Aakash BYJU'S

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MM : 720

REVISION TEST SERIES

Time : 3 Hrs. 20 Min.

(*for* NEET-2022)

Test – 6

Topics covered :

Physics : Dual Nature of Radiation and Matter, Atoms, Nuclei, Semiconductor Electronics

Chemistry : General Principles and Processes of Isolation of elements, Biomolecules, Polymers, Environmental Chemistry, Chemistry in Everyday Life

Botany : Biodiversity and Conservation, Environmental Issues

Zoology : Biotechnology and its Applications

Instructions :

(i) There are two sections in each subject, i.e., Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.

(ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.

(iii) Use blue/black ballpoint pen only to darken the appropriate circle.

(iv) Mark should be dark and completely fill the circle.

(v) Dark only one circle for each entry.

(vi) Dark the circle in the space provided only.

(vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS

Choose the correct answer:

SECTION-A

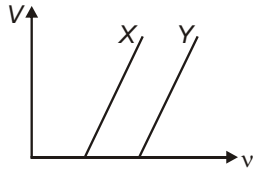
1. Work function of a material depends on
   (1) Nature of material
   (2) Wavelength of incident light
   (3) Frequency of incident light
   (4) Intensity of incident light

2. A point source of light is used in a photoelectric effect experiment. If the source is moved away from the emitting metal, the stopping potential
   (1) Will increase
   (2) Will decrease
   (3) Will remain unchanged
   (4) Will either increase or decrease

3. Photons of energies twice and five times the work function of metal, are incident separately on the same metal surface. The ratio of the maximum velocity of photoelectron emitted in the two cases will be
   (1) 1 : 2 (2) $1:\sqrt{2}$
   (3) 1 : 4 (4) 1 : 3

4. A nucleus of mass M is at rest and suddenly it emits gamma radiation of wavelength λ. The recoil energy of the nucleus will be
   (1) $\frac{hc}{\lambda}$ (2) $\frac{h}{\lambda}$
   (3) $\frac{h^2}{2M\lambda^2}$ (4) Mc^2

5. For metals *X* and *Y* the graph between stopping potential *V* and applied frequency ν of light is as shown in figure



From graph it can be concluded that

(1) All the photoelectrons of *Y* are more energetic than that of *X*

(2) *X* has lesser work function, than that of *Y*

(3) *X* has larger threshold wavelength, compared to *Y*

(4) Both (2) and (3)

6. In a photoelectric experiment, lights of frequencies ν_1 and ν_2 are made to fall on the metal surface. The maximum speeds of photoelectrons in the two cases are v_1 and v_2 respectively. The value of, Planck's constant is (*m* : Mass of electron)

(1) $\frac{m\left(v_1^2 - v_2^2\right)}{2(\nu_1 - \nu_2)}$ (2) $\frac{m(v_1 - v_2)}{2(\nu_1 + \nu_2)}$

(3) $\frac{m\left(v_1^2 + v_2^2\right)}{2(\nu_1 + \nu_2)}$ (4) $\frac{m(v_1 + v_2)}{2(\nu_1 + \nu_2)}$

7. The maximum kinetic energy of photoelectrons liberated is K_A then de-Broglie wavelength is λ_A. If for same metal the maximum kinetic energy of photoelectrons liberated is K_B and the de-Broglie wavelength of these photoelectrons is related as $\lambda_B = 2\lambda_A$, then

(1) $K_A = 4K_B$ (2) $K_A = 2K_B$

(3) $K_A = \frac{1}{4}K_B$ (4) $K_A = \frac{1}{2}K_B$

8. An electron of mass m_e and a photon have same energy *E*. The value of $\frac{\lambda_{electron}}{\lambda_{photon}}$ is

(1) $\frac{1}{c}\sqrt{\frac{E}{2m_e}}$ (2) $\frac{1}{2c}\sqrt{\frac{E}{2m_e}}$

(3) $\frac{1}{c}\sqrt{\frac{2E}{m_e}}$ (4) $\frac{1}{c}\sqrt{\frac{E}{m_e}}$

9. Which among the followings, is inorganic compound semiconductor?

(1) Si (2) Ge

(3) GaAs (4) Anthracene

10. When a nucleus with atomic number *Z* and mass number *A* undergoes a radioactive decay process, then choose **incorrect** statement.

(1) Both *Z* and *A* will decrease, if the process is α decay

(2) *Z* will decrease but *A* will not change, if the process is β^+ decay

(3) *Z* will decrease but *A* will not change, if the process is β^- decay

(4) *Z* and *A* will remain unchanged, if the process is γ decay

11. The Lyman series in the spectra of hydrogen atom is obtained

(1) When electrons of excited atoms fall to first excited state

(2) When electrons of excited atoms fall to ground state

(3) In any transition from any lower state to higher state

(4) In any transition from higher state to lower state

12. The wavelength of the first spectral line in the Balmer series of hydrogen atom is 6561 Å. Now in He^+ atom the second spectral line in the Balmer series will have the wavelength approximately

(1) 951 Å (2) 974 Å

(3) 1028 Å (4) 1215 Å

13. In a hydrogen atom the frequency of revolution of electron in first excited state is *f*. The frequency of revolution in second excited state will be

(1) $\frac{f}{8}$ (2) $8f$

(3) $\frac{8f}{27}$ (4) $\frac{27f}{8}$

14. A transistor in CE configuration when used as a device then

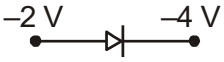
(1) Active region is suited for amplification

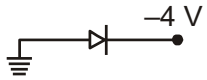
(2) Active region is suited for transistor as a switch

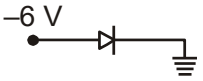
(3) Cut-off and saturation region are suited for switch operation

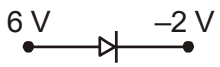
(4) Both (1) and (3) are correct

15. The diode which is in reverse-biased mode of operation is

(1) 

(2) 

(3) 

(4) 

16. The ratio of radius of nuclei $_{13}Al^{27}$ and $_{Z}X^{A}$ is 3 : 5. The value of A is

(1) 81 (2) 73

(3) 65 (4) 125

17. Excitation energy of a hydrogen like ion in its first state is 40.8 eV. The atomic number of atom is

(1) 4 (2) 2

(3) 6 (4) 7

18. After 200 days, the activity of a radioactive sample is 5000 dps. The activity reduces to 2500 dps after another 100 days. The initial activity of the sample was

(1) 20,000 dps (2) 10,000 dps

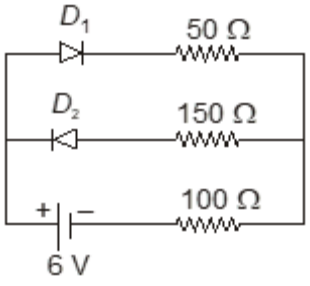
(3) 5,000 dps (4) 15,000 dps

19. The half-life period of a radioactive element x is same as the mean life time of another radioactive element y. Relationship of decay constants is

(1) $\lambda_x = \lambda_y$ (2) $\lambda_x = 0.693\ \lambda_y$

(3) $\lambda_y = 0.693\ \lambda_x$ (4) $\lambda_x = 2\lambda_y$

20. Find current through 100 Ω resistance in the circuit shown in the figure containing two diode D_1 and D_2 each with a forward resistance of 50 ohm and with infinite backward resistance.



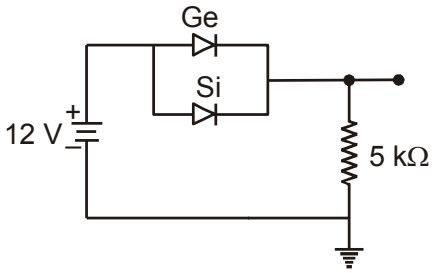
(1) 0.03 A

(2) Zero

(3) 0.02 A

(4) 0.025 A

21. Ge and Si diodes conduct at 0.3 V and 0.7 V respectively. In the following figure if Ge diode connection is reversed, the current in the circuit is



(1) 1 mA (2) 2.34 mA

(3) 2.26 mA (4) Zero

22. In which of the following transitions for hydrogen atom will the wavelength be minimum?

(1) $n_1 = 5, n_2 = 4$ (2) $n_1 = 4, n_2 = 3$

(3) $n_1 = 3, n_2 = 2$ (4) $n_1 = 2, n_2 = 1$

23. The angular momentum of an electron in first orbit of L_i^{++} ions is

(1) $\frac{3h}{4\pi}$ (2) $\frac{9h}{2\pi}$

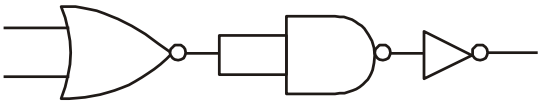
(3) $\frac{h}{2\pi}$ (4) $\frac{h}{6\pi}$

24. In a full wave rectifier circuit operating from 50 Hz mains frequency, the frequency in the ripple at output would be

(1) 50 Hz (2) 25 Hz

(3) 100 Hz (4) 707 Hz

25. The logic circuit given below is equivalent to



(1) OR gate (2) NOR gate

(3) AND gate (4) NAND gate

26. An electron is moving in a orbit of H-atom having n = 3. Radius of orbit in terms of de-Broglie wavelength λ of electron can be given as

(1) $\frac{\lambda}{\pi}$ (2) $\frac{2\lambda}{\pi}$

(3) $\frac{3\lambda}{2\pi}$ (4) $\frac{\lambda}{2\pi}$

27. In Rutherford's scattering experiment, if impact parameter is zero, then angle of scattering for α particle is

(1) 90° (2) 270°

(3) 180° (4) 0°

28. Which of the following properties for isotone is correct?

(1) Isotone have equal number of protons

(2) Isotone have equal number of neutrons

(3) Isotone have equal number of electrons

(4) In isotone, number of protons in one is equal to the number of neutrons in other

29. If the nuclear radius of ^{64}X nucleus is 4.8 fermi, then the nuclear radius of ^{125}Y nucleus is

(1) 4.8 fermi (2) 6 fermi

(3) 3.8 fermi (4) 7.5 fermi

30. When aluminium is bombarded with fast moving neutron, it changes into sodium with emission of particle *X* according to equation

$$^{27}_{13}Al + {}^{1}_{0}n \longrightarrow {}^{24}_{11}Na + X$$

The particle *X* is

(1) Electron (2) Proton

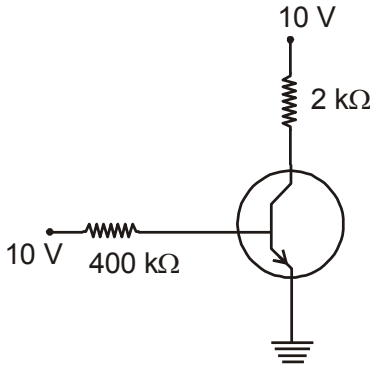
(3) Alpha particle (4) Positron

31. In a common emitter amplifier, the phase difference between the input signal voltage and the output signal voltage is

(1) π (2) $\frac{\pi}{2}$

(3) Zero (4) $\frac{\pi}{4}$

32. For the given common emitter amplifier circuit V_{in} applied is 10 V and V_{BE} = 0. If V_{CE} is 6 V, then value of base current (I_B) and collector current (I_C) are respectively



(1) 25 μA, 2 μA (2) 25 mA, 2 mA

(3) 25 μA, 2 mA (4) 25 mA, 2 μA

33. In a common base transistor circuit, the current gain is 0.98. The current gain of common emitter transistor circuit is

(1) 0.2 (2) 98

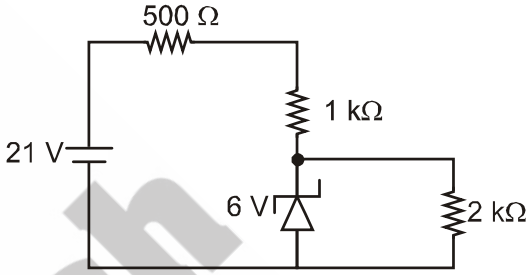
(3) 20 (4) 49

34. A common emitter transistor amplifier has a current gain of 50. If input resistance is of 2 kΩ then the value of its transconductance is

(1) 100 mho (2) 40 mho

(3) 5.2×10^{-3} mho (4) 2.5×10^{-2} mho

35. A Zener diode, having breakdown voltage of 6 V is used as a voltage regulator in a circuit as shown in figure. The currents through diode, 1 kΩ and 2 kΩ resistors are respectively



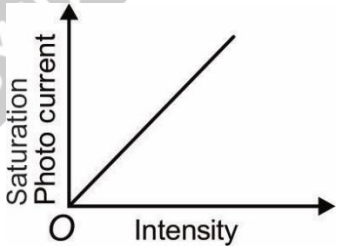
(1) 7 mA, 3 mA, 10 mA (2) 7 mA, 10 mA, 3 mA

(3) 10 mA, 3 mA, 7 mA (4) 3 mA, 10 mA, 7 mA

SECTION-B

36. If frequency of incident light is constant, then choose the correct option.

(1)



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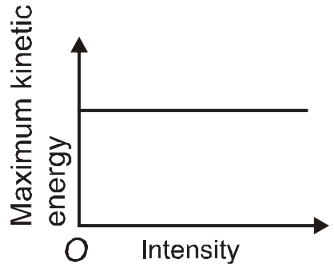
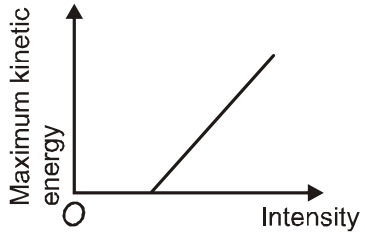


(3)



(4) Both (1) and (2)

37. The ratio of de-Broglie wavelengths of molecule of helium at 27°C and hydrogen at 227°C is $\sqrt{\frac{2+a}{2a}}$. The value of a is

(1) 3 (2) 5

(3) 2 (4) 6

38. The de-Broglie wavelength of an electron having 80 eV of energy is nearly

(1) 14 Å (2) 1.4 Å

(3) 21 Å (4) 2.1 Å

39. The energy of a photon corresponding to visible light of maximum wavelength is approximately

(1) 1.7 eV (2) 2.9 eV

(3) 0.7 eV (4) 2.3 eV

40. Representing the stopping potential V along y-axis and $\frac{1}{\lambda}$ along x-axis, for a given photocathode, the graph is a straight line. The slope of graph is

(1) $\frac{e}{hc}$ (2) $\frac{hc}{e}$

(3) $\frac{ec}{h}$ (4) $\frac{he}{c}$

41. In the context of the phenomenon of beta decay let M_1 and M_2 be the atomic masses of the parent and the daughter nuclei respectively. The Q value for negative beta (β^-) decay is E_1 and that for positive beta decay (β^+) be E_2. Assume mass of electron is m_e and speed of light in vacuum is c, then

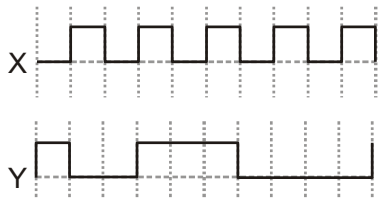
(1) $E_1 = (M_1 - M_2)c^2$

(2) $E_2 = (M_1 - M_2 - 2m_e)c^2$

(3) $E_1 = (M_1 - M_2 + 2m_e)c^2$

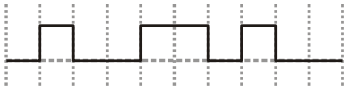
(4) Both (1) & (2)

42. In a NAND gate the input signals are X and Y and the output signal is Z. If the inputs X and Y have the following pulse patterns



then the output Z will be

(1) Z 

(2) Z 

(3) Z 

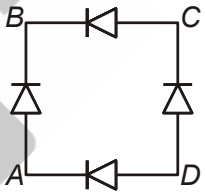
(4) Z 

43. Transition between three consecutive energy levels in a particular atom gives rise to three spectral lines of wavelengths, in increasing order, λ_1, λ_2 and λ_3. Which of the following correctly relates λ_1, λ_2 and λ_3?

(1) $\lambda_1 = \lambda_2 - \lambda_3$ (2) $\lambda_1 = \lambda_3 - \lambda_2$

(3) $\frac{1}{\lambda_1} = \frac{1}{\lambda_2} + \frac{1}{\lambda_3}$ (4) $\frac{1}{\lambda_1} = \frac{1}{\lambda_3} - \frac{1}{\lambda_2}$

44. In the diagram, the input is across the terminal A and C and the output is across B and D, then the output signal is



(1) Half wave rectified (2) Full wave rectified

(3) Same as input (4) Zero

45. There is a stream of radioactive material having N_0 number of nuclei initially, moving with constant speed of 2500 m/s. If half life of material is 693 s, then amount of material remain after they travel a distance of 2500 km is

(1) $\frac{N_0}{e}$ (2) $\frac{N_0}{e^2}$

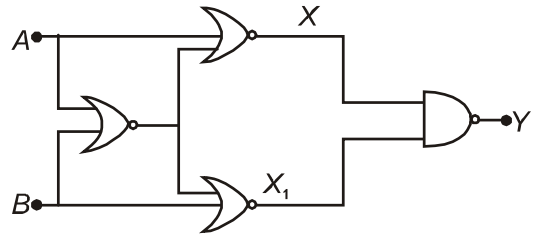
(3) $\frac{N_0}{2}$ (4) $\frac{N_0}{4}$

46. If activity of a radioactive substance is R_0 at time $t = 0$ and $\frac{R_0}{e^2}$ and at $t = 10$ hours, then the time (in hours) at which the activity reduces to half $\left(\frac{R_0}{2}\right)$ of its initial value is

(1) $5 \log_{10} 2$ (2) $5 \log_e 2$

(3) $\frac{5}{\log_{10} 2}$ (4) $\frac{5}{\log_e 2}$

47. If A = 0 and B = 1 for given logic circuit, then value of X and Y are respectively



(1) 1, 1 (2) 0, 0

(3) 0, 1 (4) 1, 0

48. Intrinsic concentration of pure silicon at room temperature $n_i = n_e = n_h = 2 \times 10^{16}$ m^{-3}. After doping by trivalent atom concentration of holes n_h increases to 4×10^{22} m^{-3}, then concentration of electrons (n_e) in doped silicon is

(1) 1×10^{11} m^{-3} (2) 1×10^{10} m^{-3}

(3) 1×10^{12} m^{-3} (4) 1×10^{9} m^{-3}

49. The wavelength of K_α line for an element of atomic number 43 is λ. Then the wavelength of K_α line for an element of atomic number 29 is

(1) $\frac{3}{2}\lambda$

(2) $\frac{43}{29}\lambda$

(3) $\frac{9}{4}\lambda$

(4) $\frac{4}{9}\lambda$

50. For the Bohr's second orbit of circumference $2\pi r$. The de-Broglie wavelength of revolving electron will be

(1) $2\pi r$ (2) πr

(3) $\frac{1}{2\pi r}$ (4) $\frac{1}{4\pi r}$

CHEMISTRY

SECTION-A

51. Which among the following is an ore of zinc?

(1) Cryolite (2) Sphalerite

(3) Siderite (4) Malachite

52. Dressing of haematite ore can be done by

(1) Smelting (2) Hydraulic washing

(3) Froth floatation (4) Calcination

53. Bayer's process is used for bauxite. Which of the following impurities are present in bauxite?

(1) NaCN (2) TiO_2

(3) Xanthates (4) $NaAlO_2$

54. In MacArthur-Forrest cyanide process, the hybridization of the complex of silver formed is

(1) sp (2) sp^3

(3) dsp^2 (4) sp^3d^2

55. Which one of the following ores is concentrated by chemical leaching method?

(1) Galena

(2) Copper pyrite

(3) Cinnabar

(4) Argentite

56. The incorrect statement among the following is

(1) Hydrogen is used to reduce NiO

(2) Zirconium is refined by van Arkel method

(3) Galena is concentrated by froth floatation process

(4) In the metallurgy of iron, the flux used is SiO_2

57. Smelting cannot be done for

(1) Fe_2O_3 (2) Al_2O_3

(3) ZnO (4) PbO

58. The percentage decrease in weight of carbon when pig iron is converted to cast iron is

(1) 1% approx. (2) 3% approx.

(3) 4% approx. (4) 25% approx.

59. Electrorefining can be done for

(1) Al (2) Ag

(3) Na (4) Both (1) and (2)

60. The method not used in metallurgy to refine the impure metal is

(1) Mond's process

(2) van Arkel process

(3) Magnetic separation

(4) Liquation

61. The element which is not present in the alloy, german silver, is
(1) Cu (2) Ag
(3) Zn (4) Ni

62. Excess of sulphates in water causes
(1) Kidney damage
(2) Methemoglobinemia
(3) Laxative effect
(4) Decaying of teeth

63. Which of the following is a secondary precursor of photochemical smog?
(1) Hydrocarbons (2) SO_2
(3) NO_2 (4) PAN

64. Which type of iron is collected from blast furnace?
(1) Steel (2) Pig iron
(3) Cast iron (4) Wrought iron

65. Which of the following reaction has negative slope in Ellingham diagram?
(1) $C + O_2 \rightarrow CO_2$ (2) $2C + O_2 \rightarrow 2CO$
(3) $2CO + O_2 \rightarrow 2CO_2$ (4) $4Cu + O_2 \rightarrow 2Cu_2O$

66. In the extraction of copper from its sulphide ore metal is formed by reduction of Cu_2O with
(1) FeS (2) CO
(3) Cu_2S (4) SO_2

67. In van Arkel method, impure metal is heated with
(1) I_2 (2) S_8
(3) P_4 (4) CO

68. In Mond process for refining Nickel, the volatile complex formed is
(1) $Ni(CO)_4$ (2) NiI_4
(3) $NiCl_4$ (4) $Ni(NH_3)_4$

69. Which among the following is a copolymer?
(1) Buna-S (2) Polythene
(3) Neoprene (4) Orlon

70. Monomer(s) of dacron is/are
(1) Phenol and formaldehyde
(2) Isoprene
(3) Chloroprene
(4) Ethane-1, 2-diol and Benzene-1,4-dicarboxylic acid

71. The essential amino acid among the following is
(1) Serine (2) Proline
(3) Lysine (4) Aspartic acid

72. The monomer of starch is
(1) Glucose (2) Mannose
(3) Fructose (4) Lactose

73. Water soluble vitamin is
(1) Vitamin-A (2) Vitamin-D
(3) Vitamin-C (4) Vitamin-K

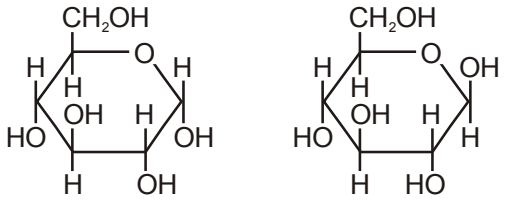
74. The incorrect statement among the following is
(1) Fructose is a reducing sugar and exhibit mutarotation
(2) Maltose is a reducing sugar and formed by glucose units held by $C_1 - C_4$ glycosidic linkage
(3) Maltose on hydrolysis with dilute acid produces glucose as two monosaccharide units
(4) Lactose is a non reducing sugar and formed by the glycosidic linkage of C_1 of β-D-galactose and C_4 of β-D-glucose units

75. Biodegradable polymer among the following is
(1) Nylon 6 (2) Nylon 6,6
(3) Nylon 2-nylon 6 (4) Polyacrylonitrile

76. Antihistamine among the following is
(1) Dimetane (2) Cimetidine
(3) Amytal (4) Meprobamate

77. In a protein molecule various amino acids are linked together by
(1) Ionic bond (2) α-glycosidic bond
(3) Peptide bond (4) Peroxy bond

78. Consider the following structures



(I) (II)

The incorrect statement is
(1) (I) and (II) are anomers
(2) (I) and (II) show mutarotation
(3) (I) and (II) are enantiomers
(4) (I) are (II) are pyranose structure

79. Non-narcotic analgesics among the given options is
(1) Morphine (2) Aspirin
(3) Phenelzine (4) Tetracycline

80. Which among the following is a purine base?
(1) Adenine (2) Cytosine
(3) Thymine (4) Uracil

81. Which among the following is not used as an antiseptic?
(1) Bithional
(2) Dilute aqueous solution of boric acid
(3) 0.2 percent solution of phenol
(4) 0.2 to 0.4 ppm aqueous solution of chlorine

82. Sweetest compound among the following is
(1) Sucrose (2) Sucralose
(3) Alitame (4) Saccharin

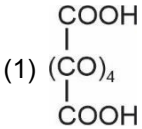
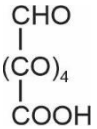
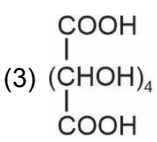
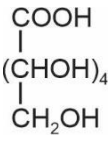
83. During 'Denaturation of protein'
(1) The hydrogen bonds get disturbed and protein is called native protein
(2) 1°, 2° and 3° structures of proteins are destroyed hence pH of protein changes
(3) The protein is subjected to physical or chemical change and converted into its native form
(4) The globules unfold, helix get uncoiled and protein loses its biological activity

84. The incorrect statement for α-D-(+)-glucose is
(1) It is optically active
(2) It is cyclic hemiacetal
(3) It has free aldehyde group
(4) It has five asymmetric carbon atoms

85. Novestrol is used as an
(1) Antibiotic (2) Antifertility drug
(3) Antipyretic drug (4) Antacid

SECTION-B

86. On oxidation with nitric acid, glucose as well as gluconic acid yield

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

87. Example of fibrous protein is
(1) Insulin and keratin
(2) Albumin and myosin
(3) Keratin and myosin
(4) Insulin and albumin

88. Cationic detergent among the following is
(1) Sodium stearate
(2) Sodium laurylsulphate
(3) Cetyltrimethyl ammonium bromide
(4) Sodium dodecylbenzenesulphonate

89. The incorrect statement among the following is
(1) Cellulose is composed of only β-D-(+)-glucose units
(2) Starch is the main storage polysaccharide of plants
(3) Amylose is a branched polymer of β-D-(+)-glucose units
(4) In amylopectin, chain is formed by C1-C4 glycosidic linkage

90. Correct statement regarding DNA and RNA is
(1) Sugar component in DNA is α-D-ribose and that in RNA is β-D-2-deoxyribose
(2) Sugar component in DNA is β-D-2-deoxyribose and that in RNA is β-D-ribose
(3) Sugar component in DNA is α-D-2-deoxyribose and that in RNA is α-D-2-arabinose
(4) Sugar component in DNA is β-D-arabinose and that in RNA is α-D-arabinose

91. The cyclic amino acid among the following is
(1) Proline (2) Arginine
(3) Lysine (4) Serine

92. Maximum permissible limit of cadmium in drinking water is
(1) 0.005 ppm (2) 500 ppm
(3) 50 ppm (4) 2 ppm

93. Which among the following is synthetic rubber?
(1) Buna-N (2) PVC
(3) Teflon (4) PHBV

94. Bacteriostatic antibiotic among the following is
(1) Penicillin (2) Aminoglycosides
(3) Ofloxacin (4) Chloramphenicol

95. Normally, the pH of rain water is
(1) 5.0 (2) 5.6
(3) 7.2 (4) 4.9

96. Reducing smog is the mixture of
(1) Smoke, fog and SO_2
(2) Smoke, fog and NO_2
(3) Smoke, SO_2 and NO_2
(4) Fog, SO_2 and NO_2

97. Clean water would have BOD value of less than
(1) 17 ppm (2) 5 ppm
(3) 20 ppm (4) 12 ppm

98. Which of the following is not a greenhouse gas?
(1) CO_2 (2) CH_4
(3) N_2O (4) O_2

99. The main chemical species responsible for depletion of ozone layer is
(1) PAN (2) Freons
(3) Acrolein (4) Aldrin

100. Blue baby syndrome is caused by which pollutant?
(1) Lead (2) Arsenic
(3) Sulphate (4) Nitrate

BOTANY

SECTION-A

101. Loss of biodiversity in a region may lead to
(1) Greater resistance to drought
(2) Decreased variability in certain ecosystem processes
(3) Decline in plant production or productivity
(4) Decreased pest and disease cycles

102. Which of the following is an example of recently extinct species from Australia?
(1) Dodo (2) Quagga
(3) Thylacine (4) Tiger

103. Most important cause for driving plants and animals to extinction, can be exemplified by
(1) Elimination of more than 200 species of cichlid fishes by predator Nile perch
(2) Co-extinction of plant pollinator insect with plant
(3) Loss of a part of tropical rain forest
(4) Introduction of *Eichhornia* in India

104. "Every species has an intrinsic value and it is our moral duty to care for their well being".
What kind of argument it is for conservation of biodiversity?
(1) Narrowly utilitarian (2) Broadly utilitarian
(3) Bioprospecting (4) Ethical

105. How many species are presently facing threat of extinction?
(1) 2000 (2) About 7840
(3) 359 (4) More than 15,500

106. Read the following statements.
a. There are 14 biosphere reserves in India.
b. Seed banks and field gene banks are *in-situ* conservation strategies.
c. The Earth Summit was held in Rio de Janeiro in 1992.
The **correct** ones are
(1) All a, b and c (2) Only a and c
(3) Only a and b (4) Only b and c

107. "We save the entire forest to save tiger"
Choose the **correct** example w.r.t. the conservation strategy it depicts.
(1) Wildlife safari parks (2) National parks
(3) Cryopreservation (4) Zoological parks

108. Mark the **incorrect** statement w.r.t. hot spots of biodiversity.
(1) There are total 20 hotspots located in the world
(2) They cover less than 2% of earth's land area
(3) Himalaya is one of the richest hotspots of biodiversity
(4) These are the richest and the most threatened reservoirs of plant and animal life

109. Tropics show greater diversity because
(1) Tropical environments are less seasonal, more constant and predictable
(2) There is less solar energy available in tropics
(3) Tropical environment is more seasonal
(4) Tropics have less constant and rarely predictable environment

110. Find out the **incorrect** match.
(1) Noise pollution - Any value more than 80 dB
(2) Cultural eutrophication - By thermal pollution
(3) Incineration - Disposal of hospital wastes
(4) Integrated organic farming - Zero waste procedure

111. Which one is **not** an example of primary pollutants?
(1) SO_2 (2) CO
(3) O_2 (4) PAN

112. The plant which is also called Terror of Bengal is
(1) *Datura* (2) *Cassia*
(3) *Vallisneria* (4) *Eichhornia*

113. In which part of the atmosphere, 'good ozone' is found?
(1) Troposphere (2) Stratosphere
(3) Ionosphere (4) Exosphere

114. Which statement is **incorrect** for photochemical smog?
(1) It consists mainly O_3, PAN and NO_x
(2) It is called brown air or grey air
(3) It causes acid rain
(4) It is formed in traffic congested cities

115. Read the following statements and select the option which is **true** for them.
Statement-A : CNG burns more efficiently, unlike petrol and diesel.
Statement-B : Ozone depletion is enhanced by CFCs.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both statements are incorrect
(4) Both statements are correct

116. According to CPCB the size of particulate matter that cause greatest harm to human health is
(1) 2.5 mm or less
(2) 2.5 mm or more
(3) 2.5 micrometer or less
(4) 25 micrometer or more

117. Air (Prevention and Control of Pollution) act came into force in
(1) 1987 (2) 1981
(3) 1977 (4) 1982

118. Column-I and Column-II have greenhouse gases and their contributions in greenhouse effect (global warming) respectively. Match them and choose the **correct** option.

Column-I	**Column-II**
a. CO_2	(i) 20%
b. Methane	(ii) 60%
c. CFCs	(iii) 6%
d. N_2O	(iv) 14%

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

119. The extinction of Steller's sea cow and passenger pigeon was due to
(1) Habitat loss and fragmentation
(2) Over - exploitation
(3) Alien species invasions
(4) Co-extinctions

120. The term used for exploring molecular, genetic and species level diversity for products of economic importance is
(1) Biofortification (2) Cryopreservation
(3) Bioprospecting (4) Biodiversity

121. Which of the following has maximum biodiversity among the vertebrates?
(1) Amphibians (2) Reptiles
(3) Fishes (4) Mammals

122. About 1000 varieties of mango are found in India. This is an example of

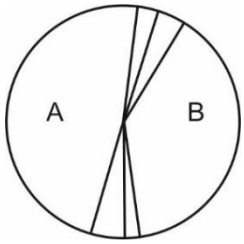
(1) Ecological diversity

(2) Species diversity

(3) Genetic diversity

(4) Community diversity

123. The following pie chart shows global biodiversity w.r.t. proportionate number of different plants including fungi and lichens.



The labels A and B respectively represent

(1) Algae and fungi

(2) Fungi and angiosperms

(3) Algae and angiosperms

(4) Mosses and ferns

124. India has more than (i) species of birds and most of the land area of our country lies in (ii) .

Select the **correct** option to fill in the blanks (i) and (ii).

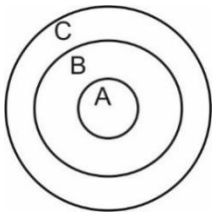
(1) (i) 40,000, (ii) Tropics

(2) (i) 35,000, (ii) Temperate areas

(3) (i) 18,000, (ii) Temperate areas

(4) (i) 1,200, (ii) Tropics

125. Different zones in a terrestrial biosphere reserve are labelled as A, B and C as shown below.



In which zone(s), human settlements of local people can be seen?

(1) B (2) Both B and C

(3) C (4) A

126. How many of the following should be considered broadly utilitarian ecosystem services?

Firewood, Oxygen, Flood control, Drugs, Fibre, Food, Pollination, Erosion control

(1) Three (2) Four

(3) Six (4) Five

127. Which one of the following is **not** the key criteria for determining a hotspot?

(1) Very high levels of species richness

(2) High level obstacles to check the invasions of alien species

(3) High degree of endemism

(4) Degree of threat w.r.t. habitat loss

128. Earth summit is concerned with

(1) Conservation of biodiversity and sustainable utilisation of its benefits

(2) Removal of toxic substances from water bodies

(3) Protection of soil from its erosion

(4) Development of new resources for a population inhabiting a new area

129. Select the statement which is **incorrect** w.r.t. species-area relationship.

(1) For small areas, the value of slope of regression lies in the range of 0.1 to 0.2

(2) On logarithmic scale, the relationship becomes rectangular hyperbola

(3) For a very large area the regression coefficient ranges between 0.6 to 1.2

(4) Alexander von Humboldt found that species richness increased with increasing explored area but only upto a limit

130. If we consider the different animal like birds (B), reptiles (R), fishes (F) and mammals(M), the **correct** order for their number of species in Amazonian rain forest will be

(1) F > M > R > B (2) B > M > F > R

(3) B > F > M > R (4) F > B > M > R

131. Since the origin and diversification of life on earth, there were how many episodes of mass extension of species?

(1) Five (2) Three

(3) Four (4) Two

132. The scrubbers installed in industries to remove SO_2 pollutant from the exhaust gases contain
(1) $CaCO_3$ (2) $MgSO_4$
(3) SiO_2 (4) $CaCl_2$

133. All of the following are advantages of CNG over petrol or diesel, **except**
(1) It cannot be adulterated
(2) It cannot be siphoned off by thieves
(3) It needs too much care for use
(4) It is comparatively cheaper

134. To safeguard our water resources, the government of India has passed the Water Act in
(1) 1974 (2) 1980
(3) 1954 (4) 2000

135. In Chamoli district, Chipko movement was started to
(1) Protect trees from their cutting
(2) Conserve water
(3) Promote sustainable use of forest products
(4) Protect the wild animals from their illegal hunting

SECTION-B

136. Among animals, most species-rich taxonomic group is of
(1) Molluscs (2) Fishes
(3) Insects (4) Crustaceans

137. 'Rivet popper hypothesis' was used to explain the effect of reduction in biodiversity by
(1) David Tilman (2) Norman Myers
(3) Paul Ehrlich (4) Lindemann

138. Ecosystems are undergoing change due to several factors. Which one of the following is **not** amongst them?
(1) Pollution
(2) Climate change
(3) Migration of animals
(4) Over-exploitation by humans

139. On lag scale, species-area relationship can be represented by the equation
[Here, S = Species richness; A = Area; Z = Regression coefficient; C = Y intercept]
(1) $\log S = \frac{\log C}{Z \log A}$
(2) $\log C = \log S + A \log Z$
(3) $\log S = \log C + Z \log A$
(4) $\log A = \log S + C \log Z$

140. Match items of Column-I with Column-II and select the **correct** option.

	Column-I		**Column-II**
a.	Electrostatic precipitator	(i)	Air pollutant
b.	Noise	(ii)	Inactivated by leaded petrol
c.	Catalytic converter	(iii)	UV-B radiations
d.	Snow blindness	(iv)	Attracts the charged dust particles

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

141. Select the **incorrect** match
(1) Kyoto Protocol – For reduction of greenhouse gas emission
(2) Montreal Protocol – Held at Montreal, Canada in 1987
(3) Dobson Units – Measures green house gases like CFC
(4) Euro Norms – Regulates sulphur and aromatic content in fossil fuel

142. Estimation of Biochemical Oxygen Demand (BOD) is a method used to
(1) Know the amount of biodegradable organic matter in sewage water
(2) Measure suspended solids like sand, silt and clay in a pond
(3) Indicate intense level of non-biodegradable pollutants in water
(4) Calculate the respiratory capacity of aquatic flora

143. Select the **incorrect** statement w.r.t. aerosols.
(1) It causes ozone depletion
(2) It cannot be a carbon compound
(3) It is emitted from jet aeroplanes
(4) It is used in refrigerators

144. UV-radiations are harmful to plants and other organisms because they
(1) Damage the ozone layer
(2) Cause dehydration
(3) Increase respiration
(4) Damage DNA and can cause genetic changes

145. Consider the following statements regarding EcoSan toilets.
(A) Uses water to dispose off human excreta.
(B) Recycles human excreta as a natural fertilizer.
(C) This is a hygienic and efficient solution of human waste disposal.
(D) It is not a cost effective and practical solution.
The **correct** statements are
(1) (A) and (D) (2) (B) and (C)
(3) (B) and (D) (4) (A) and (C)

146. Select the **incorrect** statement w.r.t. biomagnification.
(1) The phenomenon is well-known for accumulation of mercury and DDT
(2) Occurs w.r.t. non-biodegradable substances which does not metabolised or excreted and are passed to next trophic level
(3) Causes natural ageing of lakes by enrichment of nutrients
(4) Refers to increase in concentration of a toxicant at successive trophic level

147. Greenhouse gases absorb a major fraction of a form of radiations re-emitted by Earth's surface which are
(1) UV-radiations
(2) Infrared radiations
(3) Shortwave radiations
(4) Photosynthetically active radiations

148. Global warming **cannot** be controlled by
(1) Reducing deforestation
(2) Cutting down the use of fossil fuel
(3) Slowing down population growth
(4) Promoting the use of compressed natural gas

149. For laying roads, polyblend is mixed with
(1) Benzene hexachloride
(2) Bitumen
(3) Polyethene
(4) PVC

150. Pyrolysis is a process in which
(1) Aerobic combustion of solid waste is done at temperature of 850°C-1000°C
(2) Dumping of wastes is done on low-lying uncovered area
(3) Anaerobic combustion of solid wastes is done at 1650°C
(4) Recovery of the articles that can be recycled is carried out

ZOOLOGY

SECTION-A

151. *Agrobacterium,* containing Ti plasmid, provides a vehicle for introducing foreign DNA into dicot plants. This natural engineer can be used in which of the following techniques?
(1) RNAi (2) ELISA
(3) PCR (4) Autoradiography

152. Read the given statements and select the correct option.
Statement-A : *In vitro* DNA amplification is characterized by PCR.
Statement-B : The Green revolution succeeded in tripling the food supply and is enough to feed the growing human population.
(1) Both statements are correct
(2) Only statement B is incorrect
(3) Only statement A is incorrect
(4) Both statements are incorrect

153. Select the **incorrect** match.
(1) Pest resistant crop – Flavr savr
(2) Patent controversy – Turmeric
(3) Resistant to bollworm – Bt Cotton
(4) Production of Hirudin – *Brassica napus*

154. A transgenic cow, Rosie is known for producing milk which is enriched in
(1) Vitamin A and D (2) α-Lactalbumin
(3) Casein (4) β-Lactalbumin

155. Choose the **odd** one out from the given animals.
(1) Molly (2) Polly
(3) Dolly (4) ANDi

156. _____ method is used to control the infection of *Meloidogyne incognita* in tobacco plant and this control is due to production of _____.
Choose the correct option which fills the blanks respectively.
(1) DNAi, ssRNA (2) RNAi, dsDNA
(3) RNAi, dsRNA (4) DNAi, dsRNA

157. For the preparation of humulin, which of the following gene is introduced in the plasmid of *E.coli*?
(1) Human gene encoding A and C chains
(2) Synthetic gene encoding A and C chains
(3) Human gene encoding B and C chains
(4) Synthetic gene encoding A and B chains

158. The patents which are being granted for biological entities and for products derived from them are called
(1) Biopatent (2) Biopiracy
(3) Biowar (4) Bioterrorism

159. A gene, *cryIAc* controls the population of insects like
(1) Corn borer (2) Cotton bollworm
(3) Prawn (4) Cockroach

160. In gene therapy, _____ from blood cells of the patient are grown in culture medium outside the body and a functional ADA cDNA gene is introduced with the help of _____ as a part of the treatment of SCID.
Select the **correct** option that fills the blanks respectively.
(1) Neutrophils, Reovirus
(2) Erythrocytes, Arbovirus
(3) Lymphocytes, Retrovirus
(4) Liver cells, Microinjection

161. How many of the recombinant therapeutics have been approved for human use the world over?
(1) 20 (2) 12
(3) 30 (4) 27

162. Decisions regarding the validity and safety of introducing GM organisms for public services in India are made by
(1) RAC
(2) GEAC
(3) NIH
(4) Indian patent and trademark office

163. Select the **correct** statement regarding benefits of genetically modified (GM) plants.
(1) They are more susceptible to abiotic stress.
(2) All of the GM plants are nutrient deficient.
(3) Pest resistant plants have reduced reliance on chemical pesticides.
(4) Their increased efficiency of mineral usage has led to depletion of nutrients in soil.

164. Read the following statements and select the **correct** option.
Assertion (A) : During autoradiography, cells or colonies having the mutated gene do not appear on the photographic film.
Reason (R) : Probe doesn't have complementarity with mutated gene.
(1) Both (A) and (R) are true and (R) is the correct explanation of (A)
(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(3) (A) is true statement but (R) is false
(4) Both (A) and (R) are false statements

165. RNA interference has been used to develop plants which are resistant to
(1) Nematodes
(2) Bacteria
(3) Insects
(4) Viruses

166. Transgenic animals are developed by
(1) Introducing foreign genes
(2) Introducing gene mutations
(3) Deleting certain parts of chromosomes
(4) Stopping spindle formation

167. Select an **incorrect** statement w.r.t. gene therapy.
(1) Gene therapy can be attempted for treating a person with hereditary disease.
(2) It is a collection of methods that does not allows a correction of gene defect that has been diagnosed in a child/embryo.
(3) In this, genes are inserted into a person's cells and tissues in order to treat a disease.
(4) Correction of a genetic defect involves delivery of a normal gene into the individual or embryo to take over the function of and compensate for the non-functional gene.

168. During the processing of proinsulin into mature insulin in humans, which of the following is true?
(1) C-peptide chain is removed from proinsulin
(2) Disulphide bonds are broken to form proinsulin
(3) B-peptide chain is added to proinsulin
(4) A-peptide chain is removed from proinsulin

169. An American company got patent rights on Basmati rice through the US patent and trademark office in the same year when
(1) First rDNA was created
(2) Humulin was created
(3) First transgenic cow produced human protein-enriched milk
(4) First gene therapy was done

170. The transgenic animal that is used to test the safety of the polio vaccine is
(1) Mice (2) Fish
(3) Pigs (4) Cows

171. Bt toxin produced by *Bacillus thuringiensis* bacteria does **not** kill the *Bacillus* itself because
(1) The toxin is produced only after entry of *Bacillus* into a host after induction from host proteins
(2) Toxin exists as inactive protoxin in the *Bacillus* cell
(3) Activation of toxin requires acidic pH which is not available in the host
(4) The toxin is an exotoxin and is not stored in *Bacillus* cell

172. Single stranded DNA or RNA segment tagged with radioactive molecule is called
(1) Probe (2) Plasmid
(3) Vector (4) Clone

173. α-1-antitrypsin is used in treatment of a chronic pulmonary lung disease called
(1) Tuberculosis (2) Emphysema
(3) Atelectasis (4) Bronchitis

174. Which of the following animals represent maximum number of existing transgenic animals?
(1) Fishes (2) Monkeys
(3) Cows (4) Mice

175. 'Round up' ready crops were resistant to glyphosate which interferes with plant growth by
(1) Inhibiting the process of glycolysis in weeds
(2) Inhibiting the synthesis of aromatic amino acids
(3) Promoting accumulation of toxins in all plants
(4) Reducing the formation of lipids required in seeds

176. Which of the following is **true** w.r.t. antisense technology?
(1) It is when a piece of RNA that is complementary in sequence is used to stop expression of a specific gene
(2) It can detect presence of antigens in a sample
(3) Production of somaclonal variants in tissue cultures
(4) Powerful technique to identify many genetic disorders

177. Which of the following methods could be a permanent cure for a child suffering from ADA deficiency?
(1) Transferring ADA gene into the blood
(2) Treatment by enzyme replacement therapy
(3) Gene producing ADA is isolated from marrow cells and is introduced into cells at early embryonic stages
(4) Transferring ADA gene via DNA vaccine method

178. Enzyme streptokinase obtained from bacteria *Streptococcus* is used clinically as
(1) Surfactant in case of atelectasis
(2) Clot buster in case of myocardial infarction
(3) α-1-antitrypsin in case of emphysema
(4) Humulin

179. Which of the following is the first human hormone which was synthesized by recombinant DNA technology?
(1) Thyroxine (2) Growth hormone
(3) Prolactin (4) Insulin

180. Golden rice is a transgenic crop with
(1) Insect resistance
(2) High protein content
(3) High β-carotene content
(4) High amino acid content

181. Bioremediation of oil spills is carried out by which genetically engineered microorganism?
(1) *Escherichia coli*
(2) *Streptococcus*
(3) *Pseudomonas putida*
(4) *Salmonella typhi*

182. Biopatents are awarded to inventors in all of the following situations applying to invention except if the invention is
(1) Documented
(2) Non-obvious
(3) Novel
(4) Useful for human beings

183. Early diagnosis is possible by using all of the following except
(1) ELISA (2) Urine analysis
(3) RDT (4) PCR

184. Mature form of recombinant human insulin has
(1) Two intrachain disulphide bonds
(2) Only one interchain disulphide bonds
(3) Three interchain disulphide bonds
(4) Two interchain disulphide bonds

185. All of the following can be used for increasing food production, **except**
(1) Better management practices
(2) Use of fertilisers but not pesticides
(3) Organic agriculture
(4) Genetically engineered crop-based agriculture

SECTION-B

186. In RNAi, there is silencing of a specific _____ due to complementary molecule that binds to and prevents protein synthesis.
Choose the option that fills the blank **correctly**.
(1) tRNA (2) rRNA
(3) mRNA (4) ssDNA

187. *B. thuringiensis* forms protein crystals during a particular growth phase. These crystals contain a toxic protein which is
(1) Herbicidal (2) Insecticidal
(3) Bactericidal (4) Fungicidal

188. Polyethylene glycol is used in biotechnology for
(1) Creating transient pores in cell membrane
(2) DNA extraction
(3) Cell culture preparation
(4) Protoplast fusion

189. Which of the following gene controls corn borer?
(1) *cry*I*Ac* (2) *cry*II*Ab*
(3) *cry*IAb and *cry*IAc (4) *cry*I*Ab*

190. The part of tobacco plant infected by *Meloidogyne incognita* is
(1) Flower (2) Leaf
(3) Stem (4) Root

191. **Incorrect** match w.r.t. therapeutic product is
(1) FSH – Infertility treatment
(2) Interferon – Leukemia
(3) Somatotrophin – Haemophilia
(4) Erythropoietin – Anemia

192. The term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment is
(1) Biopiracy (2) Bioprospecting
(3) Bioexploitation (4) Bio-infringement

193. Eli Lilly, an American company in _____ prepared recombinant human insulin.

Select the correct option to fill in the blank.

(1) 1983 (2) 1970

(3) 1963 (4) 1989

194. Which of the following statement is **incorrect** w.r.t. plant, *Pentadiplandra brazzeana*?

(1) It produces a protein, brazzein

(2) Brazzein protein is a high calorie sweetener

(3) Brazzein protein is 2000 times sweeter than sugar

(4) Protein brazzein was patented in U.S.A.

195. Autoradiography is employed in all of the given techniques **except**

(1) DNA fingerprinting

(2) Southern hybridisation

(3) Northern blotting

(4) PCR

196. How many estimated varieties of rice are present in India alone?

(1) 200,000 (2) 20,000

(3) 2000 (4) 20,000,00

197. **Assertion (A):** Insulin is usually not administered orally to a diabetic patient.

Reason (R): Insulin is a peptide and hydrolysed in digestive tract.

In the light of above statements, select the correct option.

(1) Both (A) and (R) are true and (R) is the correct explanation of (A)

(2) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(3) (A) is true, (R) is false

(4) (A) is false, (R) is true

198. Which of the following enzymes is not currently used in ELISA?

(1) Catalase

(2) Peroxidase

(3) β-galactosidase

(4) Alkaline phosphatase

199. Read the given statements and select the correct option.

Statement (A): During gene cloning, plasmid is called as gene taxi.

Statement (B): The current interest in the manipulation of microbes, plants and animals has raised no ethical questions.

(1) Both statements (A) and (B) are correct

(2) Both statements (A) and (B) are incorrect

(3) Only statement (A) is correct

(4) Only statement (B) is correct

200. Basmati rice is distinct for its unique aroma and flavour and _____ documented varieties of Basmati are grown in India.

Select the option that correctly fills the blank.

(1) 27 (2) 35

(3) 47 (4) 17

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