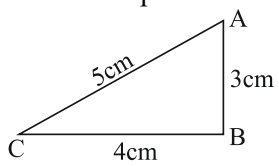
PHYSICS

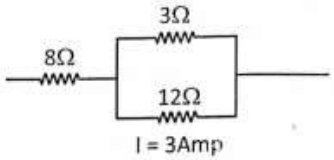
1. A triangle made by wire of resistance 24Ω. Then find resistance across point 'A' and 'B'.



(A) $\frac{2}{9}\Omega$ (B) $\frac{9}{2}\Omega$
(C) 14 Ω (D) 2.4

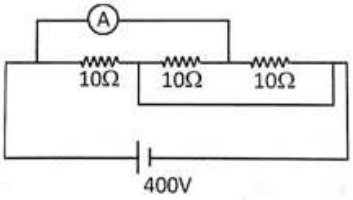
2. An electric Kettle has two heating coil. When both the coil used in Kettle separately, then time taken to boil the same amount of water is 3s and 6s then find time when both the coils are connected in series and used
(A) 4s (B) 18s
(C) 9s (D) 3s

3. For a given circuit find potential difference across 8Ω if current in 12Ω is 3 Amp.



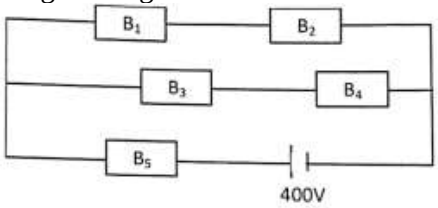
(A) 120 V (B) 24 V
(C) 96 V (D) 16 V

4. In the circuit shown, reading of Ideal Ammeter A is;



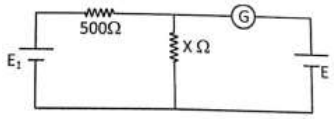
(A) Zero (B) Infinite
(C) 40A (D) 80A

5. In the given circuit bulbs are rated as B_1 (50w, 220V) B_2(50w, 220V) B_3(220V, 50w) B_4(50w, 220V) & B_5(220V, 100w) Among these bulbs which glow brightest ?



(A) B_1 (B) B_3
(C) B_5 (D) All of these

6. In the circuit E_1 has e.m.f. of 12V and zero internal resistance while the battery E has an e.m.f. of 2V. If the galvanometer G reads zero, then value of the resistance 'x' in ohm is

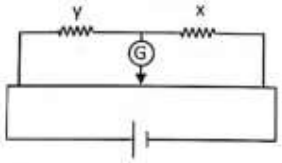


(A) 100 Ω (B) 500 Ω
(C) 400 Ω (D) 200 Ω

7. A Potentiometer wire has length 10 m and resistance 8 Ω. The resistance that must be connected in series with the wire and main battery of emf 20V, so as to get a potential gradient 1.6V per m on the wire
(A) 44 Ω (B) 2 Ω
(C) 3 Ω (D) 8 Ω

8. A carbon resistance has coloured strips as brown, green, orange and silver respectively. The resistance is
(A) 15 kΩ ± 10% (B) 15 kΩ ± 15%
(C) 15 kΩ ± 20% (D) 10 kΩ ± 5%

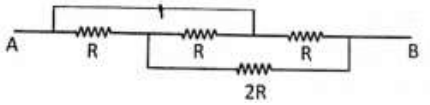
9. In the given circuit a meter bridge is shown in balanced state. If Temperature of X is increases which have –ve coefficient of resistivity then balance point will shift towards.



(A) Towards X (B) Towards Y
(C) May be towards (D) Will not shift

10. A cell is balanced at 40 cm and 30 cm of potentiometer wire respectively when it is in open circuit and when short circuited by the resistance of 4Ω. The internal resistance of cell is
(A) 4Ω (B) 3Ω
(C) $\frac{4}{3}\Omega$ (D) $\frac{3}{4}\Omega$

11. The effective resistance between A and B is

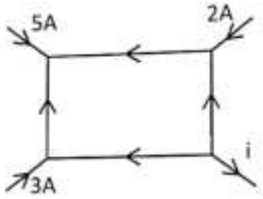


(A) $\frac{7}{5}R$ (B) $\frac{5}{7}R$
(C) $\frac{3R}{7}$ (D) $\frac{5}{3}R$

12. The path of free electrons between two successive collision in current carrying conductor is

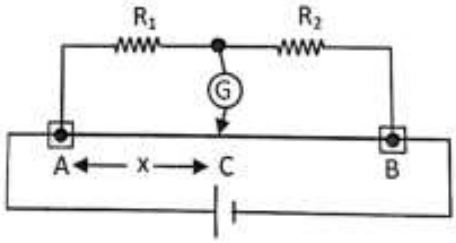
(A) Straight line (B) Zig-Zog
(C) Parabolic (D) Circle

13. Figure shows a network of currents. The magnitude of the current *i* is



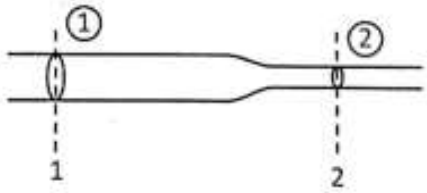
(A) 1 A (B) 4 A
(C) 8 A (D) 10 A

14. In the shown arrangement of a meter bridge. If AC corresponding to null deflection of galvanometer is x. What would be its value if the radius of wire AB is doubled ?



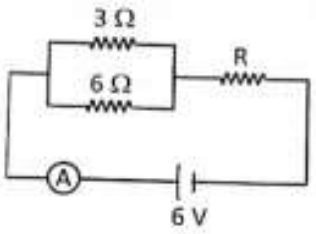
(A) $\frac{x}{4}$ (B) 2 x
(C) 4 x (D) x

15. The area of cross-section of a current carrying conductor is A_0 and $\frac{A_0}{4}$ at section (1) and (2) respectively. If V_1, V_2 and E_1, E_2 be the drift velocity and electric field at section 1 and 2 respectively then



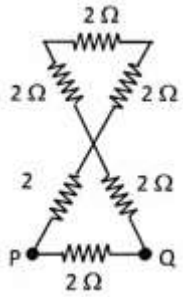
(A) $V_1 : V_2 = 1 : 4$ and $E_1 : E_2 = 4 : 1$
(B) $V_1 : V_2 = 4 : 1$ and $E_1 : E_2 = 1 : 2$
(C) $V_1 : V_2 = 2 : 1$ and $E_1 : E_2 = 1 : 4$
(D) $V_1 : V_2 = 1 : 4$ and $E_1 : E_2 = 1 : 4$

16. If the ammeter in given circuit reads 1 A, then resistance R is



(A) 4 Ω (B) 2 Ω
(C) 3 Ω (D) 1 Ω

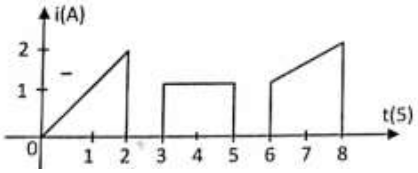
17.



In the given figure, equivalent resistance between points P and Q is

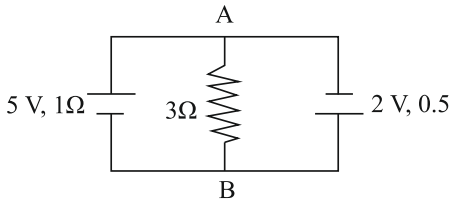
(A) $\frac{1}{3}\Omega$ (B) $\frac{4}{3}\Omega$
(C) $\frac{2}{3}\Omega$ (D) 2 Ω

18. The point represents the flow of current through a wire at three times. The ratio of charges flowing through the wire at different time is



(A) 2 : 1 : 2 (B) 1 : 1 : 1
(C) 1 : 3 : 3 (D) 2 : 2 : 3

19. A 5V battery with internal 1 Ω and a 2 V battery with internal resistance 0.5 Ω are connected to a 3 Ω resistor as shown in the figure. The current in the 3Ω resistor is



(A) 0.1 A, A to B (B) 0.1 A, B to A
(C) 0.01 A, A to B (D) 0.01 A, B to A

20. A battery of EMF 10 V, with internal resistance 1 Ω is being charged by a 120 V d.c. supply using a series resistance of 10 Ω. The terminal voltage of the battery is

(A) 20 V (B) 10 V
(C) Zero (D) 30 V

21. A battery of EMF E produces currents 4 A and 3 A when connected to external resistance 1 Ω and 2 Ω respectively. The internal resistance of the battery is

(A) 0.5 Ω (B) 2 Ω
(C) 1.5 Ω (D) 1 Ω

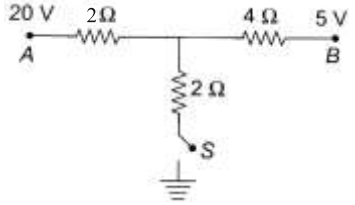
22. A carbon resistor is marked with the rings coloured brown, black, green and gold. The resistance (in ohm) is :

(A) $3.2 \times 10^5 \pm 5\%$ (B) $1 \times 10^6 \pm 10\%$
(C) $1 \times 10^7 \pm 5\%$ (D) $1 \times 10^6 \pm 5\%$

23. 4 cells each of e.m.f. 2V and internal resistance of 1 ohm are connected in parallel to a load resistor of 2 ohm. Then the current through the load resistor is

(A) 2A (B) 1.5A
(C) 1A (D) 0.888A

24. As the switch S is closed in the circuit shown in figure, current passing through it is :



(A) 4.5A (B) 6.0A
(C) 3.0A (D) Zero

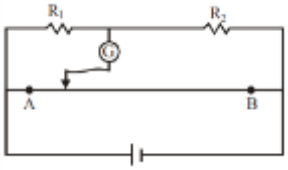
25. A potentiometer has uniform potential gradient across it. Two cells connected in series (i) to support each other and (ii) to oppose each other are balanced over 6m and 2m respectively on the potentiometer wire. The e.m.f.'s of the cells are in the ratio of :

(A) 1 : 2 (B) 1 : 1
(C) 3 : 1 (D) 2 : 1

26. In a potentiometer experiment the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2Ω, the balancing length becomes 120 cm. The internal resistance of the cell is :

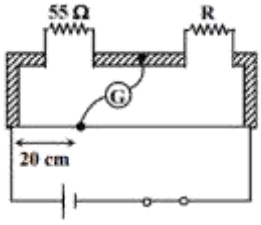
(A) 4 Ω (B) 2 Ω
(C) 1 Ω (D) 0.5 Ω

27. In the figure shown for determining values of R_1 and R_2 the balance point for Jockey is at 40 cm from A. When R_2 is shunted by a resistance of 10 Ω, balance shifts to 50 cm. R_1 and R_2 are (AB = 1m) :



(A) $\frac{10}{3}\Omega$, 5Ω (B) 20Ω, 30Ω
(C) 10Ω, 15Ω (D) 5Ω, $\frac{15}{2}\Omega$

28. Shown in the figure given below is a meter-bridge set up with null deflection in the galvanometer. The value of the unknown resistor R is :



(A) 13.75 Ω (B) 220 Ω
(C) 110 Ω (D) 55 Ω

29. At a certain place, vertical component of earth's magnetic field is $\sqrt{3}$ times the horizontal component of earth's magnetic field. If a magnetic needle is suspended freely in air then it will incline

(A) 30º below horizontal
(B) 60º below horizontal
(C) 30º above horizontal
(D) 45º above horizontal

30. The value of the apparent angles of dip in two planes at right angles to each other are 45º and 30º respectively. The true value of angle of dip at the place is

(A) $\cot^{-1}(1)$ (B) $\cot^{-1}(2)$
(C) $\cot^{-1}(3)$ (D) $\cot^{-3}(4)$

31. A magnetic needle oscillates in horizontal plane with a period T at a place where the angle of dip is 60º. When he same needle is made oscillate in a vertical plane coinciding with the magnetic meridian, its period will be

(A) $\frac{T}{\sqrt{2}}$ (B) T
(C) $\sqrt{2}T$ (D) 2T

32. A bar magnetic moment M is cut into two equal parts along its length. The magnetic moment of either part is

(A) 2M (B) M
(C) M/2 (4) zero

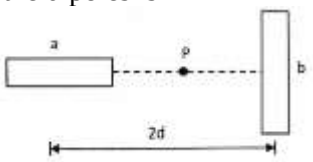
33. A steel wire of length *l* has a magnetic moment M. It is then bent into a semi-circular arc. The new magnetic moment is

(A) M (B) $\frac{2M}{\pi}$
(C) $\frac{M}{\pi}$ (D) 2 Mπ

34. Point A and B are situated perpendicular to axis of a small bar magnet at large distances x and 3x from its centre on opposite sides. The ratio of the magnetic fields at A and B will be approximately equal to

(A) 2 : 9 (B) 1 : 9
(C) 27 : 1 (D) 9 : 1

35. Figure shows two small identical magnetic dipoles a and b of magnetic moment M each, placed at a separation 2d, with their axis perpendicular to each other. The magnetic field at the point P mid-way between the dipoles is



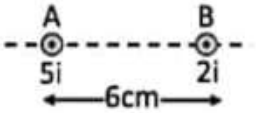
(A) $\frac{2\mu_0 M}{4\pi d^3}$ (B) $\frac{\mu_0 M}{4\pi d^3}$
(C) zero (D) $\frac{\sqrt{5}\mu_0 M}{4\pi d^3}$

36. Two identical thin bar magnets each of length *l* and strength *m* are placed at right angle to each other with north pole of one touching the south pole of other. Magnetic moment of the system is

(A) 2 ml (B) ml

(C) $\sqrt{2}$ ml (D) $\frac{ml}{2}$

37. Find the position of point from wire 'B' where net magnetic field is zero due to following current distribution.



(A) 4 cm (B) $\frac{30}{7}$cm

(C) $\frac{12}{7}$cm (D) 2 cm

38. A current flows in a conductor from east to west. The direction of the magnetic field at points above the conductor is ……

(A) Towards north (B) Towards south

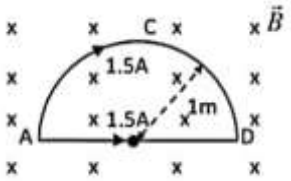
(C) Towards east (D) Towards west

39. Two wires of same length are shaped into a square and circle. If they carry same current, ratio of the magnetic moment is

(A) 2 : π (B) π : 2

(C) π : 4 (D) 4 : π

40. In the figure, a semicircular wire loop is placed in a uniform magnetic field 2.0 T. The plane of the loop is perpendicular to the magnetic field. A current of 1.5 A flows in the loop in the direction shown. The radius of the loop is 1.0m. The magnitude of the magnetic force on the loop is nearly:



(A) Zero (B) 4 N

(C) 8 N (D) 12 N

41. An element $d\vec{l} = dx\hat{i}$ (where dx = 1 cm) is placed at the origin and carries a large current l = 10A. What is the magnetic field on the y-axis at a distance of 0.5m?

(A) $2\times10^{-8}\hat{k}$ T (B) $-2\times10^{-8}\hat{k}$ T

(C) $4\times10^{-8}\hat{k}$ T (D) $-4\times10^{-8}\hat{k}$ T

42. What is the magnetic field produced by L metre long straight thin current (i) carrying conductor at any point on the conductor itself?

(A) lnfinity (B) Zero

(C) $\frac{\mu_0}{4\pi}\frac{2l}{L}$ (D) $\frac{\mu_0}{4\pi}\frac{l}{L}$.

43. Out of $\vec{F},\vec{v}$ and $\vec{B}$ in the relation $\vec{F}_m = q\left(\vec{v}\times\vec{B}\right)$, which of the following pairs can have any angle between then?

(A) $\vec{v}$ and $\vec{B}$ (B) $\vec{F}_m$ and $\vec{B}$

(C) $\vec{F}_m$ and $\vec{B}$ (D) None of the above

44. Force is never exerted by a magnetic field on a stationary

(A) Current loop

(B) electric dipole

(C) Magnetic dipole

(D) current carrying conductor.

45. What is the magnetic dipole moment of an electron orbiting around a nucleus in circular orbit of radius 53 pm? The orbital speed of the electron is 2.185 × 10^6 ms^{-1}.

(A) 1.6 × 10^{-19} Am^2 (B) 5.3 × 10^{-23} Am^2

(C) 9.3 × 10^{-24} Am^2 (D) None of the above

46. Which statement is correct regarding adsorption ?
(A) ΔH is always +ve
(B) ΔG is always +ve
(C) $T\Delta S$ is always –ve
(D) All are correct

47. Which of the following characteristics is not correct for physical adsorption ?
(A) Adsorption is spontaneous at suitable conditions
(B) It is not specific in nature
(C) It is reversible in nature
(D) Degree of adsorption increases with temperature

48. Point out the false statement :-
(A) Brownian movement and Tyndall affect is shown by colloidal systems
(B) Gold number is a measure of the protective power of a lyophilic colloid
(C) The colloidal mixture of a liquid in liquid is called 'gel'
(D) Hardy-Schulze rule is related with coagulation power.

49. Gold number of a lyophilic sol is such a property that :
(A) The larger its value, the greater is the peptizing power
(B) The lower its value, the greater is the peptizing power
(C) The lower its value, the greater is the protecting power
(D) The larger its value, the greater is the protecting power

50. Which of following is incorrect regarding physical adsorption ?
(A) More easily liquefiable gases are adsorbed easily
(B) Physical adsorption is multilayer
(C) Enthalpy of adsorption ($\Delta H_{adsorption}$) is low and positive
(D) It occurs because of vander waal forces

51. Which of following involves heterogeneous catalysis ?
(A) $2HCl_{(g)} + \frac{1}{2}O_2(g) \xrightarrow{CuCl_2(s)} Cl_{2(g)} + H_2O_{(\ell)}$
(B) $4NH_3(g) + 5O_2(g) \xrightarrow{Pt(s)} 4NO_{(g)} + 6H_2O_{(\ell)}$
(C) $2SO_2(g) \xrightarrow{Pt(s)} 2SO_3(g)$
(D) All of these

52. The stability of lyophilic colloids is due to :
(A) charge on their particles
(B) a layer of dispersion medium on their particles
(C) the smaller size of their particles
(D) the large size of their particles

53. Which of the following is incorrect match ?
(A) physisorption - multilayered
(B) Active Adsorption - Requires activation energy
(C) Lyophilic colloid - charge is present
(D) Lyophilic colloid - less hydration

54. Which of the following is an example of positively charged colloidal solution ?
(A) $100ml\frac{M}{10}AgNO_3 + 100ml\frac{M}{10}KI$
(B) $100ml\frac{M}{10}AgNO_3 + 100ml\frac{M}{20}KI$
(C) $100ml\frac{M}{20}AgNO_3 + 100ml\frac{M}{10}KI$
(D) $100ml\frac{M}{20}AgNO_3 + 100ml\frac{M}{20}KI$

55. Lyophilic colloidal solution can be coagulated by -
(A) addition of high concentration of electrolyte
(B) By addition of solvent like C_2H_5OH
(C) By addition of excess H_2O
(D) Both (A) & (B) correct

56. A freshly prepared $Fe(OH)_3$ precipitate is peptized by adding $FeCl_3$ solution. The charge on the colloidal particle is due to preferential adsorption of :-
(A) Cl^- ions (B) Fe^{+++} ions
(C) OH^- ions (D) None of these

57. For the coagulation of 100 ml of ferric hydroxide sol. 10 ml of 0.5 M KCl is required. What is the coagulation value of KCl ?
(A) 5 (B) 10
(C) 100 (D) 50

58. In electrolysis of Al_2O_3 by Hall-Heroult process :-
(A) Cryolite (Na_3AlF_6) lowers the M.P. of Al_2O_3 & increases its electrical conductivity
(B) Al is obtained at cathode & O_2 at anode
(C) Graphite anode is converted into CO_2.
(D) All of these

59. Which of the following ores are concentrate by froath floatation ?
(A) Haematite (B) Galena
(C) Copper Pyrites (D) Both (B) & (C)

60. The Zone refining of metal is based on the principle of :-
(A) Greater mobility of pure metal than that of impurity.
(B) Higher melting point of impurity than that of pure metal
(C) Greater noble character of solid metal than that of impurity
(D) Greater solubility of impurity in the molten state than in the solid

61. Which of the following is separated as slag during extraction of Fe in blast furnace ?
(A) SiO_2 (B) Al_2O_3
(C) CaO (D) MgO

62. Electrolytic refining is used to purify which of the following metals :-
(A) Cu & Al (B) Ge & Si
(C) Zr & Ti (D) Zn & Hg

63. Which one is mismatched ?
(A) Poling – Refining of copper
(B) Cupellation – Refining of silver
(C) Smelting – An oxidation process
(D) Roasting – An oxidation process

64. From the following which will have maximum coagulating power for As_2S_3 sol.
(A) 0.1 N $ZnSO_4$ (B) 0.1 N Na_3PO_4
(C) 0.1 N $AlCl_3$ (D) 0.1 N $Zn(NO_3)_2$

65. Which one of the following is not applicable to chemisorption ?
(A) High magnitude of ΔH
(B) Occur at higher temperature
(C) It is reversible
(D) It forms mono layer

66. An aqueous solution of Na_2SO_4 in water is electrolysed using Pt electrodes. The products at the cathode and anode respectively, are :-
(A) H_2, SO_2 (B) O_2, NaOH
(C) H_2, O_2 (D) O_2, SO_2

67. Co | $Co^{2+}(C_2)$ || Co^{2+} (C_1) | Co : for this cell, ΔG is negative if :-
(A) $C_2 > C_1$ (B) $C_1 > C_2$
(C) $C_1 = C_2$ (D) unpredictable

68. The E°_{RP} for half cells Fe^{2+}/Fe and Cu^{2+}/Cu are – 0.44 V and + 0.32 V respectively. Then:
(A) Cu^{2+} oxidises Fe (B) Fe^{2+} oxidises Cu^{2+}
(C) Cu reduces Fe (D) Cu reduces Fe^{2+}

69. Electrode potential data are given below :-

$Fe^{3+}_{(aq)} + e^- \rightarrow Fe^{2+}_{(aq)}$; E° = +0.77 V

$A\ell^{3+}_{(aq)} + 3e^- \rightarrow A\ell_{(s)}$; E° = –1.66 V

$Br_{2(aq)} + 2e^- \rightarrow 2Br^-_{(aq)}$; E° = +1.08 V

Based on the data given above, reducing power of Fe^{2+}, Aℓ and Br^- will increase in the order.
(A) $Br^- < Fe^{2+} < A\ell$
(B) $Fe^{2+} < A\ell < Br^-$
(C) $A\ell < Br^- < Fe^{2+}$
(D) $A\ell < Fe^{2+} < Br^-$

70. The mass of copper deposited from a solution of $CuSO_4$ by passage of 5 A current for 965 second is (Mol. Mass of copper = 63.5)
(A) 15.875 g (B) 1.5875 g
(C) 4825 g (D) 96500 g

71. Which one of the following statements is true for H_2– Cu electrochemical cell ?
(A) H_2 is cathode and Cu is anode
(B) H_2 is anode and Cu is cathode
(C) Reduction occurs at H_2 electrode
(D) Oxidation occurs at Cu electrode

72. The resistance of 0.01 N NaCl solution at 25°C is 200 Ω. Cell constant of conductivity cell is 1 cm^{-1}. The equivalent conductance is :-
(A) $5 \times 10^2\ \Omega^{-1}\ cm^2\ eq^{-1}$
(B) $6 \times 10^3\ \Omega^{-1}\ cm^2\ eq^{-1}$
(C) $7 \times 10^4\ \Omega^{-1}\ cm^2\ eq^{-1}$
(D) $8 \times 10^5\ \Omega^{-1}\ cm^2\ eq^{-1}$

73. EMF of cell Ni | Ni^{2+} (1.0 M)||Au^{3+} (1.0 M) | Au (Where E° for Ni^{2+} |Ni is –0.25 V : E° for Au^{3+} |Au is 1.50 V) is :-
(A) +1.25 V (B) –1.75 V
(C) +1.75 V (D) +4.0 V

74. If pH is 10 for the used solution then potential of hydrogen electrode will be :-
(A) – 0.059 V (B) – 0.0295 V
(C) – 0.591 V (D) – 0.0296 V

75. The highest electrical conductivity from the following aqueous solutions will be of :
(A) 0.1 M acetic acid
(B) 0.1 M chloroacetic acid
(C) 0.1 M fluoroacetic acid
(D) 0.1 M difluroacetic acid

76. λ^{∞}_m of $BaCl_2$, H_2SO_4 and $HCl_{(aq)}$ solutions are x_1, x_2 and x_3 respectively then $\lambda^{\infty}_m(BaSO_4)$ will be :
(A) $x_1 + x_2 - x_3$ (B) $x_1 + x_2 - x_3$
(C) $x_1 + x_2 - 2x_3$ (D) $x_1 - 2x_2 + x_3$

77. How much electricity in terms of Faraday is required for reduction of 1 mole of $KMnO_4$ to MnO_2 ?
(A) 1 F (B) 3 F
(C) 5 F (D) 7 F

78. Which of the following relation is correct ?
(A) $W = \frac{E.i.t}{96500}$
(B) $\frac{W_1}{E_1} = \frac{W_2}{E_2}$
(C) If q = 1, then W = Z
(D) All of these

79. For the same charge passed, deposited mole ratio of Ag, Cu and Al is :-
(A) 1 : 1 : 1 (B) 1 : 2 : 3
(C) $1 : \frac{1}{2} : \frac{1}{3}$ (D) 3 : 2 : 1

80. Weight of Ag obtained when 1 ampere current is passed for 100 second in Ag^+ ion solution :-
(A) 0.11 g (B) 1.08 g
(C) 10 g (D) 0.05 g

81. $\underset{1.0M}{Ag}\left|Ag^+\right|\left|\underset{1.0M}{Ag^+}\right|Ag$
For this cell which of the following is correct :
(A) $E°_{cell} = 0$ (D) $\Delta G°_{cell} = 0$
(C) $E_{cell} = 0$ (D) All of the above

82. For a reaction - $A(s) + 2B^+ \rightarrow A^{2+} + 2B(s)$, K_C has been found to be 10^6. The $E°_{cell}$ is :
(A) 0.177 V (B) 0.708 V
(C) 0.0098 V (D) 1.36 V

83. During the electrolysis of molten sodium chloride, the time required to produce 0.10 mol of chlorine gas using a current of 2 amperes, is
(A) 48250 sec (B) 96500 sec
(C) 4825 sec (D) 9650 sec

84. The resistance of 0.1 N solution of formic acid is 200 ohm and cell constant is 2.0 cm^{-1}. The equivalent conductivity (in S cm^2eq^{-1}) of 0.1 N formic acid solution is :-
(A) 100 (B) 10
(C) 1 (D) None of these

85. Molar conductivity of a solution of an electrolyte AB_3 is 150 S cm^2mol^{-1}. If it ionises as $AB_3 \rightarrow A^{3+} + 3B^-$, its equivalent conductivity will be :
(A) 150 (in S cm^2eq^{-1})
(B) 75 (in S cm^2eq^{-1})
(C) 50 (in S cm^2eq^{-1})
(D) 80 (in S cm^2eq^{-1})

86. What will be the emf for the given cell ?
$Pt|H_2(g, P_1)|H^+(aq)|H_2(g, P_2)|Pt$
(A) $\frac{RT}{F}\ell n\frac{P_1}{P_2}$ (B) $\frac{RT}{2F}\ell n\frac{P_1}{P_2}$
(C) $\frac{RT}{F}\ell n\frac{P_2}{P_1}$ (D) None of these

87. $E°$ for $Cl_2(g) + 2e^- \rightarrow 2Cl^-(aq)$ is 1.36 V: $E°$ for $Cl^-(aq) \rightarrow 1/2Cl_2(g) + e^-$ is :
(A) 1.36 V (B) –1.36 V
(C) –0.68 V (D) 0.68 V

88. Given $E^\circ_{Fe^{3+}/Fe} = -0.036V$, $E^\circ_{Fe^{2+}/Fe} = -0.439V$. The value of standard electrode potential for the change,
$Fe^{3+}_{(aq)} + e^- \rightarrow Fe^{2+}_{(aq)}$ will be :-
(A) –0.072V (B) 0.385V
(C) 0.770V (D) –0.270V

89. Calculate E_{cell} for $Cr\,|\underset{(0.04M)}{Cr^{3+}(aq)}||\underset{(1M)}{Cr^{3+}(aq)}\,|Cr$
(A) 0.083 V (B) 0.027 V
(C) 0.33 V (D) 0.17 V

90. When one faraday of electricity is passed, the mass deposited is equal to :-
(A) one gram equivalent
(B) one gram mole
(C) electrochemical equivalent
(D) Half gram equivalent

BIOLOGY

91. Mark the incorrectly matched-
(A) Taq polymerase - Substrate is dNTP
(B) Okazaki fragments- Made up of RNA
(C) tRNA - Inverted L-shape is tertiary structure
(D) RNAi- Mechanism of cellular defence

92. Automated DNA sequencers, work on the principle of the method developed by
(A) Alec Jeffreys
(B) Maurice Wilkins
(C) Frederick Sanger
(D) Francis Crick

93. Difference in prokaryotic and eukaryotic DNA replication is-
(A) Substrate (B) Direction
(C) Location (D) Primer nature

94. Go through the salient features of human genome project
(i) Largest human gene is dystrophin with 2.4 million bases
(ii) Chromosome 1 has maximum number of genes, i.e. 2968 and Y-chromosome has minimum number, i.e. 231
(iii) The human genome contains 3164.7 billion nucleotide bases
(iv) The total number of genes is estimated at 30,000.
Which of these are correct?
(A) (i), (ii) & (iii)
(B) (ii), (iv)
(C) (i), (ii) & (iv)
(D) All are correct

95. Number of functional codons in codon dictionary
(A) 61 (B) 64
(C) 20 (D) 3

96. Phosphodiester linkage is absent in -
(A) cDNA (B) SnRNA
(C) Poly A tail (D) GTP

97. DNA as an acidic substance present in nucleus was first identified by Friedrich Meischer in-
(A) 1869 (B) 1879
(C) 1939 (D) 1859

98. Packaging of chromatin at higher level require-
(A) NHC protein (B) Histones
(C) Tubulin (D) Polyamines

99. Prior to work of Avery, Macleod and McCarty genetic material was thought to be-
(A) RNA (B) Protein
(C) DNA (D) both (A) and (B)

100. Number of hybrid DNA form after 4 generation of division of E. coli in Meselson and Stahl experiment-
(A) Four (B) Five
(C) Two (D) One

101. Which of the following is not feature of cistron-
(A) Absent in prokaryotes
(B) Present on DNA
(C) Code for RNA
(D) Located in nucleus in eukaryotes

102. Bond which can't be common between DNA and RNA is-
(A) Phosphodiester (B) N-glycosidic bond
(C) H-bond (D) Phosphoester

103. Most stable RNA have feature -
(A) Present in ribosome
(B) Adaptor molecule
(C) Sc RNA
(D) Have UTR

104. Number of replication fork in two replicons are-
(A) Six (B) Three
(C) Four (D) One

105. Which of the following RNA polymerase transcribe Cistron in Eukaryotes-
(A) RNA polymerase
(B) RNA polymerase I
(C) RNA polymerase II
(D) RNA polymerase III

106. Which of the following RNA polymerase transcribe Cistron in prokaryotes
(A) RNA polymerase
(B) RNA polymerase I
(C) RNA polymerase II
(D) RNA polymerase III

107. Terminal addition of poly - A tail occur in-
(A) 3' End of primary structure of tRNA
(B) 5' end of t RNA
(C) 3' end of hn RNA
(D) 3'end of mRNA

108. Clover leaf structure is of –
(A) 2° of tRNA (B) 3° of tRNA
(C) 1° of tRNA (D) rRNA

109. Secondary structure of DNA is-
(A) linear (B) functional
(C) helical (D) both (B) and (C)

110. Which of the following have similar code to mRNA-
(A) coding strand of RNA
(B) coding strand of DNA
(C) template strand of DNA
(D) transcription unit

111. In S-phase all enzymes are active except-
(A) ligase (B) DNA polymerase
(C) Recombinase (D) helicase

112. Polynucleotide phosophorylase is enzyme which is-
(A) DNA polymerase
(B) RNA polymerase
(C) Discovered by George Gamow
(D) Ligase

113. Which amino acid is most basic-
(A) Histidine (B) Lysine
(C) Asparagine (D) Arginine

114. Conditions that regulate gene expression are
(A) Metabolic (B) Physiological
(C) Environmental (D) All of the above

115. In lac operon inducer is
(A) Lactose (B) Glucose
(C) Allolactose (D) Both (A) or (C)

116. One of the hallmarks of Watson & Crick. proposition for DNA structure is
(A) Presence of four nitrogen bases
(B) Purine & Pyrimidines ratio is 1:1
(C) Base pairing between two polypeptide chains
(D) Two strands of a DNA molecule show base pairing

117. Find the wrong match
(A) Biochemical characterisation of transforming principle - Griffith
(B) The unequivocal proof for genetic material is DNA – Avery, Macleod, McCarty
(C) Transforming principle experiment – Hershey & Chase
(D) All of the above

118. The genetic material of a Virus could be
(A) DNA
(B) RNA
(C) Both DNA & RNA
(D) Either DNA (or) RNA

119. Which of the following combination correctly fulfilled the criteria for a genetic material
(A) Replication – DNA & tRNA
(B) Chemically, structurally more stable – RNA
(C) Easily express the character – RNA
(D) Scope for slow change – RNA is better than DNA

120. Find the correct statement from the following.
(A) There is no enough evidence to suggest that essential life processes evolved around RNA
(B) Only 23s rRNA acts as catalyst
(C) Deoxyribose is evolved from ribose
(D) 28s rRNA is not a catalyst hence more stable

121. Semiconservative mode of DNA replication was first shown in
(A) Watson and Crick
(B) Meselson and Stahl
(C) Escherichia coli
(D) Medicago sativa

122. Find the incorrect statement with regard to DNA replication.
(A) Substrates are deoxyribonucleosides
(B) Substrates for replication also catalyse the polymerisation reaction
(C) Energy required for polymerization provided by substrates for replication like ATP, GTP etc
(D) All these

123. In eukaryotic DNA replication, number of replication forks at each origin of replication site is
(A) 1 (B) 2
(C) 4 (D) many

124. Synthesis of primer occur in DNA replication by
(A) Topoisomerases
(B) Helicases
(C) Ligase
(D) RNA polymerase

125. Number of phosphodiester bonds broken by helicase at replication fork during DNA replication is
(A) Zero (B) 4
(C) 8 (D) 2

126. Principle of complementarity does not govern the processes of
(A) Replication
(B) Transcription
(C) Translation
(D) Reverse transcription

127. Find the incorrect one regarding gene expression.
(A) In E. coli capping of hnRNA occurs at 5' end
(B) In a eukaryotic cell, site of transcription is nucleus only
(C) In a mammalian cell translation of mRNA in to proteins in cytoplasm carried out by 80S ribosomes
(D) More than one option is incorrect

128. The evidence lead to proposition of genetic code is.
(A) Complementarity between nucleotide and amino acids
(B) Change in nucleic acid were responsible for change in amino acids in proteins
(C) A nucleic acid is copied from another nucleic acid in translation
(D) Translation could any be drawn theoretically

129. The ribosomal sub unit that first binds with mRNA to initiate translation on the surface of RER is
(A) 30s (B) 50s
(C) 40s (D) 60s

130. The site of eukaryotic cell where ribozyme (23s rRNA) catalyses peptide bond formation is
(A) Matrix of mitochondria
(B) On the surface of RER
(C) Cytoplasm
(D) All these

131. In ara operon 'ara' refers to
(A) arginine (B) alanine
(C) arachidonic acid (D) arabinose

132. An eight coiled DNA molecule has 20% of adenine. If one strand of the DNA has 34 guanines, what would be the number of cytosines in the same strand
(A) 34 (B) 36
(C) 14 (D) 16

133. Transformation experiment was performed by Griffith in year
(A) 1928 (B) 1925
(C) 1920 (D) 1918

134. Nucleic acids seen in E.coli is /are
(A) ds DNA (B) ss DNA
(C) ss RNA (D) Both 1 & 3

135. Which among the following is nucleoside
(A) Adenylic acid (B) Adenosine
(C) Cytidylic acid (D) Uridylic acid

136. Which of the following diseases is characterised by constipation, abdominal pain, stools with excess mucus and blood clot?
(A) Typhoid
(B) Ascariasis
(C) Amoebiasis
(D) Jaundice

137. Cytokine barriers of innate immunity includes
(A) Skin (B) Saliva in mouth
(C) PMNL cell (D) Interferons

138. Cell acting like HIV factory is
(A) Macrophage (B) RBC
(C) Basophil (D) Eosinophil

139. Property shown by a normal cell when compared to a cancerous cells is
(A) Neoplasm formation
(B) High telomerase activity
(C) Uncontrolled cell division
(D) Contact inhibition

140. The diagnosis of cancer can be performed by using techniques such as
(A) Biopsy
(B) MRI
(C) Computed tomography
(D) All of these

141. Sportspersons misuse narcotic analgesics, anabolic steroids and certain hormones. What is the correct reason for it?
(A) Increase in muscle strength
(B) Promote aggressiveness
(C) Increase athletic performance
(D) All of these

142. Select correct option among the given statements regarding true and false.
(i) Nicotine reduces the concentration of haembound oxygen.
(ii) Nicotine raises blood pressure and increases heart rate.
(iii) Smoking is associated with increased incidence of lung cancers.
(iv) Smoking causes oxygen deficiency only in the lungs.

	(i)	(ii)	(iii)	(iv)
(A)	T	T	T	T
(B)	T	F	T	F
(C)	F	F	T	T
(D)	T	T	T	F

143. A toxic substance, responsible for the chills and high fever recurring every three to four days in malarial fever, is
(A) interferon (B) haemozoin
(C) histamine (D) colostrum

144. Several genes called ____have been identified in normal cells which when activated will turn into ____ and under certain conditions, could lead to cancerous transformation of the cells.
(A) oncogenes, proto-oncogenes
(B) cellular oncogenes, proto-oncogenes
(C) proto-oncogenes, oncogenes
(D) oncogenes, cellular oncogenes

145. The sporozoites that cause infection, when a female *Anopheles* mosquito bites a person, are stored in
(A) Liver of the person
(B) RBCs of mosquito
(C) salivary glands of Mosquito
(D) intestine of mosquito

146. Appearance of dry, scaly lesions with itching on various parts of the body such as skin nails and scalp are the symptoms of_____.
(A) elephantiasis (B) ringworm
(C) ascariasis (D) amoebiasis

147. Viral RNA replicates to form viral DNA with the help of the enzyme 'x'. What is 'x'?
(A) DNA polymerase
(B) Restriction endonuclease
(C) RNA polymerase
(D) Reverse Transcriptase

148. The human immuno deficiency virus (HIV) is
(A) an enveloped, ds RNA containing retrovirus
(B) an unenveloped, ds RNA containing retrovirus
(C) an enveloped, ss RNA containing retrovirus
(D) an unenveloped, ss RNA containing retrovirus

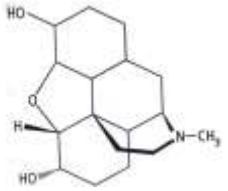
149. A preparation of antigenic proteins of pathogen or inactivated/ weakened pathogen are introduced into the body. This process is known as
(A) Immunisation (B) Vaccination
(C) Autoimmunity (D) Allergy

150. Which factors are very important for maintaining good health?
(A) Balanced diet (B) personal Hygiene
(C) Regular exercise (D) All of these

151. An antibody is represented as H_2L_2. This refers to
(A) Each antibody molecule has four light chains
(B) Each antibody molecule has 3 light & 1 heavy chain
(C) Each antibody molecule has 2 light & 2 heavy chains
(D) Each antibody molecule has 3 heavy & 1 light chain

152. Antibodies are secreted by
(A) T-lymphocytes (B) B-lymphocytes
(C) both (A) and (B) (D) natural killer cell.

153. The chemical compound whose chemical structure is given below is obtained from which plant?



(A) *Papaver somniferum*
(B) *Erythroxylum coca*
(C) *Atropa belladona*
(D) *Cannabis sativa*

154. Which of the following statements is not correct?
(A) Higher vertebrates can distinguish foreign organisms from self-cells.
(B) Fetus receives antibodies from its mother through placenta, is an example of active immunity.
(C) Cell-mediated immunity involves T-lymphocytes.
(D) Antibodies against cancer-specific antigens are used for detection of certain cancers.

155. Which of the following statements is not correct?
(A) Acquired immunity is pathogen specific.
(B) Macrophages can phagocytose and destroy microbes.
(C) Hallucinogenic chemicals obtained from leaves, resins and inflorescence of plant Cannabis sativa are called as cannabinoids.
(D) Opioid is a medicine used to help patients to cope with mental illnesses.

156. Which of the following immune responses is responsible for rejection of kidney graft?
(A) Auto-immune response
(B) Humoral immune response
(C) Inflammatory immune response
(D) Cell-mediated immune response

157. In which one of the following options the two examples are correctly matched with their particular type of immunity?

	Examples	**Type of immunity**
(A)	Natural killer cells	Physical barriers
(B)	Acid in the stomach and saliva in the mouth	Physiological barriers
(C)	Mucus coating of the epithelium lining	Cellular barrier
(D)	Polymorpho–nuclear leukocytes	Cytokine barriers

158. Antibodies present in colostrum which protect the new born from certain diseases is of
(A) IgG type (B) IgA type
(C) IgD type (D) IgE type

159. Match column I with Column II and select the correct option

	Column–I	**Column–II**
(a)	Heroin	(i) *Atropa belladona*
(b)	Charas	(ii) *Erythroxylum coca*
(c)	Cocaine	(iii) *Papaver somniferum*
(d)	Atropine	(iv) *Cannabis sativa*

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

160. If regular does of the drug is abruptly discontinued than tendency of body to manifest a characteristic and unpleasant withdrawl syndrome is called:
(A) Addiction
(B) Dependence
(C) Allergy
(D) Autoimmune disorder

161. Lymphoid organs where immature lymphocyte differentiate into antigen-sensitive lymphocytes. This statement is applicable to
(A) Spleen (B) Thymus
(C) Bone marrow (D) Both (B) & (C)

162. The alveoli filled with fluid and lips and finger nails may turn gray to bluish in colour. This symptoms are related to
(A) Dysentery (B) Pneumonia
(C) common cold (D) diphtheria

163. Select the correct statement regarding activated sludge formed during secondary sewage treatment.
(A) A small part of its is rapidly pumped back from sedimentation to aeration tank.
(B) It absorbs pathogenic bacteria present in waste water while sinking to the bottom of the settling tank.
(C) A major part of it is anaerobically digested.
(D) Both (A) and (C)

164. Which of the following is not used as a biopesticide?
(A) *Trichoderma*
(B) *Nucleopolyhedrovirus*
(C) *Xanthomonas campestris*
(D) *Bacillus thuringiensis*

165. Which of the following statements is/are correct?
A) In paddy fields, cyanobacteria serve as an important biofertiliser.
(B) Plants having mycorrhizal associations show functions like tolerance to drought, salinity and resistance to root-borne pathogens.
(C) The important examples of cyanobacteria as biofertilisers are *Anabaena*, *Nostoc* and *Oscillatoria*.
(D) All of these

166. Match the following list of bacteria and their commercially important products.

	Bacterium		**Product**
(i)	*Aspergillus niger*	(A)	Lactic acid
(ii)	*Acetobacter aceti*	(B)	Butyric acid
(iii)	*Clostridium butylicum*	(C)	Acetic acid
(iv)	*Lactobacillus*	(D)	Citric acid

Choose the correct match.
(A) i-(B), ii-(C), iii-(D), iv-(A)
(B) i-(B), ii-(D), iii-(C), iv-(A)
(C) i-(D), ii-(C), iii(B), iv-(A)
(D) i-(D), ii-(A), iii-(C), iv-(B)

167. The primary treatment of wastewater involves the removal of
(A) dissolved impurities
(B) stable particles
(C) toxic substances
(D) harmful bacteria.

168. BOD of wastewater is estimated by measuring the amount of
(A) total organic matter
(B) biodegradable organic matter
(C) oxygen evolution
(D) oxygen consumption.

169. The technology of biogas production was developed in India due to the efforts of
(A) IARI (B) KVIC
(C) CDRI (D) Both (A) and (B)

170. Biofertilisers are the living organisms which
(A) bring about soil nutrient enrichment
(B) maximise the ecological benefits
(C) minimise the environmental hazards
(D) all of these

171. *Monascus purpureus* is a yeast commercially used in the production of
(A) citric acid
(B) ethanol
(C) blood cholesterol lowering statins
(D) streptokinase for removing clots from blood vessels.

172. Match column I with column II and select the correct option from the given codes.

	Column I		Column II
A.		(i)	Adenovirus
B.		(ii)	Tobacco Mosaic Virus
C.		(iii)	Bacteriophage

(A) A-(i), B-(ii), C-(iii)
(B) A-(ii), B-(i), C-(iii)
(C) A-(iii), B-(ii), C-(i)
(D) A-(iii), B-(i), C-(ii)

173. Penicillin was the first antibiotic made by Alexander Fleming from
(A) *Penicillium chrysogenum*
(B) *Penicillium notatum*
(C) *Streptococcus thermophiles*
(D) *Penicillium roqueforti*

174. Conversion of milk to curd improves its nutritional value by increasing the amount of
(A) vitamin-B_{12} (B) vitamin-A
(C) vitamin-D (D) vitamin-E

175. The purpose of biological treatment of waste water is to
(A) reduce BOD
(B) increase BOD
(C) reduce sedimentation
(D) increase sedimentation.

176. Match the following

	Column-A		**Column-B**
(A)	Swiss cheese	(i)	*Trichoderma polysporum*
(B)	Cyclosporin-A	(ii)	*Mycorrhiza*
(C)	Glomus	(iii)	*Propionibacterium sharmanii*
(D)	Baker's yeast	(iv)	*Saccharomyces cerevisiae*

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

177. Methanogens, growing anaerobically on cellulosic material produce
(A) methane
(B) methane and carbon dioxide
(C) methane and hydrogen
(D) methane, carbon dioxide and hydrogen.

178. There is always a time lag between the infection and appearance of AIDS symptoms, called as?
(A) Incubation period (5-10 months)
(B) Window period (5-10 months)
(C) Incubation period (2-12 months)
(D) Incubation period (5-10 yrs)

179. Haemozoin is
(A) Tissue dissolving enzyme
(B) Formed in the RBC of vector
(C) Malarial parasites antigen
(D) Released from erythrocyte of patient

180. Which one of the following options gives the correct matching of a disease with its causative organism and mode of infection?

	Disease	**Causative organism**	**Mode of infection**
(A)	Typhoid	*Salmonella typhi*	With inspired air
(B)	Pneumonia	*Streptococcus pneumoniae*	Droplet infection
(C)	Elephantiasis	*Wuchereria bancrofti*	With infected water and blood
(D)	Malaria	*Plasmodium vivax*	Bite of male Anopheles mosquito