Roll No.: | | | | | | | | | | | | |

Test Date: 14-08-2022

Aakash + BYJU'S

A
Booklet Code

AIATS
ALL INDIA AAKASH TEST SERIES

for

Medical Entrance Exam - 2023

National Eligibility-cum-Entrance Test (NEET)

TEST No. 1

(XII Studying Students)

INSTRUCTIONS FOR CANDIDATES

1. Read each question carefully.
2. It is mandatory to use Blue/Black Ball Point Pen to darken the appropriate circle in the answer sheet.
3. Mark should be dark and should completely fill the circle.
4. Rough work must not be done on the answer sheet.
5. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked is allowed.
6. Student cannot use log tables and calculators or any other material in the examination hall.
7. Before attempting the question paper, student should ensure that the test paper contains all pages and no page is missing.
8. Each correct answer carries four marks. One mark will be deducted for each incorrect answer from the total score.
9. Before handing over the answer sheet to the invigilator, candidate should check that Roll No. and Centre Code have been filled and marked correctly.
10. Immediately after the prescribed examination time is over, the answer sheet to be returned to the invigilator.
11. 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 out of 15 from Section-B.

Note : It is compulsory to fill **Roll No.** and **Test Booklet Code** on answer sheet, otherwise your answer sheet will not be considered.

CLICK HERE TO JOIN CHANNEL

Test No. 1

TOPICS OF THE TEST

Physics	Electric Charges and Fields, Electrostatic Potential and Capacitance, Current Electricity
Chemistry	The Solid State, Solutions, Electrochemistry, Chemical Kinetics
Botany	Reproduction in Organisms, Sexual Reproduction in Flowering Plants
Zoology	Reproduction in organisms, Human Reproduction

MM : 720

TEST - 1

Time : 3 Hrs. 20 Min.

[PHYSICS]

Choose the correct answer :

SECTION-A

1. Two equal point charges each 6 μC are separated by a certain distance in metres. If they are located at $\left(2\hat{i}+2\hat{j}+2\hat{k}\right)$ m and $\left(3\hat{i}+4\hat{j}+4\hat{k}\right)$ m, then electrostatic force between them is
   (1) 18 mN (2) 24 mN
   (3) 9 mN (4) 36 mN

2. A charge $\frac{2Q}{3}$ is to be divided on two objects. The value of charge on each object, such that force between the object can be maximum, would be
   (1) $\frac{2Q}{3}, 0$ (2) $\frac{Q}{4}, \frac{5Q}{12}$
   (3) $\frac{Q}{3}, \frac{Q}{3}$ (4) $\frac{Q}{2}, \frac{Q}{6}$

3. A point charge is brought in an electric field. The electric field at a nearby point
   (1) Will increase if the charge is positive
   (2) Will decrease if the charge is negative
   (3) May increase if the charge is positive
   (4) Will remains same

4. An electric dipole is placed in a uniform electric field, the net torque on the dipole
   (1) Is always zero
   (2) Depend on orientation of dipole
   (3) Can never be zero
   (4) Never depend on the strength of the dipole

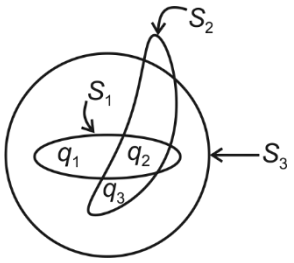
5. A solid spherical conductor of radius R has a spherical cavity of radius a ($a < R$) at its centre. A charge $+Q$ is kept at the centre. The charge inside a gaussian surface of radius r ($a < r < R$) will be
   (1) Zero
   (2) $-Q$
   (3) $+Q$
   (4) $\frac{+Q}{2}$

6. Two identical point charges are placed in air at a distance d. Now they are placed in a medium having dielectric constant 4. If magnitude of net force on either of the charge in both cases are same, then distance between the charges in the medium will be
   (1) $2d$
   (2) $d/2$
   (3) $4d$
   (4) $d/4$

7. Which among the following statements is correct for electric lines of force?
   (1) They always intersect
   (2) They exist only in the immediate vicinity of electric charges
   (3) They exist only when both positive and negative charges are near one another
   (4) It is an imaginary line/curve

Space for Rough Work

8. Three charges of $q_1 = 1 \times 10^{-6}$C, $q_2 = 2 \times 10^{-6}$C and $q_3 = -3 \times 10^{-6}$C have been placed as shown in the figure. The net electric flux will be maximum for the surface

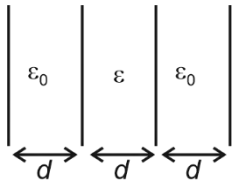


(1) S_1
(2) S_2
(3) S_3
(4) Same for S_1, S_2 and S_3

9. Magnitude of rate of change in potential with distance is maximum if one goes
(1) Along the electric field
(2) Perpendicular to electric field
(3) In any direction
(4) At 45° with electric field

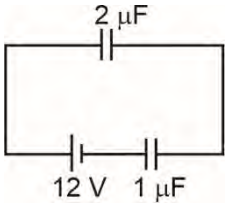
10. When a 4 μC of charge is carried from a point A to point B, the amount of work done by electric field is 100 μJ. What is the potential difference between points A and B and which point is at higher potential?
(1) 21 V, B
(2) 25 V, A
(3) 20 V, B
(4) 20 V, A

11. For configuration of media of permittivity ε_0, ε and ε_0 between parallel plates of a capacitor each of area A, as shown in the figure, the equivalent capacitance is



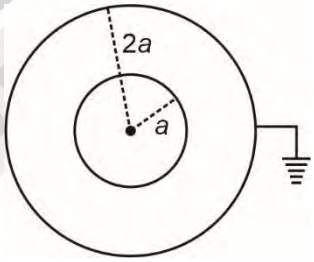
(1) $\frac{A\varepsilon_0}{d}$
(2) $\frac{\varepsilon\varepsilon_0 A}{d}$
(3) $\frac{\varepsilon\varepsilon_0 A}{(2\varepsilon+\varepsilon_0)d}$
(4) $\frac{\varepsilon\varepsilon_0 A}{d(\varepsilon+\varepsilon_0)}$

12. In a circuit as shown in the figure, potential difference across the capacitor of 1 μF is



(1) 8 V
(2) 4 V
(3) 12 V
(4) 6 V

13. Two concentric conducting spherical shells having radii a and $2a$ respectively are arranged as shown in the figure.

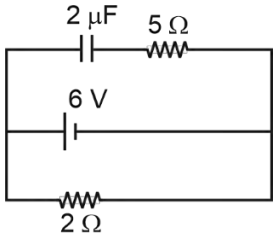


Capacitance of this system is
(1) $4\pi\varepsilon_0 a$
(2) $2\pi\varepsilon_0 a$
(3) $8\pi\varepsilon_0 a$
(4) Zero

Space for Rough Work

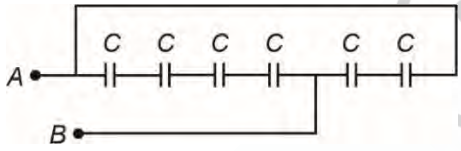
14. The magnitude of electric field at which dielectric of a condenser get punctured is called
(1) Dielectric constant
(2) Dielectric strength
(3) Dielectric resistance
(4) Dielectric number

15. A capacitor of 2 μF is connected as shown in circuit. The internal resistance of the battery is 1 Ω. The amount of charge on the capacitor in steady state, will be



(1) 9 μC (2) 8 μC
(3) 6 μC (4) 10 μC

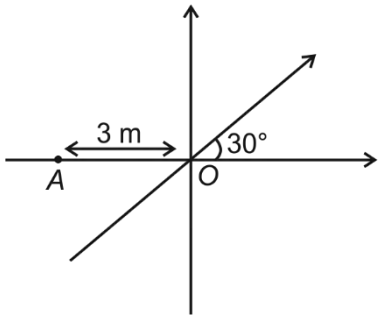
16. The equivalent capacitance of the combination between point *A* and *B*, as shown in the figure, is



(1) $\frac{C}{4}$ (2) $\frac{C}{3}$
(3) $\frac{3C}{4}$ (4) $4C$

17. A parallel plate air capacitor is charged to 50 V and is then connected to an uncharged geometrically identical capacitor in parallel. The second capacitor has some dielectric medium between its plates. If the common potential is 10 V, the dielectric constant of the medium is
(1) 4 (2) 2
(3) 8 (4) 3

18. A uniform electric field of 60 V/m is directed at 30° with the positive *x*-axis as shown in figure. If *OA* = 3 m, then potential difference $V_O - V_A$ is



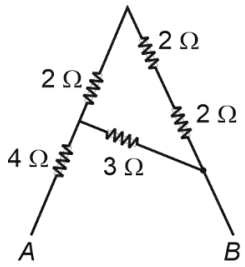
(1) 90 V
(2) $-90\sqrt{3}$ V
(3) $60\sqrt{3}$ V
(4) $-60\sqrt{3}$ V

19. A battery of internal resistance *r* has an emf *E*. What is the potential difference across the terminals of the battery when a load resistance ($R = 2r$) is connected to its terminal?
(1) $\frac{E}{3}$
(2) $\frac{2E}{3}$
(3) $\frac{E}{2}$
(4) E

20. The solids which have the positive temperature coefficient of resistance are
(1) Insulators
(2) Semiconductors
(3) Metals
(4) Both insulators and semiconductors

Space for Rough Work

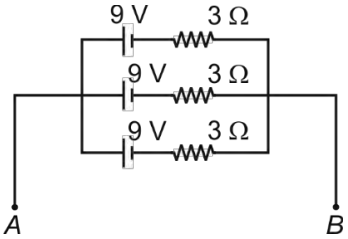
21. The equivalent resistance between A and B for circuit shown in the figure is



(1) 4 Ω (2) 8 Ω

(3) 6 Ω (4) 12 Ω

22. Three identical cells are connected in parallel across AB. Net emf across A and B is



(1) 6 V (2) 9 V

(3) 12 V (4) 3 V

23. The resistance of a wire is 'R'. If it is melted and made to '$\frac{1}{n}$' times its original length. Its new resistance will be

(1) nR (2) R/n

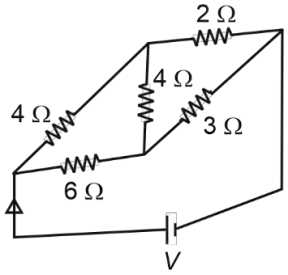
(3) n^2R (4) $\frac{R}{n^2}$

24. The power dissipated through internal resistance of a 2.1 V cell, which gives a current of 0.2 A through a load resistance of 10 Ω, is

(1) $\frac{1}{25}$W (2) $\frac{1}{50}$W

(3) $\frac{1}{10}$W (4) $\frac{1}{100}$W

25. For the network shown in the figure, the potential drop across the 6 Ω resistance will be



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

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

26. Two metal wires of identical dimensions are connected in series. If σ and 2σ are the conductivities of the metal wire respectively, the effective conductivity of the combination is

(1) $\frac{4\sigma}{3}$ (2) $\frac{2\sigma}{3}$

(3) $\frac{\sigma}{3}$ (4) 3σ

27. A wire 100 cm long and 2 mm^2 in cross-section carries a current of 2 A when connected to 4 V battery. The resistivity of the wire is

(1) 4×10^{-4} Ω-m (2) 4×10^{-6} Ω-m

(3) 2×10^{-4} Ω-m (4) 2×10^{-6} Ω-m

28. In a potentiometer having wire length l, a cell of emf V is balanced at length $\frac{l}{4}$ from the positive end of the wire. For another cell of emf $\frac{4}{3}V$, the balancing length becomes

(1) $\frac{3l}{4}$ (2) $\frac{l}{3}$

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

Space for Rough Work

29. Two unknown resistances are connected in two gaps of a meter-bridge. The null point is obtained at 40 cm from left end. A 20 Ω resistance is connected in series with the smaller of the two resistances. The null point shift by 10 cm towards right. The value of smaller resistance in Ω is

(1) 30 (2) 10

(3) 40 (4) 20

30. Match the colour codes of carbon resistor with their respective number

(A)	Violet	(P)	5
(B)	Green	(Q)	8
(C)	Grey	(R)	3
(D)	Orange	(S)	7

(1) A–S, B–P, C–Q, D–R

(2) A–P, B–Q, C–R, D–S

(3) A–R, B–S, C–P, D–Q

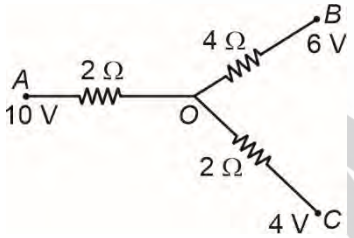
(4) A–Q, B–P, C–S, D–R

31. The material whose resistivity is less sensitive to temperature is

(1) Silicon (2) Copper

(3) Silver (4) Nichrome

32. In the given part of network, potential at *O* will be



(1) $\frac{24}{5}$ V (2) $\frac{34}{5}$ V

(3) $\frac{20}{3}$ V (4) $\frac{40}{3}$ V

33. The amount of charge flowing per second per unit area normal to flow, is called

(1) Electrical conductivity

(2) Current density

(3) Electrical resistivity

(4) Mobility

34. The current flowing through a wire depends on time t (in second) as $I = (3t^2 + 2t + 5)$ A. The average current flowing through the wire from time $t = 0$ to $t = 2$ s is

(1) 11 A

(2) 10 A

(3) 9 A

(4) 5 A

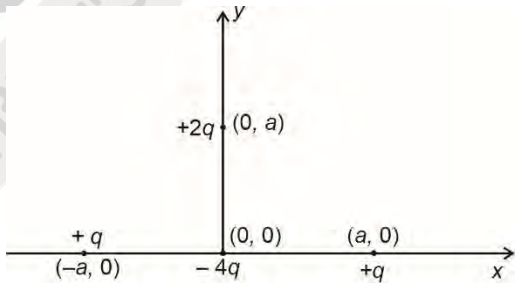
35. A metallic wire of cross-sectional area 2 mm^2 carries a current of 3.2 A. If 10^{26} electrons flow across the wire per unit volume, then their drift velocity in m/s is

(1) 1 (2) 0.01

(3) 0.1 (4) 10

SECTION-B

36. The net dipole moment of the system as shown in the figure is



(1) $qa\hat{j}$ (2) $-3qa\hat{j}$

(3) $2qa\hat{j}$ (4) Zero

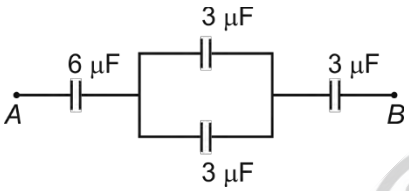
Space for Rough Work

37. Three charges $-2q$, Q and $-q$ are placed at equal distances along a straight line shown in the figure. If the total P.E. of the system is zero, then the ratio $\frac{Q}{q}$ will be

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

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

38. In the given diagram, the potential difference between A and B is 80 V. The potential difference across 6 μF capacitor is



(1) 10 V (2) 30 V

(3) 20 V (4) 40 V

39. If dielectric is removed from the space between the plates of an isolated charged parallel plate capacitor, then

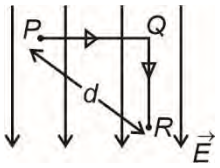
(1) Electric field between the plates decreases

(2) Capacity of the capacitor decreases

(3) Charge stored on the capacitor increases

(4) Energy stored in the capacitor decreases

40. Figure shows two points P and R, separated by a distance d, in a uniform electric field $\vec{E}$. Find the potential difference ($V_R - V_P$) when positive test charge q_0 is moved from P to R along the path PQR ($PQ = QR$).



(1) Ed (2) $\frac{-Ed}{\sqrt{2}}$

(3) $\sqrt{2}Ed$ (4) $-Ed$

41. A parallel plate capacitor has two square plates separated by distance d with equal and opposite charges. The surface charge densities on the plates are $+\sigma$ and $-\sigma$ respectively. The magnitude of potential difference between the plates will

(1) $\frac{\sigma d}{\varepsilon_0}$

(2) $\frac{2\sigma d}{\varepsilon_0}$

(3) $\frac{2\sigma}{\varepsilon_0 d}$

(4) Zero

42. Mobility of free electrons in a conductor is

(1) Directly proportional to electron density

(2) Directly proportional to relaxation time

(3) Inversely proportional to cube of electron density

(4) Inversely proportional to relaxation time

43. A bulb rated as (40 W, 10 V) is connected across 20 V cell. What resistance is required to glow it with full intensity?

(1) 4 Ω

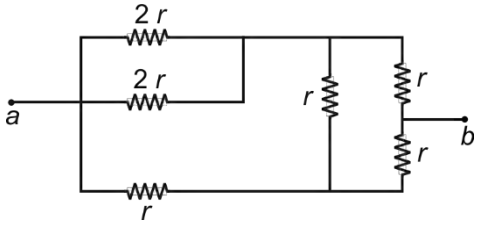
(2) 6 Ω

(3) 8 Ω

(4) 2.5 Ω

Space for Rough Work

44. The equivalent resistance between the points *a* and *b* of the electrical network, as shown in figure, is



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

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

45. Consider the following statements.

Statement A: Kirchhoff's junction law is in accordance with law of conservation of charge.

Statement B: Kirchhoff's voltage law is in accordance with law of conservation of energy.

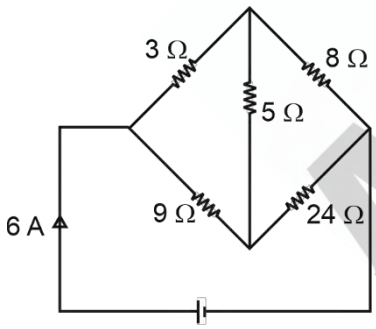
(1) Both statement (A) and (B) are true

(2) Both statement (A) and (B) are false

(3) Statement (A) is true (B) is false

(4) Statement (B) is true (A) is false

46. In the circuit shown, if the 5 Ω resistance is replaced by 10 Ω then what is the amount of current drawn from the battery?



(1) 4 A (2) 6 A

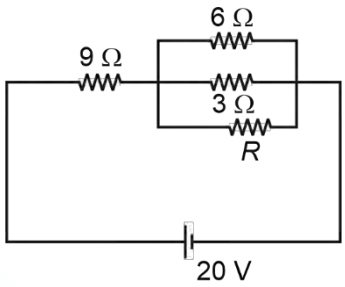
(3) 12 A (4) 3 A

47. The resistivity of potentiometer wire is 20×10^{-8} ohm-meter and its area of cross-section is 4×10^{-6} m^2. If 0.4 ampere current is flowing through the wire, the potential gradient of the wire is

(1) 2×10^{-2} V/m (2) 4×10^{-2} V/m

(3) 2×10^{-1} V/m (4) 4×10^{-1} V/m

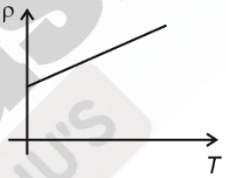
48. In the circuit shown, for what value of *R*, will the ideal battery transfer power of 40 W?

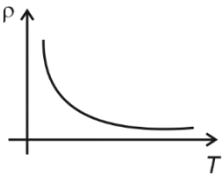


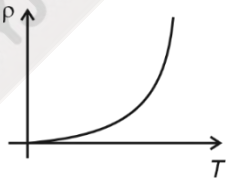
(1) 4 Ω (2) 8 Ω

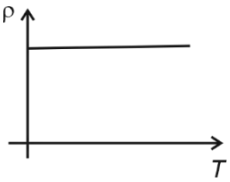
(3) 2 Ω (4) 6 Ω

49. Choose the best graph for temperature dependence of resistivity (ρ) for a typical semiconductor

(1) 

(2) 

(3) 

(4) 

50. Ohm's law fails in

(1) Transistor (2) Photodiode

(3) Diode (4) All of these

Space for Rough Work

[CHEMISTRY]

SECTION-A

51. Formula of nickel oxide with metal deficiency defect in its crystal is $Ni_{0.94}O$. The crystal contains Ni^{2+} and Ni^{3+} ions. The fraction of nickel existing as Ni^{3+} ion in the crystal is

(1) $\frac{7}{23}$ (2) $\frac{4}{53}$

(3) $\frac{6}{47}$ (4) $\frac{2}{39}$

52. An element exhibits fcc structure at room temperature. Above 500°C, it transforms to simple cubic structure. The ratio of density of element at room temperature to that above 500°C is (assuming molar mass and atomic radii remains constant with temperature)

(1) 1 : 1 (2) $\sqrt{2}:1$

(3) $2\sqrt{2}:1$ (4) $1:2\sqrt{2}$

53. The total number of voids (tetrahedral and octahedral) and number of atoms in fcc unit cell respectively are

(1) 4 and 4 (2) 12 and 4

(3) 12 and 6 (4) 8 and 8

54. The correct option for the number of end centred unit cells in all 14 types of Bravais Lattice unit cells is

(1) 2 (2) 3

(3) 4 (4) 7

55. A hypothetical metal crystallises in a fcc unit cell. The edge length of unit cell is 200 pm and the molar mass of metal is 50 g mol^{-1}. The density of the metal is ($N_A = 6 \times 10^{23}$)

(1) 10.41 g cm^{-3} (2) 23.27 g cm^{-3}

(3) 33.34 g cm^{-3} (4) 41.67 g cm^{-3}

56. Which is the **incorrect** statement?

(1) AgBr shows both Frenkel as well as Schottky defects

(2) Schottky defect is shown by ionic substance in which cation and anion are of almost similar size

(3) Due to metal excess defect ZnO turns yellow on heating

(4) Due to metal deficiency defect formation of F-centres take place

57. **Statement-I:** Ferrimagnetic substance becomes paramagnetic on heating.

Statement-II: Diamagnetic substances are weakly magnetised in a magnetic field in opposite direction.

In the light of above statements choose the **correct** option.

(1) Statement I is correct and statement II is incorrect

(2) Statement I is incorrect and statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

58. A compound formed by elements X and Y crystallizes in a fcc structure in which the X atoms are forming fcc lattice while Y atoms are at alternate tetrahedral voids. The formula of the compound is

(1) YX (2) Y_2X

(3) YX_2 (4) Y_2X_3

59. The following solutions were prepared by dissolving 10 g of urea in 250 g of water (P_1), 10 g of NaCl in 250 g of water (P_2) and 10 g of glucose in 250 g of water (P_3). The right option for decreasing order of freezing point of these solutions is

(1) $P_3 > P_1 > P_2$ (2) $P_2 > P_1 > P_3$

(3) $P_1 > P_2 > P_3$ (4) $P_2 > P_3 > P_1$

Space for Rough Work

60. An ideal solution is made by mixing A and B. If vapour pressure of component A in the solution is 200 torr. Then molar ratio of A and B in vapour phase is

$\left(P_A^\circ = 400\,\text{torr}, P_B^\circ = 100\,\text{torr}\right)$

(1) 1 : 1 (2) 2 : 1

(3) 1 : 4 (4) 4 : 1

61. The mixture which shows negative deviation from Raoult's law is

(1) Benzene + Toluene

(2) Chloroethane + Bromoethane

(3) Acetone + Chloroform

(4) Carbon disulphide + Acetone

62. Which of the following terms is temperature independent?

(1) Molarity (2) Molality

(3) $\left(\frac{w}{V}\right)\%$ (4) Normality

63. Assuming 100% ionisation, which of the following has same van't Hoff factor as $K_4[Fe(CN)_6]$?

(1) $CaSO_4$ (2) $Al_2(SO_4)_3$

(3) $CaCl_2$ (4) $AlCl_3$

64. At constant temperature and pressure, which of the following is not true for ideal solution?

(1) $\Delta G_{mix} < 0$ (2) $\Delta S_{mix} > 0$

(3) $\Delta V_{mix} = 0$ (4) $\Delta H_{mix} < 0$

65. **Statement I:** Aquatic species are more comfortable in cold waters than warm waters.

Statement II: The solubility of gases in liquid decreases with decrease in temperature.

In the light of above statements choose the **correct** option.

(1) Statement I is correct and statement II is incorrect

(2) Statement I is incorrect and statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

66. If solubility of H_2S in water at STP is 0.2 m then the Henry's law constant of H_2S is nearly

(1) 114 atm (2) 165 atm

(3) 278 atm (4) 512 atm

67. Maximum value of ebullioscopic constant is for

(1) 0.1 M aq CH_3COOH

(2) 0.2 M aq urea

(3) 0.1 M aq NaCl

(4) All have same values

68. The number of Faradays (F) required to produce 2.7 g aluminium from molten $AlCl_3$ (Molar mass of Al = 27 g mol^{-1}) is

(1) 0.1 F (2) 0.3 F

(3) 0.6 F (4) 0.9 F

69. On electrolysis of aqueous solution of $AgNO_3$ using silver electrodes, the product obtained at anode will be

(1) O_2 (2) Ag^+

(3) Ag (4) NO_2

70. In a typical fuel cell, the reactant (R) and product (P) are

(1) $R = H_2(g), Cl_2(g) : P = HCl(aq)$

(2) $R = N_2(g), O_2(g) ; P = NO_2(aq)$

(3) $R = H_2(g), O_2(g) ; P = H_2O(l)$

(4) $R = H_2O(g), SO_3(g) ; P = H_2SO_4(l)$

Space for Rough Work

71. Following limiting molar conductivities are given as

$\Lambda_m^\circ(H_2SO_4) = x\ Scm^2\,mol^{-1}$

$\Lambda_m^\circ(MgSO_4) = y\ Scm^2\ mol^{-1}$

$\Lambda_m^\circ\left((CH_3COO)_2Mg\right) = z\ Scm^2\ mol^{-1}$

$\Lambda_m^\circ\left(\text{In } Scm^2\ mol^{-1}\right)$ for CH_3COOH will be

(1) $z + x - y$ (2) $\frac{z}{2} + \frac{x}{2} - \frac{y}{2}$

(3) $z + y - x$ (4) $\frac{z}{2} + \frac{y}{2} - \frac{x}{2}$

72. The standard electrode potential (E°) values of Cu^{2+}/Cu, Pb^{2+}/Pb, Zn^{2+}/Zn and Au^{3+}/Au are 0.34 V, – 0.13 V, –0.76 V and 1.40 V respectively. The correct decreasing order of reducing power of the metals is

(1) Zn > Pb > Au > Cu (2) Au > Cu > Pb > Zn

(3) Au > Cu > Zn > Pb (4) Zn > Pb > Cu > Au

73. For the cell reaction,

$Ni(s) + 2Ag^+(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$

$E^o_{cell} = 1.05\,V$ at 298 K. The standard Gibbs energy ($\Delta_rG°$) of the cell reaction is

[Given that Faraday constant F = 96500 C mol^{-1}]

(1) –202.65 kJ mol^{-1} (2) 202.65 kJ mol^{-1}

(3) 101.33 kJ mol^{-1} (4) –101.32 kJ mol^{-1}

74. For a cell reaction involving two electrons, $E°_{cell}$ = 0.5 V at 298 K, the equilibrium constant for the cell reaction is

[Given that $\frac{2.303RT}{F} = 0.05\,V$ at T = 298K]

(1) 10^5 (2) 10^{10}

(3) 10^{15} (4) 10^{20}

75. Consider the change in oxidation states of metal A corresponding to different emf values as shown in the diagram below

$AO_2^+ \xrightarrow{-1.0V} AO^{2+} \xrightarrow{0.34V} A^{3+} \xrightarrow{-0.26V} A^{2+} \xrightarrow{-1.13V} A$

Then the species undergoing disproportionation is

(1) A (2) AO^{2+}

(3) A^{3+} (4) A^{2+}

76. **Statement I:** Molar conductivity increases slowly on dilution for strong electrolyte.

Statement II: Conductivity decreases on dilution for weak electrolyte.

In the light of above statements, choose the correct option below.

(1) Statement I is correct and statement II is incorrect

(2) Statement I is incorrect and statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

77. Which of the following is used for the galvanization of iron?

(1) Na (2) Mg

(3) Zn (4) Cu

78. The rate constant for a first order reaction is $2.303 \times 10^{-3}\ s^{-1}$. The time required to reduce 4 g of reactant to 0.4 g is

(1) 25 s (2) 50 s

(3) 100 s (4) 1000 s

79. When initial concentration of the reactant is doubled, the half-life period of a first order reaction

(1) is halved

(2) is doubled

(3) becomes one fourth

(4) remains unchanged

Space for Rough Work

80. Mechanism of a hypothetical reaction $2O_3 \rightarrow 3O_2$ is given below.

(a) $O_3 \underset{}{\overset{\text{Fast}}{\rightleftharpoons}} O_2 + O$

(b) $O_3 + O \xrightarrow{\text{Slow}} 2O_2$

The overall order of the reaction will be

(1) 0 (2) 1

(3) 2 (4) 3

81. In a reaction A + B → Product, rate of reaction is doubled when the concentration of A is doubled and rate becomes four times when the concentrations of both the reactants (A and B) are doubled, rate law for the reaction can be written as

(1) Rate = k [A] [B] (2) Rate = k $[A]^2$ [B]

(3) Rate = k [A] $[B]^2$ (4) Rate = k $[A]^0$ $[B]^2$

82. In the reaction

$$BrO_3^-(aq) + 5Br^-(aq) + 6H^+(aq) \rightarrow 3Br_2(aq) + 3H_2O(l)$$

The ratio of rate of appearance of bromine (Br_2) and rate of disappearance of Bromide ions (Br^-) is

(1) 1 : 1 (2) 3 : 5

(3) 5 : 3 (4) 1 : 3

83. Match the order of reaction given in List I with unit of rate constant given in List II and identify the correct code

	List I		List II
(a)	Zero order	(i)	$mol^{-1}\ L\ s^{-1}$
(b)	First order	(ii)	s^{-1}
(c)	Second order	(iii)	$mol\ L^{-1}\ s^{-1}$
(d)	Third order	(iv)	$mol^{-2}\ L^2\ s^{-1}$

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

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

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

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

84. Select the incorrect statement.

(1) Order of a reaction is an experimental quantity

(2) Order is applicable only to elementary reactions

(3) For complex reaction, molecularity has no meaning

(4) Molecularity cannot be non-integer

85. If the rate constant for a first order reaction is k then the time required for 99.9% completion of the reaction is

(1) $\frac{2.303}{k}$ (2) $\frac{2\times 2.303}{k}$

(3) $\frac{3\times 2.303}{k}$ (4) $\frac{9\times 2.303}{k}$

SECTION-B

86. In one dimensional close packed arrangement of spheres, the coordination number is

(1) 4 (2) 6

(3) 2 (4) 12

87. For which of the following crystal system $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90°$?

(1) Orthorhombic (2) Monoclinic

(3) Triclinic (4) Trigonal

88. Given below are two statements:

Statement I : In CCP lattice, tetrahedral voids are present at face centre of unit cell.

Statement II : Packing efficiency of fcc unit cell is 68%.

In the light of the above statements, choose the most appropriate answer from the given below

(1) Statement I is correct but statement II is incorrect

(2) Statement I is incorrect but statement II is correct

(3) Both statement I and statement II are correct

(4) Both statement I and statement II are incorrect

Space for Rough Work

89. Which of the following colligative property is widely used to determine molar masses of proteins and polymers?
(1) Relative lowering in vapour pressure
(2) Elevation in boiling point
(3) Depression in freezing point
(4) Osmotic pressure

90. Select the incorrect statement regarding azeotropes.
(1) Same composition in liquid and vapour phase
(2) Not possible to separate components by fractional distillation
(3) Large positive deviation from Raoult's law form maximum boiling azeotrope at a specific composition
(4) A mixture of 68% HNO_3 and 32% H_2O by mass form maximum boiling azeotrope

91. A solute undergoes 40% trimerization in the solution. The van't Hoff factor of the solute is
(1) 0.33 (2) 0.73
(3) 0.42 (4) 2.6

92. The mass of non-volatile solute (molar mass 50 $gmol^{-1}$) which should be dissolved in 171 g of octane to reduce its vapour pressure to 50% is
(1) 25 g (2) 50 g
(3) 75 g (4) 100 g

93. The emf of the following cell at 298 K is nearly
$Mg(s)\left|Mg^{2+}(0.001\,M)\right|\left|Cu^{2+}(0.01\,M)\right|Cu(s)$
$\left(E^{\circ}_{Mg^{2+}/Mg} = -2.37\ V, \quad E^{\circ}_{Cu^{2+}/Cu} = 0.34\,V\right)$
(1) 1.12 V (2) 2.74 V
(3) 3.08 V (4) 4.10 V

94. Which of the following is not a semiconductor?
(1) Graphite (2) CuO
(3) Si (4) Ge

95. Maximum limiting molar conductivity in water at 298 K is of
(1) H^+ (2) Na^+
(3) K^+ (4) Ca^{2+}

96. Electrolyte used in lead storage battery is
(1) 38% solution of H_2SO_4
(2) Dilute NaOH
(3) Paste of KOH and ZnO
(4) Moist paste of NH_4Cl and $ZnCl_2$

97. Formula of cell constant is
(1) $R\kappa$ (2) κC
(3) $\frac{\kappa}{R^2}$ (4) $\frac{\kappa}{C^2}$

98. Slope of plot between log k and $\frac{1}{T}$ in Arrhenius equation is
(1) $\frac{-E_a}{R}$ (2) $\frac{E_a}{R}$
(3) $\frac{E_a}{2.303R}$ (4) $\frac{-E_a}{2.303R}$

99. If for a reaction, rate constant becomes double with every 10°C rise in temperature then the ratio of rate of reaction at 25°C and 55°C is
(1) 1/4 (2) 4
(3) 1/8 (4) 8

100. The decomposition of gaseous ammonia on a hot platinum surface at high pressure is an example of
(1) Zero order reaction
(2) First order reaction
(3) Pseudo first order reaction
(4) Second order reaction

Space for Rough Work

[BOTANY]

SECTION-A

101. In which of the given organisms, fusing gametes are morphologically similar?
(1) *Chara* (2) *Cladophora*
(3) *Fucus* (4) *Volvox*

102. In polycarpic plants
(1) Flowering occurs repeatedly at intervals
(2) Interflowering phase is not seen
(3) Clear-cut distinction between pre-reproductive, reproductive and post-reproductive phases is seen
(4) Flowering occurs once in life followed by death of plants

103. In all of the given flowering plants, life span is more than a year, **except**
(1) Rose (2) Banana
(3) Mango (4) Rice

104. Match the following columns and select the **correct** option.

	Column I		**Column II**
a.	*Amoeba*	(i)	Conidia
b.	*Chlamydomonas*	(ii)	Budding
c.	*Penicillium*	(iii)	Binary fission
d.	Yeast	(iv)	Zoospore

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

105. The vegetative propagule of *Bryophyllum* is
(1) Bulb (2) Bulbil
(3) Leaf bud (4) Rhizome

106. Interflowering period is
(1) Part of juvenile phase
(2) Seen in rice and wheat
(3) Clearly visible in all perennial plants
(4) Used to build up resources

107. Read the below given statements for sexuality in organisms and choose the wrong one.
(1) Heterothallic or dioecious terms are used to describe unisexual condition
(2) In several fungi, homothallic term is used to describe bisexual condition
(3) Male flower is called staminate flower
(4) In coconut staminate and pistillate flowers are produced on different plants

108. Zygote **cannot** be
(1) Thick walled (2) Motile
(3) Haploid (4) Produced by algae

109. Which of the given plants flowers only once in its life time?
(1) Mango (2) Neelakuranji
(3) Jackfruit (4) Apple

110. Variations are seen in offsprings produced by which of the following methods of reproduction?
(1) Binary fission in *Paramoecium*
(2) Conidia formation in *Penicillium*
(3) Rhizome of banana
(4) Fusion of heterogametes of *Chara*

Space for Rough Work

111. Read the statements A and B and select the **correct** option.

Statement A: In algae and bryophytes, number of male gametes produced is several thousand times the number of female gametes.

Statement B: In algae and bryophytes male gametes are transferred to the female gametes through external medium.

(1) Only statement A is correct

(2) Both statements A and B are correct and B is correct explanation of A

(3) Both statements A and B are correct but B is not correct explanation of A

(4) Both the statements are incorrect

112. The structure considered as the vital link between two successive generations is

(1) Gamete (2) Zygote

(3) Embryo (4) Seed

113. The innermost layer of anther wall

a. Generally have more than one nucleus.

b. Performs the function of protection and help in dehiscence of anther.

c. Is tapetum.

Choose the **incorrect** one(s).

(1) a and b (2) b and c

(3) b only (4) a only

114. Mark the feature which is similar between male gametophyte and female gametophyte of a typical angiospermic plant.

(1) Both are three celled structures

(2) They contain same number of gametes

(3) Both are haploid

(4) They are the sites of gametogenesis and syngamy

115. A mature pollen grain

a. Contains a bigger generative cell and smaller vegetative cell

b. Is two celled

c. Lacks germ pores

Choose the **incorrect** one(s) w.r.t. a typical angiospermic plant.

(1) a and b (2) b only

(3) a and c (4) c only

116. Mark these statements regarding megasporangium of a typical flowering plant as true **(T)** or false **(F)** and select the **correct** option.

A. It has one or two protective envelopes called integuments.

B. Basal part of megasporangium is called chalaza.

C. It always has a single embryo sac.

D. The food storing tissue of unfertilised megasporangium is endosperm.

	A	B	C	D
(1)	T	F	T	F
(2)	F	T	T	T
(3)	F	F	T	F
(4)	T	T	F	F

117. Select the **odd** one w.r.t. ploidy level.

(1) Antipodals (2) Synergids

(3) Egg (4) Secondary nucleus

118. Read the below given features of flowers of a plant.

a. Flowers are small and clustered into inflorescence.

b. Flowers are fragrant.

c. White coloured flowers.

d. Flowers contain nectar.

How many of the above feature(s) is/are seen in flowers pollinated by insects?

(1) All 4 (2) Only 1

(3) Only 2 (4) Only 3

Space for Rough Work

119. Which of the given is a water pollinated fresh water plant?
(1) *Hydrilla* (2) *Zostera*
(3) Water lily (4) Water hyacinth

120. Read the following statements and mark the **incorrect** one.
(1) Majority of flowering plants use a range of animals as pollinating agents
(2) Bees are the dominant biotic pollinating agents
(3) Large animals do not act as pollinators
(4) Animal pollinated flowers provide some rewards to animals

121. Monosporic embryo sac
(1) Is formed after 1 mitosis and 3 meiosis in a megaspore mother cell
(2) Develops from single megaspore
(3) Is seven nucleated and 8 celled structure
(4) Lacks egg apparatus

122. Flowers which do not open at all are termed as
(1) Chasmogamous (2) Bisexual
(3) Cleistogamous (4) Unisexual

123. Mark the plant in which both autogamy and geitonogamy are **not** possible
(1) Castor (2) Maize
(3) China rose (4) Papaya

124. All of the following are outbreeding devices, **except**
(1) Anther and stigma placed at different positions
(2) Self-incompatibility
(3) Synchronised pollen release and stigma receptivity
(4) Dioecy

125. Central cell possesses
(1) Filiform apparatus
(2) Egg nucleus
(3) Vegetative nucleus
(4) Polar nuclei

126. During artificial hybridisation of which plant, emasculation is **not** required?
(1) Maize
(2) China rose
(3) Mustard
(4) Tomato

127. Mark the event that **does not** occur during double fertilisation process.
(1) Triple fusion
(2) Syngamy
(3) Fusion of male gamete with secondary nucleus
(4) Fusion of polar nuclei together to form secondary nucleus

128. The coconut water and its surrounding white kernel
a. Are free nuclear endosperm and cellular endosperm respectively.
b. Are formed by same method of endosperm development.
c. Are food storing structures.
Choose the **correct** one(s).
(1) a and b (2) b and c
(3) a and c (4) a only

129. Endosperm is completely consumed by the developing embryo in
(1) Castor (2) Maize
(3) Wheat (4) Bean

Space for Rough Work

130. Complete the below given table by choosing **correct** option.

Type of embryo	Epiblast	Coleorhiza	Root cap
Dicot embryo	A	B	Present
Monocot embryo	Present	Present	C

	A	B	C
(1)	Present	Present	Present
(2)	Absent	Present	Absent
(3)	Absent	Absent	Present
(4)	Present	Absent	Absent

131. Mark the **odd** one for perisperm.
(1) Food storing tissue
(2) Residual nucellus
(3) Found in seeds of beet
(4) Triploid

132. Read the below given statements and select the **correct** option.
Statement A: When the seed gets mature its water content reduces to 10-15% by mass.
Statement B: A large number of seeds can remain alive for hundreds of years.
(1) Only statement A is correct
(2) Only statement B is correct
(3) Both statements A and B are correct
(4) Both statements A and B are incorrect

133. Banana is a parthenocarpic fruit as it develops
(1) Only from the ovary
(2) From parts of flowers other than ovary
(3) Without fertilisation
(4) From thalamus

134. In both *Citrus* and mango
a. Some nucellar cells form embryos.
b. Seeds have multiple embryos.
c. Zygotic embryo is absent.
Choose the **incorrect** one(s).
(1) a and c (2) c only
(3) b and c (4) All a, b and c

135. In majority of angiosperms
(1) Egg has filiform apparatus
(2) One egg is present in an embryo sac
(3) Pollen grains are shed at 3 celled stage
(4) Anther is monothecous

SECTION-B

136. A parrot can live for 140 years while similar sized crow can live for 15 years. This difference in life spans is because or shows
(1) They belong to different classes
(2) Life span is not correlated to size and complexity
(3) Life span depends on the climatic factor
(4) They have different food preferences

137. All of the below given organisms asexually reproduce by fragmentation, **except**
(1) Filamentous fungi (2) *Spirogyra*
(3) *Chlamydomonas* (4) Filamentous algae

138. Mark the feature **not** true for sexual reproduction.
(1) Produces variations (2) Syngamy
(3) Slow and simple (4) Gamete formation

139. Mark the **odd** one for pre-fertilisation events of a flowering plant.
(1) Gametogenesis (2) Pollination
(3) Gamete transfer (4) Embryogenesis

Space for Rough Work

140. Read the below given features.

A. Its proximal end remains attached to thalamus or petal.

B. It is long and slender.

Identify the structure on the basis of these features.

(1) Anther (2) Filament

(3) Microsporangium (4) Style

141. Which one is **not** true for sporopollenin?

(1) Found in outermost layer of pollen grain

(2) Helps in preservation of pollen grains as fossil

(3) Protects pollen grains from hazardous environment

(4) Evenly distributed in intine except at germ pores

142. Pollen grains of tomato plant may remain viable for

(1) 30 minutes only (2) Several months

(3) About 1 hour (4) One week only

143. Flowers pollinated by wind do **not** have

(1) Non-sticky pollen grains

(2) Nectar or fragrance

(3) Well exposed stamens

(4) Light weight pollen grains

144. In a seed of orange, multiple embryos can be seen. These embryos

(a) Are diploid

(b) Can be genetically identical

(c) Can be formed by zygote

Choose the **correct** one(s).

(1) (a) and (b) only (2) (b) and (c) only

(3) (a) only (4) All (a), (b) and (c)

145. In flowering plants, endosperm

(1) Is haploid

(2) Stores reserve food material

(3) Develops after embryo development

(4) Arise from zygote

146. All the events from pollen deposition on the stigma until pollen tube enters in ovule is known as

(1) Pollination

(2) Self-incompatibility

(3) *In-vitro* pollen germination

(4) Pollen-pistil interaction

147. Mark the **wrongly** matched pair.

(1) Cleistogamy – *Oxalis*

(2) Hydrophily – Water lily

(3) Anemophily – Maize

(4) Entomophily – *Amorphophallus*

148. *Vallisneria* shows

(1) Hypohydrophily

(2) Wind pollination

(3) Insect pollination

(4) Epihydrophily

149. Pollinators are not required in

(1) Chasmogamous flowers

(2) Unisexual flowers

(3) Bisexual flowers

(4) Cleistogamous flowers

150. Multicarpellary apocarpous ovary is found in

(1) *Papaver*

(2) Lily

(3) Pea

(4) *Michelia*

Space for Rough Work

[ZOOLOGY]

SECTION-A

151. Choose the odd one w.r.t uterine cycle.
(1) Proliferative phase (2) Secretory phase
(3) Menstrual phase (4) Follicular phase

152. Choose the **incorrect** feature w.r.t fertilisation in *Clarias*.
(1) Releases a large number of gametes into the surrounding medium
(2) Produces a large number of offsprings
(3) Show great asynchrony between the sexes
(4) Offsprings are extremely vulnerable to predators

153. In human male, each testis has about _____ testicular lobules and each lobule contains _____ highly coiled seminiferous tubules.
Select the **correct** option that fills the blanks respectively.
(1) 300, 1-3 (2) 350, 2
(3) 250, 1-3 (4) 200, 5

154. Choose the **odd** one w.r.t chromosome number per cell in humans.
(1) Spermatogonia
(2) Primary oocytes
(3) Primary spermatocytes
(4) Ootid

155. An indicator of normal reproductive phase in human females among the following is
(1) Gametogenesis
(2) Fixed duration of secretory phase
(3) Cyclic menstruation
(4) Implantation

156. Which of the following contains certain cells that have the potency to give rise to all the tissues and organs of developing embryo?
(1) Trophoblast (2) Inner cell mass
(3) Yolk sac (4) Blastomeres

157. The female gamete undergoes development to form new organisms without the most vital event of sexual reproduction in all of the following **except**
(1) Rotifers (2) Earthworm
(3) Turkey (4) *Apis*

158. Spermatids are similar to spermatozoa on the basis of
(1) Chromosome number per cell
(2) Having more cytoplasm
(3) Presence of motility
(4) Weight of gamete

159. In female external genitalia, 'A' are fleshy folds of tissue covered by hair and 'B' are smaller paired folds of tissue in the form of lips under 'A'. Select the **correct** option w.r.t. A and B.

	A	B
(1)	Mons pubis	Clitoris
(2)	Mons pubis	Labia majora
(3)	Labia minora	Labia majora
(4)	Labia majora	Labia minora

160. A 65 years old man is planning a child with his wife who is 4 years younger than him. After many attempts they have failed. The most probable reason for this is that
(1) Spermiation does not occur in old men
(2) The female is undergoing menarche
(3) Formation of ova ceases in aged females
(4) Only 60% of husband's sperm show normal shape, size and vigorous motility

Space for Rough Work

161. The blastocyst becomes embedded in which of the following layer of uterus?
(1) Outermost thin membranous layer
(2) Innermost glandular layer
(3) Thick layer of smooth muscles
(4) Perimetrium

162. How many meiotic divisions are respectively required to form 10 secondary spermatocytes in the process of spermatogenesis and 10 secondary oocytes in the process of oogenesis from a single mother cell?
(1) 10, 5 (2) 5, 10
(3) 10, 10 (4) 5, 5

163. Read the given statements and select the **incorrect** one.
(1) The mammary glands are one of the female secondary sexual characteristics.
(2) Each seminiferous tubule is lined on its inside by two types of cells called male germ cells and cells which secrete androgens.
(3) All copulations do not lead to fertilisation and pregnancy.
(4) For the sex of the baby to be a normal female, the female gamete must fuse with sperm having sex chromosome 'X'.

164. The hormone which is secreted by ovary, only during the later phase of pregnancy is
(1) hCG (2) Estrogen
(3) hPL (4) Relaxin

165. Select the **incorrect** option among the following w.r.t most constant phase of menstrual cycle.
(1) Development of a temporary endocrine gland
(2) Duration is of 14 days
(3) High levels of gonadotropins
(4) Maintenance of endometrium

166. Match column-I with column-II w.r.t human embryonic development and select the **correct** option.

	Column-I		**Column-II**
a.	Formation of heart	(i)	By the end of 2nd trimester
b.	First movements of foetus	(ii)	End of 24 weeks
c.	Eyelids separate	(iii)	During 5th month
d.	Body is covered with fine hair	(iv)	After 1st month
		(v)	End of 1st trimester

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

167. The stimulatory reflex between which of the following results into stronger and stronger uterine contractions during parturition?
(1) Fully developed foetus and placenta
(2) Uterine contractions and oxytocin from maternal pituitary
(3) Oxytocin from foetal pituitary and prostaglandins
(4) Estrogen and cortisol

168. Inhibin is produced by 'X' and inhibits the secretion of 'Y'. Select the **correct** option for 'X' and 'Y' respectively.
(1) Nurse cells in testes and LH
(2) Granulosa cells in ovary and LH
(3) Granulosa cells in ovary and FSH
(4) Leydig cells in testes and FSH

Space for Rough Work

169. Select the **correct** statement from the following w.r.t. female reproductive system.
(1) Infundibulum is the best site of fertilisation
(2) The uterus along with cervical canal forms birth canal
(3) A functional mammary gland is characteristic of all female mammals
(4) Uterine myometrium is the normal site for implantation

170. The cells of mammary alveoli secrete milk which is directly sucked out by the infant through
(1) Mammary tubules
(2) Lactiferous duct
(3) Mammary duct
(4) Mammary ampulla

171. Structural constituent of mammalian male gamete whose secretion aid in penetration of female gamete is
(1) Nucleus (2) Tail
(3) Acrosome (4) Middle piece

172. Choose the **correct** statement.
(1) Levels of FSH are higher than the progesterone levels in luteal phase of menstrual cycle.
(2) Menstrual flow occurs due to lack of progesterone.
(3) Umbilical cord contains 100% foetal blood and directly connects maternal myometrium with embryo.
(4) The follicular phase is followed by menstrual phase.

173. All of the following are functions of structural and functional unit between developing embryo and maternal body **except**
(1) Produces a hormone which is the basis of urine pregnancy test
(2) Facilitates the supply of oxygen, carbon dioxide and nutrients to the embryo
(3) Removal of excretory/waste materials produced by embryo
(4) Act as a temporary endocrine tissue

174. Which of the given events is included under pre-fertilisation event?
(1) Gametogenesis
(2) Blastulation
(3) Implantation
(4) Parturition

175. Viviparous organisms differ from oviparous organisms in all of the following, **except**
(1) Proper embryonic care and protection *in vivo*
(2) Greater chance of survival
(3) Release of calcareous ova
(4) Give birth to young ones

176. **Assertion (A):** An important role is played by release of prolactin for initiation of parturition in humans.
Reason (R): Prolactin has receptors on myometrium for promoting childbirth.
In the light of above statements, choose 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 but (R) is false
(4) Both (A) and (R) are false

177. Decline in concentration of which hormone results in regression of corpus luteum in non-pregnant women?
(1) hCG
(2) Progesterone
(3) LH
(4) Estrogen

Space for Rough Work

178. Select the **correct** match w.r.t human sperm.

(1) Acrosome – Contains haploid nucleus

(2) Neck – Contains hydrolytic enzymes rich organelle

(3) Middle piece – Contains spirally arranged "source of energy"

(4) Tail – Facilitates sperm motility due to presence of some mitochondria

179. Breast-feeding during the initial period of infant growth is recommended by doctors because colostrum is enriched in

(1) Iron and vitamin-C

(2) Immunoglobulin-A

(3) Macrophages

(4) Immunoglobulin-G

180. In humans, the embryo with 16 blastomeres is called 'A'. 'A' continues to divide and transforms into 'B' as it moves into 'C'.

Identify A, B, and C and select the **correct** option.

	A	B	C
(1)	Late morula	Blastocyst	Uterus
(2)	Early morula	Late morula	Oviduct
(3)	Blastula	Blastocyst	Isthmus
(4)	Blastocyst	Gastrula	Uterus

181. If chromosome number in meiocyte of rat is 42 what will be the chromosome number in gamete of cat?

(1) 19

(2) 39

(3) 21

(4) 23

182. If for some reason, the rete testis in the male reproductive system gets blocked, then the gametes will not be directly transported from

(1) Epididymis to vas deferens

(2) Seminiferous tubules to vasa efferentia

(3) Vasa efferentia to vas deferens

(4) Vasa efferentia to epididymis

183. Binary fission is a characteristic feature of

(1) *Hydra*

(2) *Amoeba*

(3) *Plasmodium*

(4) *Spongilla*

184. Read the given statements carefully.

Statement A: FSH acts on Leydig cells and stimulates synthesis and secretion of androgens.

Statement B: LH stimulates growth and development of the ovarian follicles in females.

Select the **correct** option.

(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 A is incorrect

Space for Rough Work

185. Select the **incorrect** statement from the following.

(1) Interaction between hormones and certain environmental factors regulate the reproductive processes and the associated behavioural expressions of organisms.

(2) In animals, the adult phase is followed by morphological and physiological changes prior to active reproductive behaviour.

(3) Life spans of organisms are not necessarily correlated with their sizes.

(4) Development of the zygote depends on the type of life cycle the organism has and the environment it is exposed to.

SECTION-B

186. If the life span of parrot is 'A', crocodile is 'B' and dog is 'C' then select the **correct** relationship among the following.

(1) B + C = A

(2) 2(B + 10) = A

(3) A + C = B

(4) 2B + A = C

187. **Assertion (A):** The mode of reproduction in which two parents participate, enhances the survival advantage of offsprings.

Reason (R): It involves fusion of male and female gametes and creation of new variants.

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

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

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

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

(4) Both (A) and (R) are false

188. A lady is blessed with fraternal twins. Which of the following is the most possible reason for this?

(1) Sometimes growing blastocyst gets broken into two parts

(2) When two sperms fertilise one egg

(3) Sometimes two or more follicles reach maturity in same menstrual cycle and fertilised by two sperms

(4) If one sperm fertilise two eggs

189. Vas deferens receives a duct from ____ and opens into urethra as the ____.

Select the **correct** option that fills the blanks, respectively

(1) Prostate gland and epididymis

(2) Seminal vesicle and ejaculatory duct

(3) Rete testis and urethral meatus

(4) Vasa efferentia and ejaculatory duct

190. A pregnant women went to a hospital for her sonography. While sonography, doctor told her that the limbs and external genital organs are well developed now. So, she is in which week of her pregnancy?

(1) 9^{th}

(2) End of 12^{th}

(3) 8^{th}

(4) End of 10^{th}

Space for Rough Work

191. Read the given statements carefully and select the **correct** one.
(1) Human sperm is viable for only upto 24 hours.
(2) The second meiotic division of secondary oocyte is not completed until the nucleus of the sperm has fused with that of the ovum.
(3) The primary oocyte forms the zona pellucida
(4) Morula in humans has almost equal quantity of cytoplasm as uncleaved zygote but much more DNA.

192. Choose the **incorrect** option among the following for the meiosis-I during oogenesis.
(1) Completed prior to ovulation
(2) Completed within follicle characterised by well developed antrum
(3) Starts during embryonic development
(4) Completed before puberty

193. Secretions of all the given parts of male reproductive system are essential for maturation and motility of sperms, **excluding**
(1) Epididymis
(2) Vas deferens
(3) Bulbourethral gland
(4) Seminal vesicle

194. All the given hormones secreted by the corresponding gland are increased several folds in the maternal blood during pregnancy, **except** the hormone
(1) Secreted by zona fasciculata layer of adrenal cortex
(2) Secreted by follicular cells of gland located on either side of trachea
(3) Which regulates the growth of mammary glands and milk formation in them and secreted by hypophysis
(4) Released by the atrial wall of heart

195. Under unfavourable conditions, *Amoeba* undergoes _____ and when favourable conditions return, it divides by _____.
Choose the **correct** option that fills the blanks respectively.
(1) Budding, Binary fission
(2) Encystation, Multiple fission
(3) Binary fission, Multiple fission
(4) Regeneration, Excystation

196. Complete the analogy by selecting the **correct** option w.r.t. site of gametogenesis.
Female gamete : Germinal epithelium :: Male gamete : _____
(1) Sustentacular cells
(2) Sertoli cells
(3) Leydig cells
(4) Seminiferous tubules

197. During oogenesis, first and the second polar body is released respectively into
(1) Coelom, Body cavity
(2) Vitelline membrane, Uterus
(3) Perivitelline space, Perivitelline space
(4) Zona pellucida, Coelom

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198. All of the following are integrated structurally and functionally to support the processes of ovulation, fertilisation, pregnancy and child care in human females, **except**

A. Ovaries

B. Female accessory ducts

C. External genitalia

D. Mammary glands

Select the **correct** option.

(1) Zero

(2) One

(3) Two

(4) Three

199. In female mammals, receptors for binding of male gamete are present on a membrane which is secreted by

(1) Tertiary follicle

(2) Secondary oocyte

(3) Corona radiata

(4) Zona pellucida

200. The event that does not occur during embryogenesis is

(1) Cell division

(2) Cell differentiation

(3) Gametes transfer

(4) Cell modification

❑ ❑ ❑

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