoin

(c) Schüffner's dots

(d) micromerozoite

97. The final stage of metamorphosis in the life cycle of a silkworm is known as

(a) larva

(b) chrysalis

(c) imago

(d) moth

98. The dental formula of humans is given as

(a) 2.1.2.3/2.1.2.3

(b) 2.1.1.4/2.1.1.4

(c) 1.2.2.3/1.2.2.3

(d) 2.2.1.3/2.2.1.3

99. Flowering or seed-bearing plants are known as

(a) Thallophyta

(b) Bryophyta

(c) Pteridophyta

(d) Phanerogams

100. A pneumatophore, in plants such as *Avicennia germinans*, assists the plant in

(a) absorption of nutrients

(b) respiration

(c) storage of food

(d) providing mechanical support

101. The embryo sac in a flower is located within

(a) micropyle

(b) nucellus

(c) chalaza

(d) funicle

102. Pollination through bats is known as

(a) cantharophily

(b) ornithophily

(c) cheroptirophily

(d) phalaenophily

103. Cytoplasm of adjacent plant cells is capable of transmitting nutrients via

(a) gap junction

(b) cytopore

(c) porin

(d) plasmodesmata

104. The enzyme invertase converts

(a) starch into dextrin and maltose

(b) sucrose into glucose and fructose

(c) hemicellulose into glucose

(d) inulin into fructose

105. An essential element of the oxygen-evolving complex or the water-splitting complex is

(a) magnesium

(b) manganese

(c) molybdenum

(d) iron-sulfur center

106. Which of the following adaptations is a characteristic of xerophytes?

(a) Modification of the stem into phylloclade

(b) Presence of large numbers of air cavities filled with oxygen and carbon dioxide in the stem

(c) Modification of specialized root structures into pneumatophores

(d) Feebly developed root system with absence of root hairs and root caps

107. Fungi are usually classified on the basis of their sexual reproductive structures and their characteristics. Unicellular fungi such as yeast (*Saccharomyces*), antibiotic-producing *Penicillium* and the common laboratory model organism *Neurospora* all form spores, usually 8 in number, endogenously in a sac. In which of the following taxonomic groups are all of the organisms placed?

(a) Ascomycota

(b) Basidiomycota

(c) Zygomycota

(d) Glomeromycota

108. Interferon protects cells from

(a) bacterial infection

(b) viral infection

(c) parasite infection

(d) worm infestation

109. Which of the following is a property of basophils?

(a) Secretion of IgG

(b) Secretion of IgE

(c) Have IgE receptors

(d) Have membrane-associated IgA

110. Constant Ig domains do not have

(a) internal disulphide bonds

(b) hypervariable regions

(c) beta-pleated secondary structure

(d) essential amino acids

111. How many protein chains are there in a pentameric IgM molecule?

(a) 5

(b) 6

(c) 19

(d) 21

112. Triple helix structure is seen in

(a) antibody molecules

(b) hemoglobin

(c) collagenase enzyme

(d) collagen

113. Gram-positive cells have a

(a) thick capsule that traps the crystal violet stain

(b) periplasmic space that traps the crystal violet stain

(c) second outer membrane that helps to retain the crystal violet stain

(d) multiple layers of peptidoglycan that help to retain the crystal violet stain

114. Teichoic acids are typically found in

(a) cell walls of gram-positive bacteria

(b) outer membrane of gram-positive bacteria

(c) cell walls of gram-negative bacteria

(d) outer membrane of gram-negative bacteria

115. Peptidoglycan is found only in the bacterial

(a) cell membrane

(b) glycocalix

(c) cell wall

(d) spore

116. Which of the following organisms has sterols in their cytoplasmic membrane?

(a) Clostridium

(b) Proteus

(c) Mycoplasma

(d) Bacillus

117. The location where the bacterial chromosome concentrates is called

(a) nucleus

(b) nuclein

(c) nucleoid

(d) nuclease

118. The disease that affects many people at different countries is termed as

(a) sporadic

(b) pandemic

(c) epidemic

(d) endemic

119. The mode of reproduction in Mycoplasma is

(a) budding

(b) bursting

(c) binary fission

(d) binary fusion

120. Higher dose of chloramphenicol affects eukaryotic cells due to the presence of

(a) 30S ribosome

(b) 70S ribosome

(c) 60S ribosome

(d) 40S ribosome

121. Boiling points of organic compounds cannot be higher than

(a) 100 °C

(b) 180 °C

(c) 350 °C

(d) 600 °C

122. When an ionic compound dissolves in a polar solvent, the type of linkage between the two could be

(a) ion-dipole bond

(b) ion-ionic bond

(c) hydrogen bond

(d) polar-polar bond

123. The weakest base among the following is

(a) NH_3

(b) OH^-

(c) H_2O

(d) NH_4^+

124. sp^3-hybridized orbitals can be observed in

(a) methane

(b) ethylene

(c) acetylene

(d) benzene

125. The energy barrier for rotation around a single covalent bond is 3 kcal/mol. Hence ethane would be expected to remain mostly in

(a) staggered conformation

(b) eclipsed conformation

(c) both the conformations in equal duration

(d) None of the above as rotation is not possible

126. In a homologous series of alkanes, the boiling point for each addition of carbon increases approximately by

(a) 30 °C

(b) 10 °C

(c) 40 °C

(d) 52 °C

127. Which of the following statements is wrong about Grignard reagent?

(a) It is a product of an alkyl halide with Mg

(b) It is the Mg salt of an extremely weak acid

(c) Water serves as the proton donor

(d) Alkanes cannot be prepared using Grignard reagent

128. Which one of the following is not a greenhouse gas?

(a) CO_2

(b) N_2

(c) Chlorofluorocarbon

(d) CH_4

129. Which one of the following can be obtained by fermentation of leucine, an amino acid?

(a) Isopentyl alcohol

(b) *n*-butanol

(c) Isoleucine

(d) Isopropanol

130. The breakdown of fructose 1,6-*bis*-phosphate into glyceraldehyde-3-phosphate and dihydroxy acetone phosphate is akin to

(a) Walden inversion

(b) aldol condensation

(c) reverse of the aldol condensation

(d) phosphorolysis of glycogen

131. An example of *cis-trans* isomerization reaction can be observed when light is

(a) perceived by pineal gland

(b) received by retina of mammals

(c) received by eye lens

(d) received by skin cells in making vitamin D

132. Biocatalysts differ from inorganic catalysts in the sense that

(a) biocatalysts lower activation energy

(b) biocatalysts do not affect the equilibrium constant

(c) biocatalysts work at room temperature

(d) biocatalysts increase the rate of the reaction

133. The number of isomers possible for a compound having three asymmetric carbon atoms is

(a) 8

(b) 6

(c) 12

(d) 16

134. Rubber is a plant product. It is chemically a polymer of

(a) monoterpene

(b) isopentene

(c) anhydro galactose

(d) amino isobutene

135. Fluorodinitrobenzene has been used for

(a) nucleic acid sequencing

(b) protein sequencing

(c) carbohydrate sequencing

(d) sequencing of rubber

136. *p*-toluene sulphonyl chloride can be used to affect the enzymatic activity of

(a) proteases like trypsin

(b) lipases like phospholipase C

(c) transaminases

(d) racemoses

137. The cell walls of fungi and the exoskeleton of insects have which of the following in common?

(a) Cellulose

(b) Chitin

(c) Protein

(d) Starch

138. Benzaldehyde can be converted into mandelic acid via

(a) oxidation of aldehyde group

(b) cyanohydrin formation

(c) reduction of aldehyde into alcohol

(d) addition of methylene group

139. Transesterification is catalyzed by

(a) phospholipases

(b) hormone-sensitive lipases

(c) fungal lipases

(d) β-amylases

140. Claisen condensation of acetone with ethyl acetate yields

(a) 2,5-pentanedione

(b) 2,3-pentanedione

(c) 3,4-pentanedione

(d) 2,4-pentanedione

141. *para*-bromoaniline can be made from aniline by

(a) direct bromination of aqueous bromine followed by selective deamination

(b) selective but direct bromination at para position

(c) acetanilide formation followed by bromination and hydrolysis

(d) bromination followed by acetanilide formation for selective labilization of bromine

142. An indicator of end point in acid-base titrations and also an azo compound is

(a) phenolphthalein

(b) methyl orange

(c) bromocresol purple

(d) bromophenol blue

143. A proteinaceous amino acid containing an indole group in its strcture is

(a) indole acetic acid

(b) tryptophan

(c) histidine

(d) serotonin

144. Pairs of compounds given below bear structural similarity, except

(a) vitamin A and β-carotene

(b) cholesterol and cortisone

(c) melanin and tyrosine

(d) riboflavin and folic acid

145. William Bragg and Lawrence Bragg determined the three-dimensional structure of sodium chloride. Who among the following got Nobel Prize for determining the tertiary structure of vitamin B_{12} and also insulin, a polypeptide hormone?

(a) Max Perutz

(b) John Kendrew

(c) DC Phillips

(d) Dorothy Hodgkin

146. Radioactive decay of $_1H^3$ represents an example

(a) for second-order reaction

(b) for zero-order reaction

(c) where half-life is not constant

(d) for β-particle emission

147. Langmuir isotherm explains the phenomenon of

(a) absorption

(b) pyrolysis

(c) adsorption

(d) temperature effect on surfaces

148. Tarnishing of silver ornaments in atmosphere is due to the formation of

(a) $AgNO_3 \cdot Ag_2S$

(b) $Ag_2O \cdot Ag_2S$

(c) $AgOH \cdot Ag_2CO_3$

(d) Ag_2S alone

149. Which one of the following compounds will not be reduced when heated with hydrogen gas?

(a) Cupric oxide

(b) Ferric oxide

(c) Stannic acid

(d) Aluminium oxide

150. A container in which heat and mass are not exchanged with environment is named

(a) an isolated system

(b) a closed system

(c) an open system

(d) a system in equilibrim

★★★