PHYSICS

(SECTION-A)

1. Lenz's law is consequence of the law of conservation of
(A) Charge (B) Momentum
(C) Mass (D) Energy

2. A copper ring is held horizontally and a bar magnet is dropped through the ring with its length along the axis of the ring. The acceleration of the falling magnet while it is passing through the ring is
(A) Equal to that due to gravity
(B) Less than that due to gravity
(C) More than that due to gravity
(D) Depends on the diameter of the ring and the length of the magnet

3. A square coil $10^{-2} m^2$ area is placed perpendicular to a uniform magnetic field of intensity $10^3 Wb/m^2$. The magnetic flux through the coil is
(A) 10 *weber* (B) 10^{-5} *weber*
(C) 10^5 *weber* (D) 100 *weber*

4. The north pole of a long horizontal bar magnet is being brought closer to a vertical conducting plane along the perpendicular direction. The direction of the induced current in the conducting plane will be
(A) Horizontal (B) Vertical
(C) Clockwise (D) Anticlockwise

5. The unit of magnetic flux is
(A) $Weber/m^2$ (B) *Weber*
(C) *Henry* (D) *Ampere*/*m*

6. A magnetic field of 2×10^{-2} *T* acts at right angles to a coil of area 100 cm^2 with 50 turns. The average emf induced in the coil is 0.1 *V*, when it is removed from the field in time *t*. The value of *t* is
(A) 0.1 *sec* (B) 0.01 *sec*
(C) 1 *sec* (D) 20 *sec*

7. The magnetic flux linked with a vector area $\vec{A}$ in a uniform magnetic field $\vec{B}$ is
(A) $\vec{B} \times \vec{A}$ (B) *AB* (C) $\vec{B} \cdot \vec{A}$ (D) $\frac{B}{A}$

8. The magnetic flux linked with coil, in weber is given by the equation, $\phi = 5t^2 + 3t + 16$. The induced emf in the coil in the fourth second is
(A) 10 *V* (B) 30 *V*
(C) 45 *V* (D) 90 *V*

9. A two metre wire is moving with a velocity of 1 m/*sec* perpendicular to a magnetic field of 0.5 *weber*/m^2. The e.m.f. induced in it will be
(A) 0.5 *volt* (B) 0.1 *volt*
(C) 1 *volt* (D) 2 *volt*

10. A conducting wire is dropped along east-west direction, then
(A) No emf is induced
(B) No induced current flows
(C) Induced current flows from west to east
(D) Induced current flows from east to west

11. A straight conductor of length 0.4 *m* is moved with a speed of 7 *m/s* perpendicular to the magnetic field of intensity of 0.9 *Wb*/m^2. The induced e.m.f. across the conductor will be
(A) 7.25 *V* (B) 3.75 *V*
(C) 1.25 *V* (D) 2.52 *V*

12. A rectangular coil of 20 turns and area of cross- section 25 *sq* cm has a resistance of 100 *ohm*. If a magnetic field which is perpendicular to the plane of the coil changes at the rate of 1000 *Tesla* per second, the current in the coil is
(A) 1.0 *ampere* (B) 50 *ampere*
(C) 0.5 *ampere* (D) 5.0 *ampere*

13. An e.m.f. of 5 *volt* is produced by a self inductance, when the current changes at a steady rate from 3 *A* to 2 *A* in 1 millisecond. The value of self inductance is
(A) Zero (B) 5 *H*
(C) 5000 *H* (D) 5 *mH*

14. When the number of turns in a coil is doubled without any change in the length of the coil, its self inductance becomes
(A) Four times (B) Doubled
(C) Halved (D) Unchanged

15. A 100 *mH* coil carries a current of 1 *ampere*. Energy stored in its magnetic field is
(A) 0.5 *J* (B) 1 *J*
(C) 0.05 *J* (D) 0.1 *J*

16. Eddy currents are produced when
(A) A metal is kept in varying magnetic field
(B) A metal is kept in the steady magnetic field
(C) A circular coil is placed in a magnetic field
(D) Through a circular coil, current is passed

17. A transformer is employed to
(A) Obtain a suitable dc voltage
(B) Convert dc into ac
(C) Obtain a suitable ac voltage
(D) Convert ac into dc

18. The core of a transformer is laminated so that
(A) Ratio of voltage in the primary and secondary may be increased
(B) Rusting of the core may be stopped
(C) Energy losses due to eddy currents may be reduced
(D) Change in flux is increased

19. A step-up transformer operates on a 230 *V* line and supplies a load of 2 *ampere*. The ratio of the primary and secondary windings is 1 : 25. The current in the primary is
(A) 15 *A* (B) 50 *A*
(C) 25 *A* (D) 12.5 *A*

20. **Assertion :** The induced emf in a conducting loop of wire will be non zero when it rotates in a uniform magnetic field.
Reason : The emf is induced due to change in magnetic flux.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

21. The potential difference *V* and the current *i* flowing through an instrument in an ac circuit of frequency *f* are given by $V = 5\cos\omega t$ *volts* and *I* = 2 sin ωt *amperes* (where $\omega = 2\pi f$). The power dissipated in the instrument is
(A) Zero (B) 10 *W*
(C) 5 *W* (D) 2.5 *W*

22. In an ac circuit, *V* and *I* are given by *V* = 100 sin (100 *t*) *volts*, $I = 100\sin\left(100t + \frac{\pi}{3}\right)mA$. The power dissipated in circuit is
(A) 10^4 *watt* (B) 10 *watt*
(C) 2.5 *watt* (D) 5 *watt*

23. The peak value of 220 *volts* of ac mains is
(A) 155.6 *volts* (B) 220.0 *volts*
(C) 311.0 *volts* (D) 440 *volts*

24. The frequency of ac mains in India is
(A) 30 *c/s* or *Hz* (B) 50 *c/s* or *Hz*
(C) 60 *c/s* or *Hz* (D) 120 *c/s* or *Hz*

25. If a current *I* given by $I_0\sin\left(\omega t - \frac{\pi}{2}\right)$ flows in an ac circuit across which an ac potential of $E = E_0\sin\omega t$ has been applied, then the power consumption *P* in the circuit will be
(A) $P = \frac{E_0 I_0}{\sqrt{2}}$ (B) $P = \sqrt{2}E_0 I_0$
(C) $P = \frac{E_0 I_0}{2}$ (D) *P* = 0

26. The frequency of an alternating voltage is 50 *cycles*/*sec* and its amplitude is 120*V*. Then the *r.m.s.* value of voltage is
(A) 101.3*V* (B) 84.8*V*
(C) 70.7*V* (D) 56.5*V*

27. A lamp consumes only 50% of peak power in an a.c. circuit. What is the phase difference between the applied voltage and the circuit current
(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

28. The average power dissipated in a pure inductor of inductance *L* when an ac current is passing through it, is
(A) $\frac{1}{2}LI^2$ (B) $\frac{1}{4}LI^2$
(C) $2Li^2$ (D) Zero
(Inductance of the coil *L* and current *I*)

29. In a pure inductive circuit or In an ac circuit containing inductance only, the current
(A) Leads the e.m.f. by 90^o
(B) Lags behind the e.m.f. by 90^o
(C) Sometimes leads and sometime lags behind the e.m.f.
(D) Is in phase with the e.m.f.

30. In a circuit, the value of the alternating current is measured by hot wire ammeter as 10 *ampere*. Its peak value will be
(A) 10 *A* (B) 20 *A*
(C) 14.14 *A* (D) 7.07 *A*

31. An alternating voltage $E = 200\sqrt{2}\sin(100\ t)$ is connected to a 1 *microfarad* capacitor through an ac ammeter. The reading of the ammeter shall be
(A) 10 *mA* (B) 20 *mA*
(C) 40 *mA* (D) 80 *mA*

32. In a series circuit R = 300 Ω, L = 0.9 *H*, C = 2.0 μF and ω = 1000 *rad/sec*. The impedance of the circuit is
(A) 1300 Ω (B) 900 Ω
(C) 500 Ω (D) 400 Ω

33. The voltage of domestic ac is 220 *volt*. What does this represent
(A) Mean voltage
(B) Peak voltage
(C) Root mean voltage
(D) Root mean square voltage

34. If an $8\,\Omega$ resistance and $6\,\Omega$ reactance are present in an ac series circuit then the impedance of the circuit will be
(A) 20 *ohm* (B) 5 *ohm*
(C) 10 *ohm* (D) $14\sqrt{2}$ *ohm*

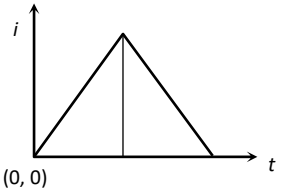
35. For high frequency, a capacitor offers
(A) More reactance
(B) Less reactance
(C) Zero reactance
(D) Infinite reactance

(SECTION-B)

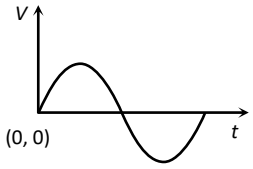
36. In an *LR*-circuit, the inductive reactance is equal to the resistance R of the circuit. An e.m.f. $E = E_0\cos(\omega t)$ applied to the circuit. The power consumed in the circuit is
(A) $\frac{E_0^2}{R}$ (B) $\frac{E_0^2}{2R}$
(C) $\frac{E_0^2}{4R}$ (D) $\frac{E_0^2}{8R}$

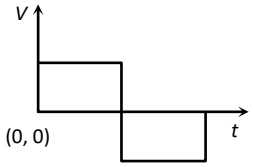
37. The reactance of a coil when used in the domestic ac power supply (220 *volts*, 50 cycles per second) is 50 *ohms*. The inductance of the coil is nearly
(A) 2.2 *henry* (B) 0.22 *henry*
(C) 1.6 *henry* (D) 0.16 *henry*

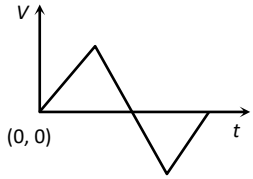
38. The current '*i*' in an inductance coil varies with time '*t*' according to following graph

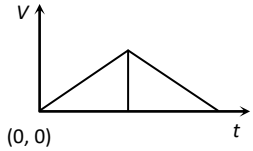


Which one of the following plots shows the variations of voltage in the coil

(A)


(B)


(C)


(D)


39. **Assertion :** If the frequency of alternating current in an ac circuit consisting of an inductance coil is increased then current gets decreased.
Reason : The current is inversely proportional to frequency of alternating current.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

40. The electric and magnetic fields of an electromagnetic wave are :
(A) in phase and parallel to each other
(B) in opposite phase and perpendicular to each other
(C) in opposite phase and parallel to each other
(D) in phase and perpendicular to each other.

41. The velocity of electromagnetic radiation in a medium of permittivity ε_0 and permeability μ_0 is given by :

(A) $\sqrt{\frac{\varepsilon_0}{\mu_0}}$ (B) $\sqrt{\mu_0 \varepsilon_0}$

(C) $\frac{1}{\sqrt{\mu_0 \varepsilon_0}}$ (D) $\sqrt{\frac{\mu_0}{\varepsilon_0}}$

42. The S.I unit of displacement current is

(A) H (B) A (C) Fm^{-1} (D) C

43. In a certain region of space electric field $\vec{E}$ and magnetic field $\vec{B}$ are perpendicular to each other and an electron enters in region perpendicular to the direction of and $\vec{E}$ both moves undeflected, then velocity of electron is :

(A) $\frac{|\vec{E}|}{|\vec{B}|}$ (B) $\vec{E} \times \vec{B}$

(C) $\frac{|\vec{B}|}{|\vec{E}|}$ (D) $\vec{E} \cdot \vec{B}$

44. Which of these statement is false :

(A) Photographic plate is sensitive for infrared rays

(B) Photographic plate is sensitive for ultraviolet rays.

(C) Infrared rays are invisible but make shadow like visible light

(D) As compared to visible light photon, infrared photon has more energy.

45. Which of the following required no medium for propagation ?

(A) Cathode rays

(B) Electromagnetic rays

(C) Sound waves

(D) None of these

46. The velocity of all radio waves in free space is 3×10^8 m/s. The frequency of a radio wave of wavelength 150 m is :

(A) 50 kHz (B) 2 kHz

(C) 2 MHz (D) 1 MHz

47. The electric field associated with an e.m. wave in vacuum is given by $\vec{E} = \hat{i}\, 40 \cos$ (kz – 6 $\times 10^8$ t), where E, z and t are in volt/m, meter and seconds respectively. The value of wave vector k is :

(A) 2 m^{-1} (B) 0.5 m^{-1}

(C) 6 m^{-1} (D) 3 m^{-1}

48. The ratio of amplitude of magnetic field to the amplitude of electric field for an electromagnetic wave propagating in vacuum is equal to :

(A) the speed of light in vacuum

(B) reciprocal of speed of light in vacuum

(C) the ratio of magnetic permeability to the electric susceptibility of vacuum

(D) unity

49. Match List – I with List – II

List – I

(A) AC generator

(B) Galvanometer

(C) Transformer

(D) Metal detector

List – II

(I) Detects the presence of current in the circuit

(II) Converts mechanical energy into electrical energy.

(III) Works on the principal of resonance in AC circuit.

(IV) Changes an alternating voltage for smaller of greater value

Choose the correct answer from the option given below:

(A) (A)-(II),(B)-(I),(C)-(IV),(D)-(III)

(B) (A)-(II),(B)-(I),(C)-(III),(D)-(IV)

(C) (A)-(II),(B)-(IV),(C)-(II),(D)-(I)

(D) (A)-(III),(B)-(I),(C)-(II),(D)-(IV)

50. Match the following

Column I	**Column II**
(a) Radio waves	(1) heat wave
(b) Ultraviolet	(2) highest frequency
(c) Infrared	(3) Ionosphere
(d) Gamma rays	(4) Ozone layer

(A) a-3,b-4,c-1,d-2 (B) a-1,b-2,c-4,d-3

(C) a-3,b-1,c-4,d-2 (D) a-1,b-3,c-2,d-4

(SECTION-A)

51. Co-ordination number of Co in $[CoF_6]^{-3}$ is
(A) 4 (B) 5 (C) 6 (D) 8

52. The coordination number and oxidation number of the central metal ion in the complex $[Pt(en)_2]^{+2}$ is :-
(A) C. N. = 2,O. N. = +2
(B) C. N. = 6,O. N. = +4
(C) C. N. = 4,O. N. = +4
(D) C. N. = 4,O. N. = +2

53. The addition compounds which retain their identity in solution are called.
(A) Double salts
(B) Complex compounds
(C) Coordination compounds
(D) (B) and (C) both

54. In the metal carbonyls of general formula $M(CO)_x$ (Which follows EAN rule) if M is Ni, Fe and Cr the value of x will be respectively:-
(A) 6, 5, 6 (B) 4, 5, 6
(C) 4, 4, 5 (D) 4, 6, 6

55. Give the IUPAC name of the complex compound $[Co(NH_3)_4(H_2O)Br](NO_3)_2$.
(A) Bromoaquotetraamine Cobalt (III) nitrate
(B) Bromoaquotetraaminocobalt (III) nitrate
(C) Bromoaquatetraammine cobalet (III) nitrate
(D) Tetraammineaquabromo cobalt (III) nitrate

56. Chemical Name of "Turn bull's blue" is :-
(A) Ferrous ferricyanide
(B) Potassium ferrocyanide
(C) Potassium cyanide
(D) Potassium ferricyanide

57. The number of isomeric forms in which $[Co(NH_3)_4Cl_2]^{1+}$ ion can occur is
(A) 2 (B) 3 (C) 4 (D) 1

58. The complexes $[Co(NO_2)(NH_3)_5]Cl_2$ and $[Co(ONO)(NH_3)_5]Cl_2$ are the examples of
(A) Coordination isomerism
(B) Ionisation isomerism
(C) Geometrical isomerism
(D) Linkage isomerism

59. The shape of $[Cu(NH_3)_4]SO_4$ is :
(A) Square planar (B) Pyramidal
(C) Octahedral (D) Tetrahedral

60. Among $Ni(CO)_4$, $Ni(CN)_4^{2-}$ and $[Ni(Cl)_4]^{2-}$:
(A) $Ni(CO)_4$ and $NiCl_4^{2-}$ are diamagnetic and $Ni(CN)_4^{2-}$ is paramagnetic.
(B) $NiCl_4^{2-}$ and $Ni(CN)_4^{2-}$ are diamagnetic and $Ni(CO)_4$ is paramagnetic.
(C) $Ni(CO)_4$ and $Ni(CN)_4^{2-}$ are diamagnetic and $NiCl_4^{2-}$ is paramagnetic.
(D) $Ni(CO_4)$ is diamagnetic and $NiCl_4^{2-}$ and $Ni(CN)_4^{2-}$ are paramagnetic.

61. The brown ring test for nitrites and nitrates is due to the formation of a complex ion with formula:-
(A) $[Fe(H_2O)_5NO^+]^{2+}$
(B) $[Fe(H_2O)_6]^{2+}$
(C) $[Fe(H_2O)(NO)_5]^{2-}$
(D) $[Fe(NO)(CN)_5]^{2+}$

62. Photo graphic films or plates have.....as an essential ingredient:-
(A) Silver oxide (B) Silver bromide
(C) Silver thio sulphate (D) Silver nitrate

63. Zeigler natta catalyst is :
(A) Pt/PTO
(B) $Al(C_2H_5)_3 + TiCl_4$
(C) $K(PtCl_3(\eta^2 - C_2H_4)]$
(D) Pt/Rh

64. **Assertion :** NF_3 is a weaker ligand than $N(CH_3)_3$
Reason: NF_3 ionizes to give F^- ions in aqueous solution.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

65. **Assertion :** The ligands nitro and nitrito are called ambidentate ligands.
Reason : These ligands give linkage isomers.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

66. **Assertion :** Geometrical isomerism is also called *cis-trans* isomerism.
Reason : Tetrahedral complexes show geometrical isomerism.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

67. In the first transition series the melting point of Zn is low, because:-
(A) Metallic bonds are strong due to d^{10} configuration
(B) Metallic bonds are weak due to d^5 configuration
(C) Metallic bonds are weak due to d^7 configuration
(D) d-orbital have no unpaired electrons

68. Which of the following pair of elements belong to second transition series?
(A) Fe & Pd (B) V & Y
(C) Cu & Au (D) Ag & Zr

69. Chromium forms most stable compound in the following oxidation state-
(A) Cr (IV) (B) Cr (II)
(C) Cr (III) (D) Cr (V)

70. In which compound Mn will not show +2 oxidation state?
(A) $[Mn(H_2O)_6]^{2+}$ (B) $MnCl_2$
(C) $[MnCl_4]^-$ (D) MnO

71. When the configuration is d7 in a transition metal, the paramagnetic susceptibility will be equal to-
(A) 3.87 B.M. (B) 2.68 B.M.
(C) 5.92 B.M. (D) 6.92 B.M.

72. An inorganic salt is lemon yellow in colour. It becomes orange in colour like methyl orange when it is acidic and again becomes yellow when it is alkaline. The inorganic salt will be:-
(A) Copper nitrate
(B) Ferric chloride
(C) Potassium chromate
(D) Potassium ferricyanide

73. The general electronic configuration of lanthanide is :
(A) [Xe] $4f^{14}\ 5d^{0-1}\ 6s^2$
(B) [Xe] $4f^{0-14}\ 5d^{1-2}\ 6s^1$
(C) [Xe] $4f^{0-14}\ 5d^{0-1}\ 6s^{1-2}$
(D) None of these

74. K_2MnO_4 disproportionate in :
(A) basic medium
(B) acidic medium
(C) Neutral medium
(D) in basic buffer solution

75. **Assertion :** Zn^{2+} is diamagnetic
Reason : The electrons are lost from 4 *s* orbital to form Zn^{2+}
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

76. **Assertion :** Tungsten filament is used in electric bulbs.
Reason : Tungsten is a metal of high melting point.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

77. Amongest TiF_6^{2-}, CoF_6^{-3}, Cu_2Cl_2 and $NiCl_4^{-2}$ colourless compound is
(A) Cu_2Cl_2 & $NiCl_4^{-2}$
(B) TiF_6^{-3} and CoF_6^{-3}
(C) CoF_6^{-3} and $NiCl_4^{-2}$
(D) TiF_6^{-2} and Cu_2Cl_2

78. Cr in $[Cr(NH_3)_6]\ Br_3$ has number of unpaired electron :-
(A) 4 (B) 3 (C) 1 (D) 2

79. In quantitative analysis of second group in lab., H_2S gas is passed in acidic medium for ppt. When Cu^{+2} and Cd^{+2} react with KCN, than in which of the following condition, ppt will not be formed due to relative stability.
(A) $K_2[Cu(CN)_4]$ – More stable $K_2[Cd(CN)_4]$ – Less stable
(B) $K_2[Cu(CN)_4]$ – Less stable $K_2[Cd(CN)_4]$ – More stable
(C) $K_3[Cu(CN)_4]$ – More stable $K_2[Cd(CN)_4]$ – Less stable
(D) $K_3[Cu(CN)_4]$ – Less stable $K_3[Cd(CN)_4]$ – More stable

80. In the formation of $[Ni(CN)_4]^{2-}$, the type of hybridisation involved is
(A) sp^2 (B) sp^3d
(C) dsp^2 (D) sp^3d

81. Which of the following does not show optical isomerism?
(A) $[Co(en)_3]^{3+}$
(B) $[Co(en)_2Cl_2]^+$
(C) $[Co(NH_3)_3Cl_3]^0$
(D) $[Co(en)Cl_2(NH_3)_2]^+$

82. Which one of the following ions exhibits d-d transition and paramagnetism as well ?
(A) MnO_4^- (B) $Cr_2O_7^{2-}$
(C) CrO_4^{2-} (D) MnO_4^{2-}

83. What would happen when a solution of potassium chromate is treated with an excess of dilute nitric acid ?

(A) Cr^{3+} and $Cr_2O_7^{2-}$ are formed
(B) $Cr_2O_7^{2-}$ and H_2O are formed
(C) $Cr_2O_7^{2-}$ is reduced to +3 state of Cr
(D) $Cr_2O_7^{2-}$ is oxidised to +7 state of Cr

84. Cerium (Z = 58) is an important member of the lanthanoids. Which of the following statement about cerium is incorrect ?

(A) Cerium (IV) acts as an oxidising agent.
(B) The +3 oxidation state of cerium is more stable than the +4 oxidation state.
(C) The +4 oxidation state of cerium is not known in solutions.
(D) The common oxidation states of cerium are +3 and +4.

85. Excess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. Which of the statements is incorrect for this reaction ?

(A) Evolved I_2 is reduced
(B) CuI_2 is formed
(C) $Na_2S_2O_3$ is oxidised
(D) Cu_2I_2 is formed

(SECTION-B)

86. Calomel on reaction with NH_4OH gives –
(A) $HgNH_2Cl$
(B) $NH_2–Hg–Hg–Cl$
(C) Hg_2O
(D) HgO

87. Identify the incorrect statement among the following-
(A) d-block elements show irregular and erratic chemical properties among themselves.
(B) La and Lu have partially filled d-orbitals and no other partially filled orbitals
(C) The chemistry of various lanthanoids is very similar.
(D) 4f and 5f-orbitals are equally shielded.

88. What is false about N_2O_5 ?
(A) It is anhydride of HNO_3
(B) It is a powerful oxidizing agent
(C) Solid N_2O_5 is called nitronium nitrate
(D) Structure of N_2O_5 contains no [N→O] bond

89. Aqua regia is a mixture of :
(A) $3HCl + HNO_3$
(B) $3HNO_3 + HCl$
(C) $H_3PO_4 + H_2SO_4$
(D) $HCl + CH_3COOH$

90. Which of the following compounds is metallic and ferromagnetic ?
(A) CrO_2 (B) VO_2
(C) MnO_2 (D) TiO_2

91. Nitrogen forms N_2 but phosphorus do not forms P_2, but it exists as P_4 the reason for this is :
(A) Triple bond is present between phosphorus atoms
(B) $p\pi - p\pi$ bonding is weak
(C) $p\pi - p\pi$ bonding is strong
(D) Multiple bond is formed easily

92. Oxygen molecule shows:
(A) Diamagnetism
(B) Para magnetism
(C) Ferromagnetism
(D) Ferrimagnetisms

93. Which of the following properties does not decrease from top to bottom down the group in case of hydrides of oxygen family members?
(A) Dipole moment
(B) Bond angle
(C) Covalent character
(D) Thermal stability

94. Which one of the following is wrongly matched?
(A) ClO_3^-, sp^3, pyramidal
(B) ClO_4^-, sp^3, tetrahedral
(C) ICl_4^-, sp^3d^2, square planar
(D) ICl_2^-, dsp^2, trigonal bipyramidal

95. Iron exhibits + 2 and + 3 oxidation states. Which of the following statements about iron is incorrect ?

(A) Ferrous compounds are relatively more ionic than the corresponding ferric compounds.
(B) Ferrous compounds are less volatile than the corresponding ferric compounds.
(C) Ferrous compounds are more easily hydrolysed than the corresponding ferric compounds.
(D) Ferrous oxide is more basic in nature than the ferric oxide.

96. Which one of the following is metallic and most electropositive in character?

(A) F (B) I (C) Br (D) Cl

97. The actinoids exhibits more number of oxidation states in general than the lanthanoids. This is because -

(A) The 5f-orbitals are more buried than the 4forbitals
(B) There is a similarity between 4f and 5f in their angular part of the wave function
(C) The actinoids are more reactive than the lanthanoids
(D) The 5f-orbitals extend further from the nucleus than the 4f-orbitals

98. In the clatherates of Xenon with water, the nature of bonding between Xenon and water molecule is

(A) Covalent
(B) Hydrogen bonding
(C) Coordinate
(D) Dipole induced dipole interaction

99. The formula of sodium perxenate is :-

(A) Na_3XeO_6 (B) Na_4XeO_6
(C) Na_2XeF_8 (D) None

100. The structure of XeF_6 is :

(A) Distorted octahedral
(B) Pyramidal
(C) Tetrahedral
(D) None of these

BIOLOGY

BOTANY (SECTION-A)

101. In the year 1868, the DNA was discovered by the Swedish biochemist
(A) Fredrich Miescher (B) Watson
(C) Feulgen (D) Erik Jorpes

102. Mark the odd one with respect to Chargaff's rule.
(A) A+G=T+C
(B)A+T/G+C ratio is more than one for prokaryotes.
(C) It is applicable for double-stranded only.
(D) Sugar deoxyribose and phosphates occur in equimolar proportions.

103. The genetic material of an organisms contains G = 18%. Which of the following base proportions confirms the dsDNA?
(A) A=18% ; C = 32%
(B) C=32%; T = 18%
(C) A=32%; C = 18%
(D) T=22%; C = 18%

104. Nucleosomes consist of all except
(A) Histone octamer
(B) Lysine- and arginine-rich proteins
(C) H protein
(D) 200 base pairs

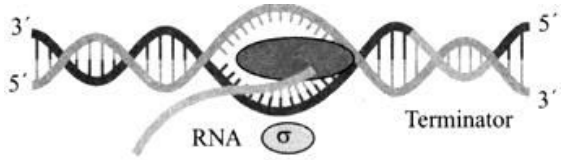
105. DNA double helix is
(A) Complementary and parallel
(B) Without supercoils
(C) Complementary and antiparallel
(D) Always linear

106. Identify the life process that is not evolved around RNA.
(A) Metabolism (B) DNA synthesis
(C) Translation (D) Splicing

107. Fill in the blanks, and choose the correct option.
(i) Histones are organized to from a unit of eight molecular called_____ A_____
(ii) _____B_____ constitute(s) the repeating unit of a structure in nucleus called_____ C_____
(iii) The chromatin that is more densely packed and is stained dark is called _____D_____
(A) A-Histone octamer; B-Nucleosome; C-Chromosome; D-Heterochromatin
(B) A-Histone octamer; B-Nucleosome; C-Chromatin; D-Heterochromatin
(C) A-Nucleosome; B-Nucleosome; C-Chromatin;D- Euchromatin
(D) A-Nu-body; B-Histone octamer; C-Chromosome D-Euchromatin

108. Unwinding of DNA creates tension that is released by the enzyme
(A) Helicase
(B) DNA polymerase I
(C) Topoisomerase
(D) Primase

109. Given diagram is the representation of a certain events. Identify this event.



(A) Chain termination of translation process in bacteria
(B) Chain initiation of transcription by o factor in prokaryotes
(C) Chain elongation catalyzed by RNA polymerase in prokaryotes
(D) Chain termination of transcription process in bacteria

110. Genetic code translates the language of
(A) RNA into that of protein
(B) RNA into that of DNA
(C) Amino acids into that of RNA
(D) Amino acids into that of DNA

111. The process of polymerization of amino acid to a polypeptide is known as
(A) Replication (B) Transcription
(C) Translation (D) Transduction

112. To code the 50 amino acids in a polypeptide chain, what will be minimum number of nucleotides in its cistron?
(A) 150 (B) 153 (C) 53 (D) 50

113. In eukaryotes, the regulation of gene expression occurs at the level of
(A) Transcription level
(B) Processing level
(C) Transport of ribosomal submits from nucleus to cytoplasm
(D) Translation level
(A) Only (A) and (B)
(B) Only (D)
(C) Only (A), (B), and (D)
(D) Only (A), (B) (C), and (D)

114. Phospholipids are
(A) monoglycerides
(B) diglycerides
(C) triglycerides
(D) Any of the above

115. Read the following statements carefully, and select correct option.
A. Sanger is credited for developing the method for determination of amino acid sequence in proteins.
B. Repeated sequence makes up vary large portion of human genome.
C. The functions are unknown for over 50% of discovered genes.
(A) Only (A)
(B) Only (B) and (C)
(C) Only (A) and (B)
(D) (A), (B), and (C)

116. Minisatellites used during DNA fingerprinting are
(A) Repetitive coding and noncoding short DNA sequence
(B) Repetitive coding short DNA sequences
(C) Repetitive noncoding short DNA sequence
(D) Nonrepetitive noncoding short DNA sequences

117. Human Genome Project (HGP) was closely associated with the rapid development of a new area in biology known as
(A) Biotechnology
(B) Bioinformatics
(C) Biolistics
(D) Genetic Engineering

118. Consider the following statements with respect to transcription, and select the correct option stating which ones are true (T) and which ones are false (F).
A. In transcription, only a segment of DNA and only one of the strands is copied into RNA.
B. Terminator is located upstream of the structural gene.
C. The nascent RNA synthesized by RNA polymerase II is called hnRNA in eukaryotes.
D. Intervening sequences do appear in processed RNA.
(A) A-T; B-F; C-T; D-T
(B) A-T; B-T; C-F; D-T
(C) A-F; B-F; C-T; D-T
(D) A-T; B-F; C-F; D-F

119. Which one is incorrect statement?
(A) The basic unit of DNA is nucleotide.
(B) A nitrogenous base is linked to pentose sugar by N-glycosidic linkage.
(C) Adenosine, guanosine, and cytidines are nucleotides.
(D) DNA is the largest macromolecule of the cell.

120. Two nucleotides are linked through
(A) N-glycosidic linkage
(B) H-bond
(C) Phosphodiester linkage
(D) B-1,4 glycosidic linkage

121. Read the following statement with respect to the structure of DNA, and state true (T) or false (F).
(A) It is made up of two polynucleotide chains that have antiparallel polarity.
(B) The two chains are coiled in a right-handed fashion.
(C) Phosphate group is linked to 5'-OH of the same nucleoside by glycoside linkage for the formation of sugar phosphate backbone.
(D) All four deoxyribonucleotides are always equally present in both the strands.
(A) A-T; B-T; C-F; D-F
(B) A-T; B-T; C-T; D-F
(C) A-F; B-F; C-T; D-T
(D) A-T; B-F; C-F; D-T

122. Number of base pairs in one turn of Z-DNA is
(A) 12 (B) 9 (C) 10 (D) 11

123. The beads-on-strings is/are
(A) Exons interrupted by introns
(B) Nucleosomes in chromatin
(C) Smaller submit of ribosomes in polysome.
(D) Amino acid in a long polypeptide chain

124. Transforming material in Griffith's experiment was DNA. It was discovered by
(A) Zinder and Lederberg
(B) Avery, Macleod, and McCarty
(C) Lederberg and Tatum
(D) Zinder and Tatum

125. RNA is not genetic material in
(A) TMV
(B) QB bacteriophage
(C) HIV
(D) $\varphi \times 174$

126. Which of the following fails to exhibit ability to direct their duplication?
(A) DNA
(B) RNA
(C) Protein
(D) Both (B) and (C)

127. Read the following statements, and select the correct option.
A. Packaging of chromatin at higher level requires additional set of proteins that collectively are referred to as non-histone chromosomal proteins.
B. Heterochromatin is transcriptionally active.
(A) Only (A) is correct.
(B) Only (B) is correct.
(C) Both (A) and (B) are correct.
(D) Both (A) and (B) are incorrect.

128. The building blocks for a new DNA molecule are
(A) Deoxyribonucleoside triphosphate
(B) Deoxyribonucleoside triphosphate
(C) Deoxyribonucleotide monophosphate
(D) Deoxyribonucleoside monophosphate

129. The enzyme involved in the opening of DNA double helix during transcription
(A) DNA helicase
(B) DNA ligase
(C) RNA polymerase
(D) DNA polymerase

130. Select the incorrectly matched pair.
(A) RNA primer-Serves as stepping-stone to start errorless replication
(B) Kornberg enzyme-DNA polymerase I
(C) Okazaki fragment-Leading daughter strand
(D) DNA polymerase III-Main replicating enzyme in prokaryotes

131. DNA replication, each new strand begins at its
(A) 5' end
(B) 3' end
(C) Both 5' and 3' ends
(D) 'end opposite to template strand

132. A promotor site on DNA
(A) Is present upstream to the start of site
(B) Initiates transcription
(C) Is the recognition and binding site of RNA polymers
(D) All of the above

133. RNA polymerase I transcribes all, except
(A) hnRNA (B) snRNA
(C) tRNA (D) 5S Rrna

134. Which of the following is unique to prokaryotic mRNA synthesis?
(A) Post-transcriptional modification
(B) Coupled transcription and translation
(C) Clear-cut division of labor for RNA polymerase enzyme
(D) Snurps activity in processing

135. Split genes are present in
(A) Prokaryotes (B) Viruses
(C) Eukaryotes (D) All except (C)

(SECTION-B)

136. The amino acid serine (Ser) is coded by four codons. This shown
(A) Ambiguous nature of codons
(B) Degeneracy of codons
(C) Universal nature of codons
(D) Dual nature of codons

137. Which of the following codons codes for methionine and it also acts as initiator codon?
(A) GUU (B) AUG
(C) UAA (D) UUU

138. The mutation that forms the genetic basis of proof that codon is triplet and it is read in a contiguous manner is
(A) Frameshift mutation
(B) Nonsense mutation
(C) Substitution mutation
(D) Transversion

139. GUG normally codes for valine, but at start position, it codes for methionine. The given statement is an exception to which property of genetic code?
(A) Degeneracy
(B) Nonoverlapping
(C) Ambiguous nature
(D) Unambiguous nature

140. Charging of tRNA refers to
(A) Activation of amino acid
(B) Attachment of amino acid to tRNA
(C) Supercoiling of tRNA
(D) More than one option is correct

141. Which of the following antibiotic inhibits peptidyl transferase activity?
(A) Tetracycline
(B) Chloramphenicol
(C) Streptomycin
(D) Neomycin

142. In eukaryotes, the first level of regulator of gene expressions is
(A) Transcription
(B) Translation
(C) Splicing
(D) Transport of mRNA from nucleus to cytoplasm

143. Operon model of gene regulation in prokaryote was proposed by
(A) Jacob and Monod
(B) Watson and Crick
(C) Beadle and Tatum
(D) Francis Crick

144. The Human Genome Project was coordinated by
(A) U.S. Department of Energy
(B) National Institute of Health
(C) Welcome Trust of UK
(D) All of the above

145. Which of the following statements is true about proteins?
(A) Proteins are polymers of glucose
(B) Proteins are polymers of peptide bonds
(C) Proteins are polymers of amino acids
(D) Proteins are polymers of disulfide bridges

146. When bands of DNA are transferred to a nitrocellulose membrane for identification, the blotting is called
(A) Southern blotting
(B) Northern blotting
(C) Western blotting
(D) Eastern blotting

147. Which of the following statements is true about the (primary) 1° structure of proteins?
(A) The sequence of amino acids joined by a peptide bond
(B) The helical structure of the protein
(C) Subunit structure of the protein
(D) Three-dimensional structure of the protein

148. **Assertion :** Viruses having shorter life span, mutate and evolve faster.
Reason : Viruses have generally RNA genome.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

149. **Assertion :** Both the strands of DNA are not copied during process of transcription.
Reason : The two molecules of RNA complementary to each other form the double stranded RNA and this would prevent RNA from being translated into protein.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

150. **Assertion :** DNA caused the transformation.
Reason : Digestion with DNase inhibits transformation.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

ZOOLOGY (SECTION-A)

151. Which of the following is related to the origin of life on earth?
(A) Panspermia
(B) Theory of spontaneous generation
(C) Chemical evolution
(D) All of these

152. Miller simulated early Earth conditions in a laboratory by passing electric discharge through a closed flask raising its temperature to 800°C and containing
(A) CH_4 and H_2 (B) NH_3
(C) Water vapour (D) All of these

153. Select the false statements.
(A) Dryopithecus was more Ape-like.
(B) Ramapithecus was more Man-like.
(C) Dryopithecus and Ramapithecus both were hairy and walked like gorillas and chimpanzees.
(D) Australopithecines lived in the East African grasslands probably 3–4 mya.
(A) B only (B) B and C only
(C) D only (D) All are correct

154. Arrange the following in the order of their evolution.

(A) Homo habilis → Ramapithecus → Homo erectus → Dryopithecus → Homo sapiens → Australopithecines → Neanderthal man

(B) Dryopithecus → Ramapithecus → Australopithecus → Homo habilis → Homo erectus → Neanderthal man → Homo sapiens

(C) Australopithecines →Homo sapiens → Ramapithecus → Dryopithecus → Homo habilis → Homo erectus → Neanderthal man

(D) Neanderthal man → Australopithecines → Homo sapiens → Homo erectus →Homo habilis → Ramapithecus → Dryopithecus

155. Seed fern evolved into

(A) Cycads (B) Dicot
(C) Monocot (D) All of these

156. The idea that life originates from pre-existing life is referred to as

(A) Biogenesis theory
(B) Abiogenesis theory
(C) Extraterrestrial theory
(D) Special creation theory

157. The study of fossils as evidence of evolution is called

(A) Anatomy (B) Embryology
(C) Palaeontology (D) Biogeography

158. The golden age of reptile was

(A) Mesozoic era
(B) Cenozoic era
(C) Palaeozoic era
(D) Proterozoic era

159. Survival of the fi ttest is possible due to

(A) Overproduction
(B) Favourable variations
(C) Environmental changes
(D) Inheritance of acquired characters

160. Industrial melanism was highlighted by

(A) Polar bear
(B) Rock python
(C) Mimosa pudica
(D) Biston betularia

161. **Assertion:** Single step large mutation is called saltation.
Reason: Mutation is responsible for speciation.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

162. **Assertion:** Dryopithecus was more man-like.
Reason: Ramapithecus was more ape-like.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

163. **Assertion:** Pasteur demonstrates that life comes from pre existing life.
Reason: Pasteur performed swan neck experiment.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

164. **Assertion:** Sweet potato and potato is an example for analogy.
Reason: They have different origin but perform same function that is storage of food.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

165. Given below are four statements (A to D) each with one or two blanks. Select the option which correctly fills up the blanks in two statements.

Statements:

(A) Wings of butterfly and birds look alike and are the results of ____ evolution.

(B) Miller showed that CH_4, H_2, NH_3 and ____ when exposed to electric discharge in a flask resulted in formation of ____.

(C) Vermiform appendix is a ____ organ and are ____ evidence of evolution.

(D) According to Darwin, evolution took place due to ____ and ____ of the fittest.

166. Mutations can be induced with

(A) IAA

(B) Ethylene

(C) Gamma radiations

(D) Infra red radiations

167. Variations caused by mutation, as proposed by Hugo de Vries are

(A) random and directional

(B) random and directionless

(C) small and directional

(D) small and directionless

168. Embryological support for evolution was disapproved by

(A) Oparin

(B) Karl Ernst von Baer

(C) Alfred Wallace

(D) Charles Darwin

169. Flippers of Penguins and Dolphins are examples of

(A) Natural selection

(B) Adaptive radiation

(C) Convergent evolution

(D) Industrial melanism

170. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask

(A) CH_3, H_2, NH_3 and water vapor at 600°C

(B) CH_4, H_2, NH_3 and water vapor at 800°C

(C) CH_3, H_2, NH_4 and water vapor at 800°C

(D) CH_4, H_2, NH_3 and water vapor at 600°C

171. Which of the following refer to correct example(s) of organisms which have evolved due to changes in environment brought about by anthropogenic action?

(a) Darwin's Finches of Galapagos islands.

(b) Herbicide resistant weeds.

(c) Drug resistant eukaryotes.

(d) Man-created breeds of domesticated animals like dogs.

(A) only (d) (B) only (a)

(C) (a) and (c) (D) (b), (c) and (d)

172. The factor that leads to Founder effect in a population is:

(A) Natural selection

(B) Genetic recombination

(C) Mutation

(D) Genetic drift

173. Match **List - I** with **List -II.**

List - I

(a) Adaptive radiation

(b) Convergent evolution

(c) Divergent evolution

(d) Evolution by anthropogenic action

List - II

(i) Selection of resistant varieties due to excessive use of herbicides and pesticides

(ii) Bones of forelimbs in Man and Whale

(iii) Wings of Butterfly and Bird

(iv) Darwin Finches

Choose the correct answer from the options given below.

	(a)	**(b)**	**(c)**	**(d)**
(A)	(iv)	(iii)	(ii)	(i)
(B)	(iii)	(ii)	(i)	(iv)
(C)	(ii)	(i)	(iv)	(iii)
(D)	(i)	(iv)	(iii)	(ii)

174. Natural selection where more individuals acquire specific character value other than the mean character value, leads to:

(A) Directional change

(B) Disruptive change

(C) Random change

(D) Stabilising change

175. Select the microbes from the following:

A. Protozoa

B. Bacteria

C. Fungi

D. Microscopic plant viruses

E. Viroids F. Prions

(A) (A) and (B) only

(B) (B), (C), and (D) only

(C) (A), (B), and (D) only

(D) (A), (B), (C), (D), (E), and (F)

176. The microscopic proteinaceous infectious agents are called
(A) Virus (B) Viroids
(C) Prions (D) Virusoids

177. Lactic acid bacteria improve the nutritional quality of curd by increasing the content of
(A) Vitamin B, (B) Vitamin B 6
(C) Vitamin B_1, 12 (D) Vitamin D

178. Read the following statements:
A. Cheese is one of the most recent food items produced because of the activity of microbes.
B. Different varieties of cheese are known by their characteristic texture, flavor and taste, and the specificity coming from the microbes used.
(A) Only (A) is correct.
(B) Only (B) is correct.
(C) Both (A) and (B) are correct.
(D) Both (A)and (B) are incorrect.

179. Palm wine is also called palm toddy, which is an alcoholic beverage made from the sap of in South India.
(A) Cycas revolute
(B) Cocos nucifera
(C) Areca nut
(D) Caryota urens

180. Microbes are utilized for commercial and industrial production of
(A) Organic acids and alcohols
(B) Antibiotics and enzymes
(C) Bioactive molecules
(D) All of the above

181. Which of the following beverages are produced by distillation of the fermented broth?
(A) Wine and brandy
(B) Brandy and rum
(C) Beer and brandy
(D) Wine and beer

182. Germinating barley grains are used in the preparation of
(A) Lactic acid (B) Wine
(C) Acetic acid (D) Beer

183. Sugar fermentation by yeast yields
(A) Ethanol and CO_2
(B) Methanol and CO_2
(C) H_2O and CO_2
(D) Ethanol and H_2O

184. Which antibiotic was extensively used to treat American soldiers wounded in World War II?
(A) Penicillin (B) Streptomycin
(C) Chlorellin (D) Neomycin

185. Penicillin was accidently discovered when Alexander Fleming was working with the culture of
(A) Penicillium notatum
(B) Streptococcus bacteria
(C) Staphylococcus bacteria
(D) Streptobacillus bacteria

(SECTION-B)

186. Biological activities are carried out in which of the following sewage treatment plant?
(A) Primary treatment
(B) Secondary treatment
(C) Chemical treatment
(D) Tertiary treatment

187. In the sewage treatment, the microbes are used in
(A) Primary treatment
(B) Secondary treatment
(C) Tertiary treatment
(D) All of the above

188. State true (T) or false (F) for the following statements with respect to sewage treatment.
A. The treatment of waste mater in a sewage treatment plant is done by autotrophic microorganisms present in the sewage.
B. During secondary treatment in a secondary treatment plant, BOD initially increases and then decreases.
C. Anaerobic digestion of activated sludge produces biogas inside the sludge digester.
D. A small portion of primary sludge is used as an inoculum to start another secondary treatment.
(A) A-F; B-T; C-T; D-F
(B) A-T; B-T; C-F; D-T
(C) A-F; B-F; C-T; D-F
(D) A-T; B-F; C-T; D-F

189. The Ministry of Environment and Forest has initiated Ganga and Yamuna Action Plans to
(A) Treat wastewater
(B) Prevent the discharge of untreated sewage into these rivers
(C) Prevent microbial treatment of sewage
(D) Both (A) and (B)

190. The microorganisms involved in floc formation during sewage treatment are
(A) Aerobic bacteria and fungi
(B) Anaerobic bacteria and fungi
(C) Autotrophic bacteria and fungi
(D) Heterotrophic anaerobic bacteria and fungi

191. Read the following statements w.r.t. activated sludge and select correct option:
A. After secondary treatment, microbial flocs are allowed to settle down, which is called as activated sludge.
B. The major part of the sludge is pumped into large tanks called anaerobic sludge digester.
C. It is generally released into natural water bodies like rivers and streams.
(A) Only (A) is correct
(B) Only (A) and (C) are correct
(C) Only (A) and (B) are correct
(D) Only (B) is correct

192. The technology of biogas production was developed in India mainly due to the efforts of
(A) Ministry of Environment and Forest
(B) Khadi and Village Industries Commission
(C) Indian Agricultural Research Institute
(D) Both (B) and (C)

193. Which larvicidal fish is used to control the mosquito larvae?
(A) Gambusia (B) Singhara fish
(C) Dog fish (D) Electric ray

194. Bioinsecticide obtained from neem is
(A) Nicotine (B) Azadirachtin
(C) Rotenone (D) Devine

195. Fungal hyphae form symbiotic association with the roots of higher plants called mycorrhiza. Mycorrhiza does not help host plant in
(A) Tolerance to salinity and drought
(B) Enhancing its resistance to root pathogens.
(C) Enhancing its phosphate uptake capacity.
(D) Increasing its resistance to insects.

196. Which of the following sources serves as a biofertilizer in paddy fields?
(A) Azolla
(B) VAM
(C) Glomus
(D) Both (A) and (C)

197. The main sources of biofertilizers are
(A) Algae, fungi, and monerans
(B) Bacteria, cyanobacteria, and fungi
(C) Algae, bryophytes, and pteridophytes
(D) Monerans, protistans, and fungi

198. Which of the following is common to Azotobacter, Anabaena, Nostoc, and Frankia?
(A) Prokaryotes (B) BGA
(C) N, fixer
(A) Only (A) and (B) are correct.
(B) Only (C) is correct.
(C) Only (A) and (C) are correct.
(D) (A), (B), and (C) are correct.

199. Which of the following are free-living nitrogen-fixing bacteria found in soil?
(A) Rhizobium and Frankia
(B) Azolla and Nostoc
(C) Azospirillum and Azotobacter
(D) Frankia and Oscillatoria

200. Select the incorrectly matched pair.
(A) Frankia Symbiotic N, fixer in root nodule of non- leguminous plants:
(B) Glomus-Absorbs phosphorus from soil and passed it to the plant
(C) Mycorrhizal roots-Sensitive to root-borne pathogens
(D) Rhizobium Symbiotic N, fixer in root nodules of leguminous plants