AIM NEET Part Test-09

TOPIC COVERED

Physics:	Dual Nature of Radiation and Matter, Atoms, Nuclei, Semiconductor Electronics: Materials, Devices and Simple Circuits
Chemistry:	Amines, Biomolecules, Polymers, Chemistry in Everyday Life
Botany:	Ecosystems Solutions Biodiversity and Conservation, Environmental Issues
Zoology:	Biotechnology: Principles and Processes, Biotechnology and its Applications, Strategies for Enhancement in Food Reproduction

Duration: 3 hr 20 min
Date: 01/06/2022

Max Marks: 720

General Instructions:

- The test will contain 200 Questions of Physics, Chemistry, Botany, and Zoology & The test will be objective type. (Attempt only 180).
- Every subject contains two Section A-35 Questions and Section B-15 Questions (Attempt only 10).
- All 35 Questions of Section-A are Compulsory to attempt.
- Time given for test is 200 minutes.
- Marking is +4 for every correct answer, –1 for every wrong answer.
- You can reattempt the test in case of any technical issue.
- Test will start at 2:00 pm and students can attempt test at any time of their own preferences

PHYSICS

SECTION - A

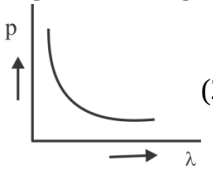
1. Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current if the frequency is halved and intensity is doubled?

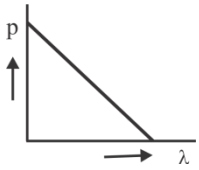
(1) Four times (2) One-fourth
(3) Zero (4) Doubled

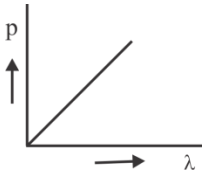
2. The photoelectric threshold wavelength of silver is 3250×10^{-10} m. The velocity of the electron ejected from a silver surface by ultraviolet light of wavelength 2536×10^{-10} m is

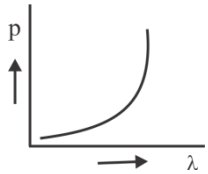
(1) $\approx 0.6 \times 10^5$ ms^{-1}
(2) $\approx 61 \times 10^3$ms^{-1}
(3) $\approx 0.3 \times 10^6$ ms^{-1}
(4) $\approx 6 \times 10^5$ ms^{-1}

3. Which of the following figure represents the variation of particle momentum and the associated de-Broglie wavelength?

(1) 

(2) 

(3) 

(4) 

4. When the energy of the incident radiation is increased by 20%, the kinetic energy of the photoelectrons emitted from a metal surface increased from 0.5 eV to 0.8 eV. The work function of the metal is

(1) 0.65 eV (2) 1.0 eV
(3) 1.3 eV (4) 1.5 eV

5. For photoelectric emission from certain metal the cut-off frequency is ν. If radiation of frequency 2ν impinges on the metal plate, the maximum possible velocity of the emitted electron will be: (m is the electron mass)

(1) $2\sqrt{\frac{h\nu}{m}}$ (2) $\sqrt{\frac{h\nu}{(2m)}}$
(3) $\sqrt{\frac{h\nu}{m}}$ (4) $\sqrt{\frac{2h\nu}{m}}$

6. If the momentum of an electron in change *P*, then the de Broglie wavelength associated with it changes by 0.5%. The initial momentum of electron will be:

(1) 200 P (2) 400 P
(3) P/200 (4) 100 P

7. In photoelectric emission process from a metal of work function 1.8 eV. The kinetic energy of most energetic electrons is 0.5 eV. The corresponding stopping potential is:

(1) 1.8 V (2) 1.3 V
(3) 0.5 V (4) 2.3 V

8. A 5 watt source emits monochromatic light of wavelength 5000Å. When placed 0.5 m away, it liberates photoelectrons from a photosensitive metallic surface. When the source is moved to a distance of 1.0 m, the number of photoelectrons liberated will be reduced by a factor of

(1) 8 (2) 16
(3) 2 (4) 4

9. Light of wavelength 3000 Å in photoelectric effect gives electrons of max. K.E. 0.5 eV. If wavelength change to 2000 Å then max K.E. of emitted electrons will be:

(1) Less than 0.5 eV
(2) 0.5 eV
(3) Greater than 0.5 eV
(4) PEE does not occurs

10. Ultraviolet radiations of 6.2 eV falls on an aluminium surface. Kinetic energy of fastest electron emitted is (work function = 4.2 eV)

(1) 3.2×10^{-21} J (2) 3.2×10^{-19} J
(3) 7×10^{-25}J (4) 9×10^{-32} J

11. The total energy of an electron in the n^{th} stationary orbit of the hydrogen atom can be obtained by

(1) $E_n = -\frac{13.6}{n^2}\text{eV}$

(2) $E_n = -\frac{1.36}{n^2}\text{eV}$

(3) $E_n = -13.6 \times n^2\,\text{eV}$

(4) $E_n = \frac{13.6}{n^2}\text{eV}$

12. If an electron in a hydrogen atom jumps from the 3^{rd} orbit to the 2^{nd} orbit, it emits a photon of wavelength λ. When it jumps from the 4^{th} orbit to the 3^{rd} orbit, the corresponding wavelength of the photon will be:

(1) $\frac{20}{7}\lambda$ (2) $\frac{20}{13}\lambda$
(3) $\frac{16}{25}\lambda$ (4) $\frac{9}{16}\lambda$

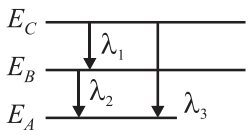
13. Out of the following which one is not a possible energy for a photon to be emitted by hydrogen atom according to Bohr's atomic model?

(1) 1.9 eV (2) 11.1 eV
(3) 13.6 eV (4) 0.65 eV

14. The wavelength of the first line of Lyman series for hydrogen atom is equal to that of the second line of Balmer series for a hydrogen like ion. The atomic number Z of hydrogen like ion is:

(1) 3 (2) 4
(3) 1 (4) 2

15. Energy levels *A*, *B* and *C* of a certain atom correspond to increasing values of energy i.e., $E_A < E_B < E_C$. If λ_1, λ_2 and λ_3 are wavelengths of radiations corresponding to transitions *C* to *B*, *B* to *A* and *C* to *A* respectively, which of the following relations is correct?



(1) $\lambda_3 = \lambda_1 + \lambda_2$
(2) $\lambda_3 = (\lambda_1\lambda_2)/(\lambda_1 + \lambda_2)$
(3) $\lambda_1 + \lambda_2 + \lambda_3 = 0$
(4) $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

16. According to Bohr's principle, the relation between principle quantum number (n) and radius of orbit (r) is

(1) $r \propto \frac{1}{n}$ (2) $r \propto \frac{1}{n^2}$
(3) $r \propto n$ (4) $r \propto n^2$

17. Of the following pairs of species which one will have the same electronic configuration for both members?

(1) Li^+ and Na^+ (2) He and Ne^+
(3) H and Li (4) C and N^+

18. The energy equivalent of 0.5 g of a substance is:

(1) 4.5×10^{13}J (2) 1.5×10^{13} J
(3) 0.5×10^{13} J (4) 4.5×10^{16} J

19. When a uranium isotope $^{235}_{92}\text{U}$ is bombarded with a neutron, it generates $^{89}_{36}\text{Kr}$ three neutrons and :

(1) $^{91}_{40}\text{Zr}$ (2) $^{101}_{36}\text{Kr}$
(3) $^{103}_{36}\text{Kr}$ (4) $^{144}_{56}\text{Ba}$

20. The half-life of a radioactive sample undergoing α – decay is 1.4×10^{17} s. If the number of nuclei in the sample is 2.0×10^{21}, the activity of the sample is nearly.

(1) 10^5 Bq (2) 10^6 Bq
(3) 10^3 Bq (4) 10^4 Bq

21. What happens to the mass number and atomic number of an element when it emits γ-radiation?

(1) Mass number and atomic number remain unchanged

(2) Mass number remains uncharged while atomic number decreases by one

(3) Mass number increases by four and atomic number increases by two

(4) Mass number decreases by four and atomic number decreases by two

22. α – particle consists of:

(1) 2 protons and 2 neutrons only

(2) 2 electrons, 2 protons and 2 neutrons

(3) 2 electrons and 4 protons only

(4) 2 protons only

23. For transistor action. Which of the following is correct?

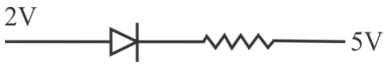
(1) Base, emitter and collector region should have same size.

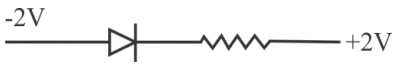
(2) Both emitter junction as well as the collector junction are forward biased.

(3) The base region must be very thin and lightly doped.

(4) Base, emitter and collector regions should have same doping concentrations.

24. Out of the following which one is a forward biased diode?

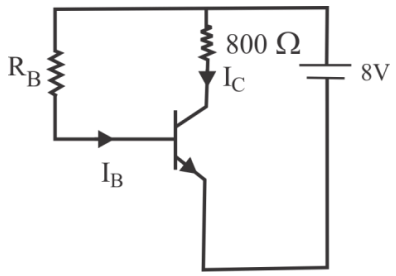
(1) 

(2) 

(3) 

(4) 

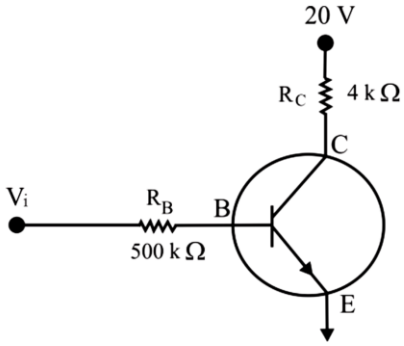
25. A n-p-n transistor is connected in common emitter configuration (see figure) in which collector voltage drop across load resistance (800 Ω) connected to the collected circuit is 0.8 V. The collector current is



(1) 0.1 mA (2) 1 mA

(3) 0.2 mA (4) 2 mA

26. In the circuit shown in the figure. The input voltage V_i is 20 V, $V_{BE} = 0$ and $V_{CE} = 0$. The values of I_B, I_C and β are given by



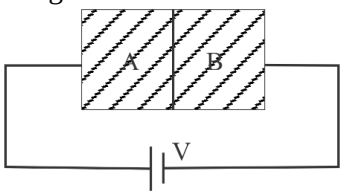
(1) $I_B = 20\ \mu A$, $I_C = 5$ mA, $\beta = 250$

(2) $I_B = 25\ \mu A$, $I_C = 5$ mA, $\beta = 200$

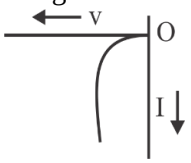
(3) $I_B = 40\ \mu A$, $I_C = 10$ mA, $\beta = 250$

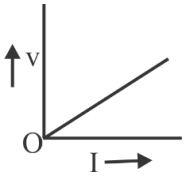
(4) $I_B = 40\ \mu A$, $I_C = 5$mA, $\beta = 125$

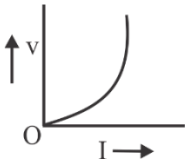
27. Two sides of a semiconductor germanium crystal A and B are doped with arsenic and indium respectively. They are connected to a battery as shown in figure.

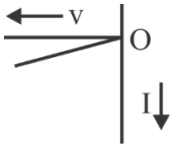


The correct graph between current and voltage for the arrangement is:

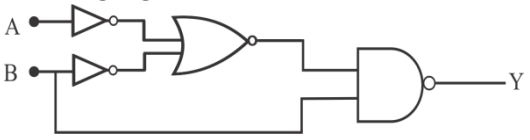
(1) 

(2) 

(3) 

(4) 

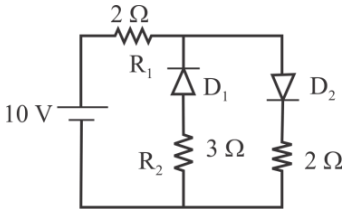
28. From the circuit of the following logic gates, the basic logic gate obtained is:



(1) NAND gate (2) AND gate

(3) OR gate (4) NOT gate

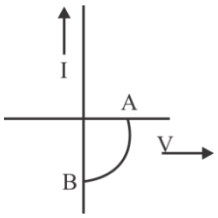
29. The given circuit has two ideal diodes connected as shown in the figure below. The current flowing through the resistance R_1 will be:



(1) 1.43 A (2) 3.13 A
(3) 2.5 A (4) 10.0 A

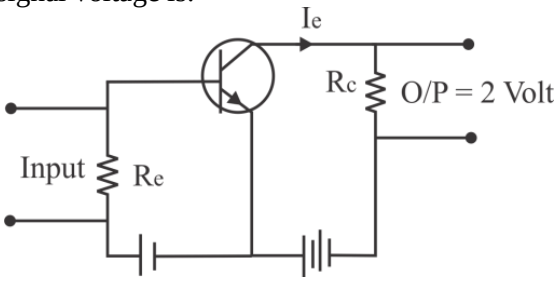
30. The barrier potential of a p-n junction depends on:
(a) Type of semiconductor material
(b) Amount of doping
(c) Temperature
Which one of the following is correct?
(1) a and b only (2) b only
(3) b and c only (4) a, b and c

31. The given graph represents V-I characteristic for a semiconductor device



Which of the following statement is correct?
(1) It is V-I characteristic for solar cell where point A represents open circuit voltage and point B short circuit current
(2) It is a for a solar cell and points A and B represent open circuit voltage and current, respectively
(3) It is for a photo diode and point A and B represents pen circuit voltage and current, respectively
(4) It is for a LED and points A and B represents open circuit. Voltage and short circuit current

32. In a CE transistor amplifier. The audio signal voltage across the collector resistance of 2 kΩ is 2V. If the base resistance is 1 kΩ and the current amplification of the transistor is 100. The input signal voltage is:



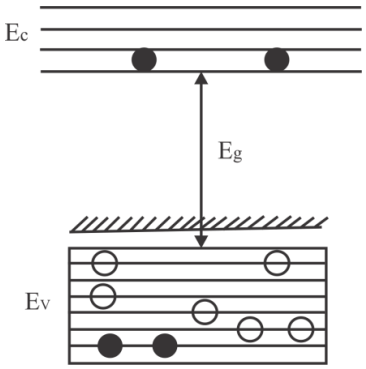
(1) 0.1 V (2) 1.0 V
(3) 1 mV (4) 10 mV

33. For transistor action
1. Base, emitter and collector regions should have similar size and doping concentration
2. The base region must be very thin and lightly doped.
3. The emitter-base junctions is forward biased and base-collector junction is reverse biased.
4. Both the emitter-base junction as well as the base collector junction are forward biased.

Which one of the following pairs of statements is correct?
(1) 4, 1 (2) 1, 2
(3) 2, 3 (4) 3, 4

34. Which of the following statement is False?
(1) The resistance of intrinsic semiconductor decreases with increase of temperature
(2) Pure Si doped with trivalent impurities give a p-type semiconductor
(3) Majority charge Carrier in a *n*-type semiconductor are holes
(4) Minority charge carriers in a *p*-type semiconductor are electrons

35. In the energy band diagram of a material shown below, the open circles and filled circles denote holes and electrons respectively. The material is:



(1) An insulator
(2) A metal
(3) An *n*-type semiconductor
(4) A *p*-type semiconductor

SECTION – B
(ATTEMPT ANY 10 QUESTIONS)

36. If radius of the $^{27}_{13}Al$ nucleus is taken to be R_{Al}, then the radius of $^{125}_{53}Te$ nucleus is nearly:

(1) $\frac{5}{3}R_{Al}$ (2) $\frac{3}{5}R_{Al}$
(3) $\left(\frac{13}{53}\right)^{1/3}R_{Al}$ (4) $\left(\frac{53}{13}\right)^{1/3}R_{Al}$

37. A nucleus $^{A}_{Z}X$ has mass represented by M(A,Z). If M_p and M_n denote the mass of proton and neutron respectively and B.E. the binding energy is MeV, then:
(1) B.E. = $[ZM_P + (A–Z)M_n – M(A, Z]c^2$
(2) B.E. = $[Z_{Mp} + Z_{Mn} – M(A, Z)]c^2$
(3) B.E = $M(A, Z) – Z_{Mp} – (A–Z)M_n$
(4) B.E = $[M(A, Z)–Z_{Mp} – (A–Z)M_n]c^2$

38. The binding energy of deuteron is 2.2 MeV and that of ^4_2He is 28 MeV. If two deuteron are fused to from one ^4_2He then the energy released is:

(1) 21.6 MeV (2) 23.6 MeV
(3) 17.2 MeV (4) 28.2 MeV

39. Fission of nuclei is possible because the binding energy per nucleon in them:

(1) Increase with mass number at high mass numbers
(2) Decreases with mass number at high mass numbers
(3) Increase with mass number at low mass numbers
(4) Decreases with mass number at low mass numbers

40. A nuclear reaction given by
$_ZX^A \rightarrow {}_{Z+1}Y^{A+} + {}_{-1}e^0 + \bar{\upsilon}$ represents:

(1) β – decay (2) γ – decay
(3) Fusion (4) Fission

41. Half-life of radioactive element is 12.5 hour and its quantity is 256 gm. After how much time its quantity will remain 1 gm:

(1) 50 Hrs (2) 100 Hrs
(3) 150 Hrs (4) 200 Hrs

42. Solar energy is due to

(1) Fusion reaction
(2) Fission reaction
(3) Combustion reaction
(4) Chemical reaction

43. The half-life of radium is 1600 years. The fraction of a sample of radium that would remain after 6400 years

(1) 1/4 (2) 1/2
(3) 1/8 (4) 1/16

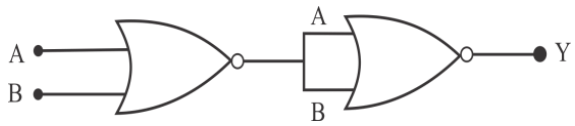
44. The ratio of the radii of the nuclei $_{13}Al^{27}$ and $_{52}Te^{125}$ approximately

(1) 6 : 10 (2) 13 : 52
(3) 40 : 177 (4) 14 : 73

45. The nucleus $^{115}_{48}Cd$, after two successive β – decay will give

(1) $^{115}_{46}Pa$
(2) $^{114}_{49}In$
(3) $^{113}_{50}Sn$
(4) $^{115}_{50}Sn$

46. In the following circuit, the output Y for all possible inputs A and B is expressed by the truth table:



	A	B	Y
(1)	0	1	1
	0	1	1
	1	0	1
	1	1	0
(2)	0	0	1
	0	1	0
	1	0	0
	1	1	0
(3)	0	0	0
	0	1	1
	1	0	1
	1	1	1
(4)	0	0	0
	0	1	0
	1	0	0
	1	1	1

47. Carbon, silicon and germanium atoms have four valence electrons each. Their valence and conduction bands are separated by energy band gaps represented by $(E_g)_C$, $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationships is true is their case?

(1) $(E_g)_C > (E_g)_{Si} > (E_g)_{Ge}$
(2) $(E_g)_C = (E_g)_{Si} = (E_g)_{Ge}$
(3) $(E_g)_C < (E_g)_{Ge} < (E_g)_{Si}$
(4) $(E_g)_C < (E_g)_{Si} < (E_g)_{Ge}$

48. In semiconductors at a room temperature:

(1) The valence band is completely filled and the conduction band is partially filled
(2) The valence band is completely filled
(3) The conduction band is completely empty
(4) The valence band is partially empty and the conduction band is partially filled

49. The correct relation for α and β for a transistor:

(1) $\beta = \frac{1-\alpha}{\alpha}$ (2) $\beta = \frac{\alpha}{1-\alpha}$

(3) $\alpha = \frac{\beta-1}{\beta}$ (4) $\alpha\beta = 1$

50. Common emitter circuit is used as amplifier, its current gain is 50. If input resistance is 1 kΩ and input voltage is 5 volt then output current will be:

(1) 250 mA (2) 30 mA
(3) 50 mA (4) 100 mA

CHEMISTRY

SECTION-A

51. In a set of reaction propanoic acid yielded compound (D):

$$CH_3CH_2COOH(A) \xrightarrow{SOCl_2} (B) \xrightarrow{NH_3} (C) \xrightarrow[Br_2]{KOH} (D)$$

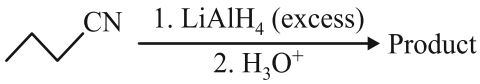
The formula of (D) is:

(1) $CH_3CH_2CH_2NH_2$

(2) $CH_3CH_2CONH_2$

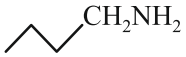
(3) $CH_3CH_2NHCH_3$

(4) $CH_3CH_2NH_2$

52. 

Product formed in the above mentioned reaction is:

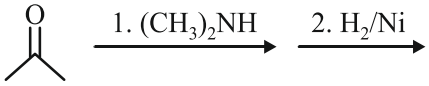
(1) 

(2) 

(3) 

(4) 

53. The product of the following sequence of reaction is



(1) 1° amine (2) 2° amine

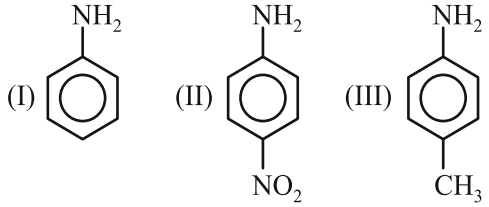
(3) 3° amine (4) 4° amine

54. In curtius reaction, acyl chloride is made to react with sodium azide to form amine. The gas evolved in the process is?

(1) H_2 (2) O_2

(3) NO_2 (4) N_2

55. The correct increasing order of basic strength for the following compounds is:



(1) III < I < II

(2) III < II < I

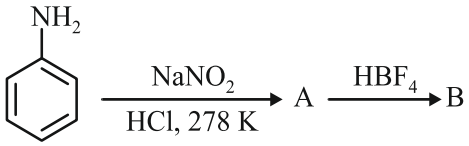
(3) II < I < III

(4) II < III < I

56. The melting point is highest for

(1) Primary amines (2) Secondary amines

(3) Tertiary amines (3) Quaternary amines

57. 

the compounds 'A' and 'B' respectively are:

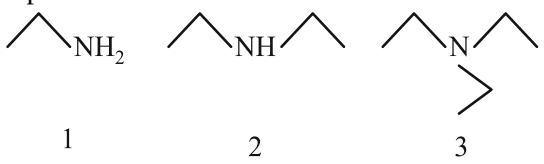
(1) Nitrobenzene and chlorobenzene

(2) Nitrobenzene and fluorobenzene

(3) Phenol and benzene

(4) Benzene diazonium chloride and fluorobenzene

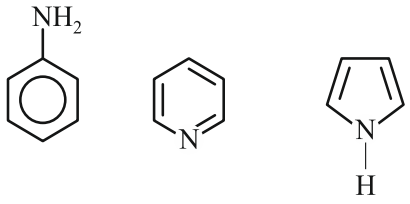
58. The basic strength order for the following compounds in water is?



(1) 1 > 2 > 3 (2) 3 > 2 > 1

(3) 2 > 3 > 1 (4) 2 > 1 > 3

59. The basic strength order for the following compounds is?



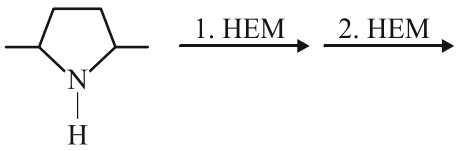
(1) 1 > 2 > 3

(2) 3 > 2 > 1

(3) 2 > 1 > 3

(4) 2 > 3 > 1

60. The total number of π-bonds in the final product is?



(1) 1 (2) 2

(3) 3 (4) 4

61. Which of the following is a basic amino acid?

(1) Glycine (2) Alanine

(3) Leucine (4) Lysine

62. The potential value of pH of acidic amino acid is?

(1) 3 (2) 7

(3) 10 (4) 12

63. Which amino acid does not contain a chiral center?
(1) Valine (2) Leucine
(3) Glycine (4) Iso-leucine

64. Which reagent can be used to distinguish between D-glucose and D-fructose?
(1) Schiff's reagent
(2) Bromine water
(3) Tollens reagent
(4) 2,4-DNP

65. During denaturation of protein, the structure which doesn't get affected is?
(1) Primary (2) Secondary
(3) Tertiary (4) Quaternary

66. Sucrose is an example of:
(1) Monosaccharide (2) Disaccharide
(3) Trisaccharide (4) Tetrasaccharide

67. The total number of sterioisomers of aldopentose is?
(1) 2 (2) 4
(3) 6 (4) 8

68. The type of linkage present in maltose is?
(1) $C_1 - C_2$ α-glucosidic linkage
(2) $C_1 - C_4$ α-glucosidic linkage
(3) $C_1 - C_2$ β-glucosidic linkage
(4) $C_1 - C_4$ β-glucosidic linkage

69. Which of the following is a reducing sugar?
(1) Maltose (2) Sucrose
(3) Starch (4) Cellulose

70. The disaccharide present in the milk is
(1) Maltose (2) Lactose
(3) Sucrose (4) Cellulose

71. Polymerization of chloroethylene gives the polymer:
(1) Polythene
(2) Teflon
(3) PVC
(4) Nylon

72. Which of the following an example of semi-synthetic polymer?
(1) Starch (2) Rayon
(3) Nylon (4) Cellulose

73. Bakelite is the example of?
(1) Elastomer (2) Thermoplastic
(3) Thermosetting (4) Fibre

74. The catalyst which helps in the production of high density polythene is?
(1) Lindlar's (2) H_2/Ni
(3) Ziegler Natta (4) V_2O_5

75. Buna-S is formed by the combination of
(1) Butadiene + Styrene
(2) Butadiene + Acrylonitrile
(3) Isoprene + Styrene
(4) Isoprene + Acrylonitrile

76. The total number of carbon atoms involved in Nylon-6-10 is?
(1) 06 (2) 10
(3) 16 (4) 20

77. Which of the following is an example of Biodegradable Polymer ?
(1) TEFLON (2) Polythene
(3) PHBV (4) Melamine

78. Commonly used antiseptic 'Dettol' is a mixture of
(1) o-chlorophenozylenol + terpeneol
(2) o-cresol + terpeneol
(3) phenol + terpeneol
(4) chloroxylenol + terpineol

79. Which of the following is water-soluble?
(1) Vitamin E
(2) Vitamin K
(3) Vitamin A
(4) Vitamin B

80. Which one of the following is employed as a tranquilizer?
(1) Naproxen
(2) Tetracycline
(3) Chlorpheniramine
(4) Equanil

81. Which one of the following is employed as Antihistamine?
(1) Chloroamphenicol
(2) Diphenhydramine
(3) Norothindrone
(4) Omeprazole

82. Chloroamphenicol is an:
(1) Antifertility drug
(2) Antihistaminic
(3) Antiseptic and Disinfectant
(4) Antibiotic-broad Spectrum

83. Sulpha drugs are derivatives of:
(1) Benzenesulphonic acid
(2) Sulphanilic acid
(3) Sulphanilamide
(4) *p*-Aminobenzoic acid

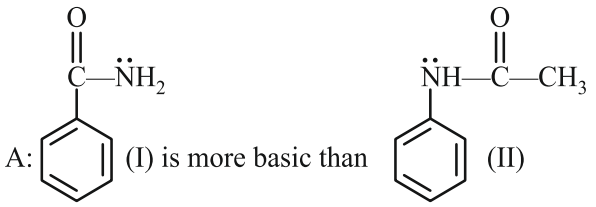
84. Which one of the following can possibly be used as an analgesic without causing addiction and mood modification?
(1) Diazepam
(2) Morphine
(3) N-Acetyl-para-aminophenol
(4) Tetrahydrocannabinol

85. Which of the following is the main component of bathing soap?
(1) Caustic potash
(2) Glycerine
(3) Potassium glycolate
(4) Potassium stearate

SECTION – B
(ATTEMPT ANY 10 QUESTIONS)

86. The degree of amine which can liberate N_2 gas on reaction with HNO_2 is
(1) 1° (2) 2°
(3) 3° (4) 4°

87. The degree of amine which doesn't react with Hinsberg reagent is
(1) 1° (2) 2°
(3) 3° (4) None

88. 
A: (I) is more basic than (II)

R: Delocalisation of lone pair of electrons decreases the basic strength:
(1) Both Assertion and Reason are true but the reason is not the correct explanation of the assertion
(2) Assertion is a true statement but Reason is false
(3) Both Assertion and Reason are true and the reason is the correct explanation of the assertion
(4) Both Assertion and Reason are false statements

89. The reagent used to convert acetamide into methyl amine is-
(1) $NaOH / Br_2$ (2) Soda lime
(3) Hot conc. H_2SO_4 (4) PCl_5

90. Match the reaction given in Column I with the statements given in Column II.

	Column I		Column II
A.	Ammonolysis	1.	Amine with a lesser number of carbon atoms
B.	Gabriel phthalimide synthesis	2.	Detection test for primary amines
C.	Hoffmann Bromamide reaction	3.	Reaction of phthalimide with KOH and R–X
D.	Carbylamine reaction	4.	Reaction of alkyl halides with NH_3

Codes:

	A	B	C	D
(1)	2	3	4	1
(2)	3	1	5	2
(3)	5	4	3	2
(4)	4	3	1	2

91. Which of the following has maximum Sweetness?
(1) Glucose (2) Fructose
(3) Sucrose (4) Maltose

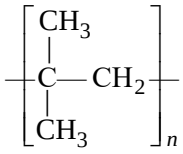
92. Which of the following does not give silver mirror with Tollen's reagent?
(1) Sucrose (2) Glucose
(3) Factose (4) Lactose

93. The change in optical rotation of a freshly prepared solution of glucose with time is called _____
(1) Specific rotation (2) Optical inversion
(3) Muta rotaton (4) Racemisation

94. Alanine is _____
(1) an enzyme
(2) purine base of nucleic acid
(3) hormone
(4) α-amino acid

95. Phospholipids are esters of glycerol with _____
(1) three phosphate groups
(2) three carboxylic acid residues
(3) two carboxylic acid residues and one phosphate groups
(4) one carboxylic acid and residues and one phosphate groups

96. Terylene is a condensation polymer of ethylene glycol and:
(1) benzoic acid (2) phthalic acid
(3) salicylic acid (4) terephthalic acid

97. Monomer of  is:

(1) 2-methyl propene
(2) styrene
(3) propylene
(4) ethane

98. Which one of the following is not a condensation polymer?

(1) Melamine (2) Glyptal
(3) Dacron (4) Neoprene

99. In basic dyes which of the following group is present?

(1) $-NO_2$
(2) $-SO_3OH$
(3) $-OH$
(4) $-NH_2$

100. Choose the fever reducing drug?

(1) Sedatives
(2) Antiseptic
(3) Antipyretic
(4) Antidepressant

BOTANY

SECTION - A

101. ..... are used in electrostatic precipitator on which charged suspended particle settles.

Choose the most appropriate option to fill in the blank.

(1) Catalysts
(2) Absorbers
(3) Electrodes
(4) Positive charge plates

102. The noise pollution is bring under air prevention and control of pollution act in

(1) 1985 (2) 1990
(3) 1975 (4) 1987

103. The amount of biodegradable organic matter in sewage water can be estimated by measuring

(1) Chemical oxygen demand
(2) biochemical oxygen demand
(3) inorganic pollutant
(4) the growth of Fungi in water

104. Bharat norms or Euro norms are implemented to reduce …… in petrol and diesel

(1) Phosphorus and Aromatic hydrocarbon
(2) Sulphur and Aromatic hydrocarbon
(3) Carbon and Aromatic hydrocarbon
(4) Phosphorus and Sulphur

105. Accumulation of inorganic non-biodegradable substance in higher member of food chain is

(1) Ozone depletion
(2) Eutrophication
(3) biomagnification
(4) algal bloom

106. Person associated with integrated organic farming is

(1) Ahmed khan
(2) Ramesh chandar dagar
(3) Amrita devi
(4) Paul Ehrlich

107. High level radioactive waste can be managed in which of the following ways?

(1) Open dumping
(2) Degradation in pit
(3) open burning
(4) Dumping in sealed containers

108. Integrated waste water management system involve

(1) only treatment in marshes
(2) Sewage treatment and then treatment through marshes
(3) primary and secondary treatment only
(4) involve filtration only

109. Indian government recently instituted 'Amrita Devi Bishnoi Award'. This is awarded to individuals and communities from rural areas involved in

(1) wildlife protection and conservation
(2) water management
(3) Pollution reduction
(4) tree plantation

110. Joint Forest Management concept was introduced in India during

(1) 1970s (2) 1980s
(3) 1990 (4) 1960s

111. Scientist related to ecosystem services is

(1) R.constanza
(2) Ehrlich
(3) Edward Wilson
(4) David Tilman

112. Green muffling material is to reduce

(1) soil pollution (2) water pollution
(3) Noise pollution (4) all of the above

113. Animal group which is under maximum threat of extinction

(1) Gymnosperm (2) Amphibian
(3) Mammals (4) Algae

114. From the following options select options with all heavy metal

(1) mercury, cadmium, copper, lead,
(2) magnesium, cadmium, copper, lead,
(3) mercury, cadmium, copper, potassium
(4) mercury, cadmium, copper, sulphur

115. Method of treatment of E-waste is

(1) land fills
(2) Incineration
(3) Recycling
(4) all

116. Kalyan sona and sonalika variety of wheat plant is an example of
(1) species diversity
(2) genetic diversity
(3) ecological diversity
(4) none of the above

117. Which of the following represents maximum number of species among global biodiversity?
(1) Algae (2) Lichens
(3) Fern (4) Angiosperm

118. India is one of the 'twelve' megadiversity countries with ..... of genetic resources of the world.
(1) more than 50 percent
(2) less than 10 percent
(3) more than 10 percent
(4) more than 80 percent

119. The country or region with greatest biodiversity on earth is
(1) New York (2) Greenland
(3) Colombia (4) England

120. The value of 'Z' lies in the range of ..... regardless of the taxonomic group or the region. The most appropriate value to fill the blank is
(1) 0.5 to 0.7 (2) 0.3 to 0.7
(3) 0.2 to 0.3 (4) 0.1 to 0.2

121. Mark the correct statement
(1) Discovered species number is greater than undiscovered
(2) Temperate region is more stable than tropical
(3) Mollusca show maximum biodiversity than any other invertebrates
(4) In vivo conservation is done by sacred grooves

122. Parthenium was introduced by mistake with imported wheat, it is an example of
(1) disturbance and degradation
(2) coextinctions
(3) alien species invasions
(4) overexploitation

123. According to rivet popper hypothesis, wings of airplane is analogous to
(1) Species
(2) Keystone species
(3) Stability of ecosystem
(4) extinction of species

124. Most of the biodiversity hotspot is present -
(1) On equator
(2) In temperate region
(3) between 23.5 degree north to 23.5 degree south
(4) at poles

125. Species-Area relationship was given by
(1) David Tilman
(2) Alexander von Humboldt
(3) Edward Wilson
(4) Malthus

126. Benefits of ecosystem not comes in narrow utilitarian is
(1) pollination (2) Drugs
(3) Timber wood (4) Fruits and pulses

127. Example of species of mammals which already extinct
(1) Passenger pigeon
(2) Dodo
(3) Bali, javan and Caspian
(4) thylacine

128. Which of the following is incorrect for humus
(1) black colour
(2) Amorphous
(3) Microbial resistant and undergo fast decomposition
(4) reservoir of mineral

129. Green algae belong to trophic level
(1) T_1 (2) T_2
(3) T_3 (4) T_4

130. Decomposers like fungi and bacteria are
(i) Autotrophs (ii) Active on inorganic
(iii) Saprotrophs (iv) helpful in recycling
Choose the correct answer:
(1) iv and iii (2) i and iv
(3) ii and iii (4) i and ii

131. Herbivore represent
(1) Primary consumers
(2) Secondary and tertiary consumers
(3) Secondary consumers
(4) Secondary producer

132. Ecosystem having the highest primary productivity is
(1) Pond
(2) Ocean
(3) Desert
(4) Forest

133. Energy and nutrients enter a community through
(1) Producers (2) Primary consumers
(3) Decomposers (4) Sunlight

134. Which is correct about GPP and NPP in ecosystem?
(1) NPP = GPP
(2) NPP = GPP + Plant respiration
(3) NPP = GPP – respiration
(4) NPP = GPP + respiration

135. Which of the following is true for primary succession

(1) occur in deforested land
(2) soil formation already occurred
(3) Slow process
(4) Previous succession propagule present

SECTION – B
(ATTEMPT ANY 10 QUESTIONS)

136. The zone of atmosphere in which bad ozone layer is present is called

(1) ionosphere (2) mesosphere
(3) stratosphere (4) troposphere

137. Which of the following protocols did aim for reducing emission of chlorofluorocarbons into the atmosphere?

(1) Kyoto protocol
(2) Gothenburg protocol
(3) Geneva protocol
(4) Montreal protocol

138. One of the main reasons of soil erosion in India is

(1) farming
(2) deforestation
(3) drought conditions
(4) temperature

139. Deforestation will decrease

(1) Soil erosion (2) Land slides
(3) Soil fertility (4) Rainfall

140. Forests take part in

(1) Control of atmospheric pollution
(2) Prevention of soil erosion
(3) Maintenance of natural balance
(4) All of the above

141. The Amazon rain forest harbouring probably millions of species is being cut and cleared for

(1) Cultivating soya beans
(2) Conservation to grasslands for raising beef cattle
(3) Playing cricket/IPL
(4) Both 1 and 2

142. The alien species (Nile perch) introduced into Lake Victoria in

(1) South Africa
(2) North America
(3) South America
(4) East Africa

143. The Earth Summit held in Rio de Janeiro in 1992 was called

(1) for conservation of biodiversity and sustainable utilisation of its benefits
(2) to assess threat posed to native species by invasive weed species
(3) for immediate steps to discontinue the use of CFCs that were damaging the ozone layer
(4) to reduce CO_2 emissions and global warming

144. Where was the World Summit on Sustainable development held?

(1) South Africa (2) USA
(3) South Korea (4) UK

145. Which one of the following is not a functional unit of an ecosystem?

(1) Energy flow
(2) Decomposition
(3) Productivity
(4) Standing state

146. Maximum primary productivity occur in oceans in

(1) Coral reef
(2) Estuaries
(3) Temperate ocean
(4) tropical ocean

147. The process of breaking down complex organic matter into inorganic substances like CO_2, water and nutrient is called

(1) humification (2) mineralization
(3) decomposition (4) leaching

148. The organic substances, which decompose slowest are

(1) Starch (2) Sugar
(3) Protein (4) Chitin

149. The rate of decomposition is quicker when detritus is rich in

(1) nitrogen and sugar
(2) phosphorus and sugar
(3) calcium and sugar
(4) both (2) and (3)

150. The green plants in an ecosystem which can trap solar energy to convert it into chemical bond energy are called

(1) producer
(2) decomposer
(3) consumer
(4) predators

ZOOLOGY

SECTION - A

151. Choose the **mismatched** pair from given options.

(1) Insertional - β-galactosidase inactivation
(2) plasmid - extra chromosomal chromosome
(3) retrovirus - Plant cell
(4) Ti plasmid - *Agrobacterium tumefaciens*

152. Which of the following is called molecular scissors in context of biotechnology?

(1) DNA ligase
(2) Restriction exonucleases
(3) DNA polymerase
(4) Restriction endonucleases

153. Which of the following is **not** correctly matched for the organism and its cell wall degrading enzyme?

(1) Tomato - Cellulase
(2) *Aspergilus* - Chitinase
(3) *Pseudomonas* - Amylase
(4) *Escherichia* - Lysozyme

154. Which of the following recognition site is for *EcoRI*?

(1)
5′–G↓G–A–T–C–C–3′
3′–C–C–T–A–G↑G–5′

(2)
5′–A↓A–G–C–T–T–3′
3′–T–T–G–A–A↑A–5′

(3)
5′–G↓A–A–T–T–C–3′
3′–C–T–T–A–A↑G–5′

(4)
5′–C–T–G–C–A↓G–3′
3′–G↑A–T–A–A–G–5′

155. **Correct** sequence of events in a PCR is

(1) Denaturation, Annealing, Extension
(2) Annealing, Denaturation, Extension
(3) Extension, Denaturation, Annealing
(4) Denaturation, Extension, Annealing

156. Which among the following is a DNA sequence for *E.coR I*

(1) GATTCG (2) GAATTC
(3) GTTCAA (4) TTCCAA

157. The intercalating agent that stacks between base pairs of DNA and helps in visualizing them under UV light is

(1) Methylene blue
(2) Bromophenol blue
(3) Ethidium bromide
(4) Aniline blue

158. The cloning vector with selectable marker amp^R and tet^R is

(1) YAC (2) BAC
(3) pBR322 (4) λ-phage

159. Stirrer in stirred-tank bioreactor has been designed for

(1) Formation of the substrate
(2) Ensuring anaerobic conditions in culture vessel
(3) Addition of preservatives to the product
(4) Increasing availability of oxygen throughout the process

160. Absence of β-galactosidase activity in recombinant pUC8 is

(1) Observed in blue colonies with intact Amp^R gene
(2) Observed in blue colonies with disrupted Amp^R gene
(3) Observed in white colonies with intact Amp^R gene
(4) Observed white colonies with inactivated Amp^R gene

161. In a gene cloning experiment the foreign DNA was ligated in pBR322 at the Bam HI site. Which of the following is most likely to happen.

(1) The transformant will die in ampicillin medium
(2) The non-transformants will survive in Ampicillin medium
(3) The Recombinants will die in tetracycline medium
(4) The recombinants will survive in tetracycline medium

162. MOET, a programme for herd improvement, has been demonstrated for all of the following, except

(1) Cattle (2) Hens

(3) Rabbits (4) Mares

163. Select the incorrect statement.

(1) Inbreeding increases homozygosity

(2) Inbreeding is essential to evolve purelines in any animal.

(3) Inbreeding selects harmful recessive genes that increases fertility and productivity

(4) Inbreeding helps in accumulation of superior genes and elimination of undesirable genes

164. Hisardale has been developed by

(1) Inbreeding

(2) Outcrossing

(3) Cross-breeding

(4) Interspecific hybridisation

165. Choose the incorrect match w.r.t. animal breeding methods

(1) Out crossing - Cross between same breed having no common ancestor for 4-6 generations

(2) Cross breeding - Cross between different breeds

(3) Interspecific - Cross between two different species

(4) Inbreeding - Mating of individuals within same breed for 1-2

166. Choose the option which has **correct** statements w.r.t. Multiple Ovulation Embryo Transfer Technology (MOET).

a. In this technique, FSH induces follicular maturation and superovulation.

b. The fertilized eggs at 8-32 cell stages are recovered non-surgically and transferred to surrogate mothers.

c. High milk-yielding breeds of females and high quality meat yielding bulls have been bred successfully.

d. It is a controlled breeding experiment.

(1) a & b only

(2) c & d only

(3) a, b & c only

(4) a, b, c & d

167. The Animal shown in the figure is a/an

(1) Exotic breed of Cow

(2) Exotic breed of Buffalo

(3) an offspring produced by Intraspecific hybridisation

(4) an offspring produced by Interspecific hybridisation

168. Read the following statements A and B and Choose the **correct** option.

Statement-A: Aquaculture involves production of useful aquatic plants and animals such as fishes, prawns, shrimps, lobsters, crabs and molluscs.

Statement-B: Fishery is an industry devoted to the catching, processing and selling of fish and shellfish.

(1) Both statements are incorrect

(2) Both statements are correct

(3) Statement A is incorrect but B is correct

(4) Statement B is incorrect but A is correct

169. Find the incorrect statement:

(1) Controlled breeding experiments are carried out using artificial insemination

(2) Bee-keeping or apiculture is the maintenance of hives of honeybees for the production of honey.

(3) Hilsa and sardine are fresh water fishes

(4) 70 per cent of the world livestock population is in India and China.

170. Choose the correct match

(1) Dolly – 1st transgene cow

(2) Tracy – produced spider wells

(3) Rosie – produced human α-lactalbumin

(4) Polly – 1st transgenic monkey

171. Chain A and B of Insulin are linked by

(1) Hydrogen bonds

(2) Disulphide bonds

(3) Hydrophobic bond

(4) Ester bond

172. Match the following:

	Column I		Column II
a.	Flavr Saver	(i)	Bt Brinjal
b.	Insect resistance	(ii)	Antigen-Antibody.
c.	ELISA	(iii)	Transgenic tomato.
d.	SCID	(iv)	ADA

(1) a-(ii), b-(iii), c-(iv), d-(i)
(2) a-(iii), b-(i), c-(iv), d-(ii)
(3) a-(i), b-(iii), c-(ii), d-(iv)
(4) a-(iii), b-(i), c-(ii), d-(iv)

173. *Cry* II Ab and *Cry* I Ab produce toxins that control
(1) Corn borer and tabacco budworms respectively
(2) Nematodes and tobacco budworms respectively
(3) Cotton bollworms and corn borer respectively
(4) Corn borer and cotton boll worms respectively

174. Which of the following is used as vector in gene therapy for SCID?
(1) pBR 322
(2) Retro virus
(3) Ti plasmid
(4) pUC 19

175. For transformation, microparticles coated with DNA to be bombarded with gene gun are made up of
(1) Silver or platinum
(2) Platinum or zinc
(3) Calcium phosphorous
(4) Gold or tungsten

176. In RNAi, genes are *silenced* using
(1) ssDNA (2) dsDNA
(3) dsRNA (4) ssRNA

177. In rDNA technology, in order to make the bacterial host cells 'competent' to accept the rDNA, these are incubated in
(1) Dilute solution of CsCl
(2) Divalent anions such as phosphates
(3) Chilled ethanol
(4) Divalent cations such as calcium

178. Which of the following nematode infects the roots of tabacco plant and causes a great reduction in yield.
(1) *Bacillus thuringiensis*
(2) *Ascaris lumbricoides*
(3) *Wuchereria malayi*
(4) *Meloidogyne incognita*

179. Gene therapy is collection of methods that allows correction of gene defect. Which of the following is/are not a completely curative method for ADA deficiency?
(1) Bone marrow transplantation in adult
(2) Enzyme replacement therapy
(3) Introduction of ADA gene isolated from marrow cells into cells at early embryo states
(4) Both (1) and (2)

180. Given below are different steps of transformation in a bacterial cell. Arrange them in correct sequence.
(i) Heat shock (at 42°C)
(ii) Treatment of bacterial cell with divalent cations at 4°C
(iii) Bacterial cells are incubated with recombinant DNA on ice
(iv) Recombinant/Transformed bacteria are plated and kept at 37° C
(1) (i), (ii), (iii), (iv) (2) (ii), (i), (iii), (iv)
(3) (ii), (iv), (i), (iii) (4) (iv), (ii), (iii), (i)

181. In PCR, the optimum temperature for denaturing the DNA fragment is _____, for annealing is ____ and for polymerisation is _____ respectively.
(1) 74°C, 94°C and 40° C
(2) 94°C, 50-60°C and 72° C
(3) 80°C, 40°C and 94°C
(4) 94°C, 72°C and 50-60°C

182. The advantage of inbreeding in animal husbandry is that it
(1) Increases homozygosity
(2) Increases heterozygosity
(3) Improves the breed with a single step
(4) Causes deletion of superior genes

183. Tumor inducing plasmid delivers a piece of DNA known as 'T-DNA' to transform
(1) Agrobacterium
(2) Fungi
(3) Dicot plants
(4) Mycobacterium

184. Procedure through which a piece of DNA is introduced in a host bacterium is
(1) Transformation
(2) Insertional inactivation
(3) Transfection
(4) Translation

185. Maintenance of hives of honeybees for the production of honey is
(1) Aquaculture
(2) Bee keeping
(3) Apiculture
(4) Both 2 and 3

SECTION – B
(ATTEMPT ANY 10 QUESTIONS)

186. Which body will make decisions regarding the validity of GM research and the safety of introducing GM-organisms for public services.
(1) ICAR
(2) GEAC
(3) CDRI
(4) IUB

187. More than _____ of the world livestock population is in India and China.
Choose the option that fills the blank **correctly.**
(1) 25% (2) 70%
(3) 90% (4) 50%

188. Which of the following technique is **not** used for early diagnosis of disease?
(1) Polymerase chain reaction
(2) Recombinant DNA technology
(3) Enzyme linked immuno sorbent assay
(4) Conventional method

189. Which of the following restriction enzyme site is present in nucleotide sequence of ampicillin resistance gene in pBR322?
(1) *Pvu* I
(2) *Pvu* II
(3) *Hind* III
(4) *Sal* I

190. How many recombinant therapeutics are approved globally?
(1) 30 (2) 20
(3) 12 (4) 112

191. Transgenic animals can be used for/at
(i) Testing of drugs
(ii) Disease models of cancer, Alzheimer, etc.
(iii) Decreasing the resistance to diseases
(iv) Testing vaccine safety
(1) (i) and (ii) only
(2) (i), (ii) and (iii)
(3) (ii) and (iv) only
(4) (i), (ii) and (iv)

192. *Bacillus thuringiensis* forms crystal protein which
(1) Gets activated in acidic medium of insect gut and destroys them
(2) Binds with epithelial cells of midgut after getting activated in alkaline medium
(3) Is functional in the bacterial cell also
(4) Act non-specifically on any insect

193. Taq polymerase is obtained from
(1) *Escherichia coli*
(2) *Thermus aquaticus*
(3) *Bacillus thuringiensis*
(4) *Agrobacterium tumefaciens*

194. α-1 antitrypsin is used the treatment of ___X___ where as ___T___ is used as biological response modifier, X and Y are
(1) X = Cystic fibrosis, Y = α-interferon
(2) X = Emphysema, Y = Vincristine
(3) X = Emphysema, Y = α-interferon
(4) X = Coronary thrombosis, Y= γ-interferon

195. Match the items in Column A with the those in Column B and choose the **correct** option.

Column A		**Column B**	
(a)	Electrophoresis	(i)	Polysaccharide
(b)	Matrix	(ii)	Separation of DNA fragments under the influence of an electric field
(c)	Staining of fragmented DNA	(iii)	Removal of DNA from gel
(d)	Elution	(iv)	Ethidium bromide

(1) (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)
(2) (a) → (ii), (b) → (i), (c) → (iii), (d) → (iv)
(3) (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)
(4) (a) → (iii), (b) → (iv), (c) → (ii), (d) → (i)

196. Which of the following is **not** a part of downstream processing?
(1) Separation of product from bioreactor
(2) Purification of product
(3) Creation of recombinant gene
(4) Maintenance of culture in fermenter

197. Which of the following is **not** a freshwater fish?
(1) Common carp fish
(2) Mackerel
(3) *Rohu*
(4) *Catla*

198. Find the incorrect statement from the following

(1) Using Agrobacterium vectors, nematode-specific genes were introduced into the host tobacco plant

(2) GM plants have made more reliance on chemical pesticides

(3) The main challenge for production of insulin using rDNA techniques was getting insulin assembled into a mature form.

(4) A single stranded DNA or RNA, tagged with a radioactive molecule is called probe

199. Which of the following is used to select the transformant from non transformant?

(1) ori

(2) rop

(3) selectable marker

(4) cloning sites

200. In which method recombinant DNA is directly injected into the nucleus of an animal cell

(1) Microporation

(2) Microinjection

(3) Biolistics

(4) Transformation

PHYSICS

ANSWERS

Section-A

1. (3)
2. (4)
3. (1)
4. (2)
5. (4)
6. (1)
7. (3)
8. (4)
9. (3)
10. (2)
11. (1)
12. (1)
13. (2)
14. (4)
15. (2)
16. (4)
17. (4)
18. (1)
19. (4)
20. (4)
21. (1)
22. (1)
23. (3)
24. (3)
25. (2)
26. (4)
27. (1)
28. (1)
29. (3)
30. (4)
31. (1)
32. (4)
33. (3)
34. (3)
35. (4)

Section-B

36. (1)
37. (1)
38. (2)
39. (2)
40. (1)
41. (2)
42. (1)
43. (4)
44. (1)
45. (4)
46. (3)
47. (1)
48. (4)
49. (2)
50. (1)

CHEMISTRY

ANSWERS

Section-A

51. (4)
52. (3)
53. (3)
54. (4)
55. (3)
56. (1)
57. (4)
58. (3)
59. (3)
60. (2)
61. (4)
62. (1)
63. (3)
64. (2)
65. (1)
66. (2)
67. (4)
68. (2)
69. (1)
70. (2)
71. (3)
72. (2)
73. (3)
74. (3)
75. (1)
76. (3)
77. (3)
78. (4)
79. (4)
80. (4)
81. (2)
82. (4)
83. (3)
84. (3)
85. (4)

Section-B

86. (1)
87. (3)
88. (1)
89. (1)
90. (4)
91. (2)
92. (1)
93. (3)
94. (4)
95. (3)
96. (4)
97. (1)
98. (4)
99. (4)
100. (3)

BOTANY

ANSWERS

Section-A

101. (4)
102. (4)
103. (2)
104. (2)
105. (3)
106. (2)
107. (4)
108. (2)
109. (1)
110. (2)
111. (1)
112. (3)
113. (2)
114. (1)
115. (4)
116. (2)
117. (4)
118. (2)
119. (3)
120. (4)
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122. (3)
123. (2)
124. (3)
125. (2)
126. (1)
127. (4)
128. (3)
129. (1)
130. (1)
131. (4)
132. (4)
133. (1)
134. (3)
135. (3)

Section-B

136. (4)
137. (4)
138. (2)
139. (4)
140. (4)
141. (4)
142. (4)
143. (1)
144. (1)
145. (4)
146. (1)
147. (3)
148. (4)
149. (1)
150. (1)

ZOOLOGY

ANSWERS

Section-A

151. (3)
152. (4)
153. (3)
154. (3)
155. (1)
156. (2)
157. (3)
158. (3)
159. (4)
160. (3)
161. (3)
162. (2)
163. (3)
164. (3)
165. (4)
166. (4)
167. (4)
168. (2)
169. (3)
170. (3)
171. (2)
172. (4)
173. (3)
174. (2)
175. (4)
176. (3)
177. (4)
178. (4)
179. (4)
180. (2)
181. (2)
182. (1)
183. (3)
184. (1)
185. (4)

Section-B

186. (2)
187. (2)
188. (4)
189. (1)
190. (1)
191. (4)
192. (2)
193. (2)
194. (3)
195. (1)
196. (3)
197. (2)
198. (2)
199. (3)
200. (2)