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

Test Date: 28-07-2024

Aakash

Medical | IIT-JEE | Foundations

A

Booklet Code

AR-008

A I A T S

ALL INDIA AAKASH TEST SERIES

for

Medical Entrance Exam - 2025

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.

Test No. 1

TOPICS OF THE TEST

Physics	Electric Charges and Fields, Electrostatic Potential and Capacitance
Chemistry	Solutions, Electrochemistry
Botany	Sexual Reproduction in Flowering Plants
Zoology	Human Reproduction

MM : 720

TEST - 1

Time : 3 Hrs. 20 Min.

[PHYSICS]

Choose the correct answer :

SECTION-A

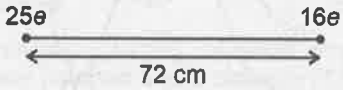
1. A point charge q_1 exerts a force F upon another point charge q_2. If a third charge q_3 be placed near the charge q_2, then the force that charge q_1 exerts on the charge q_2 will be
   (1) Less than F
   (2) Greater than F
   (3) Equal to F
   (4) Zero

2. A body has 80 microcoulomb of charge. Number of excess electrons on it will be
   (1) 5×10^{14}
   (2) 5×10^{-5}
   (3) 80×10^{15}
   (4) 5×10^{12}

3. A charge particle q_1 is at position (2, 2, 1). The electrostatic force on another charged particle q_2 at (0, 0, 0) due to q_1, is
   (1) $\frac{q_1q_2}{108\pi\varepsilon_0}(2\hat{i}+2\hat{j}+\hat{k})$ (2) $\frac{q_1q_2}{64\pi\varepsilon_0}(2\hat{i}+2\hat{j}+\hat{k})$
   (3) $\frac{-q_1q_2}{108\pi\varepsilon_0}(2\hat{i}+2\hat{j}+\hat{k})$ (4) $\frac{-q_1q_2}{54\pi\varepsilon_0}(2\hat{i}+2\hat{j}+\hat{k})$

4. Two balls carrying charges +8 μC and –4 μC attract each other with a force F. If a charge –2 μC is added to both, the force between them will be
   (1) $\frac{7F}{4}$ (2) $\frac{9F}{8}$
   (3) $\frac{9F}{4}$ (4) $\frac{7F}{2}$

5. Two charges are placed as shown in figure. Where should a third charge be placed so that net force on it is zero?



   (1) 32 cm from 25e (2) 42 cm from 25e
   (3) 40 cm from 25e (4) 50 cm from 16e

6. The electric potential (in volt) due to an electric dipole of dipole moment 4×10^{-8} C m at a distance 1.5 m on line making an angle 60° with the axis of the dipole is
   (1) 40 V (2) 80 V
   (3) 10 V (4) Zero

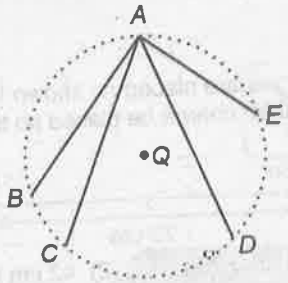
7. Electric field at a distance x from origin is given as $\vec{E} = -20x\hat{i}$, then potential difference between points situated at x = 5 m and x = 10 m is
   (1) 250 V (2) 750 V
   (3) 200 V (4) 400 V

8. A particle of charge Q and mass m is accelerated through potential difference V from rest. The final velocity of the particle is
   (1) $\frac{mV}{Q}$ (2) $2Q\sqrt{mV}$
   (3) $\sqrt{2mQV}$ (4) $\sqrt{\frac{2QV}{m}}$

9. N charged drops coalesce to form a bigger charged drop. If potential of bigger drop is 16 times that of smaller drop, then value of N will be
   (1) 64 (2) 16
   (3) 36 (4) 48

Space for Rough Work

10. In the electric field of a point charge Q, another charge is carried from A to B, A to C, A to D and A to E as shown in figure, then work done will be (Q is placed at the centre of the circle)



(1) Maximum along path AB
(2) Maximum along path AD
(3) Maximum along path AE
(4) Zero along all the paths

11. A semicircular ring of radius 1 m is uniformly charged having charge density 2×10^{-9} C/m. The electric field intensity at the centre of the ring is
(1) 9 V/m (2) 36 V/m
(3) 5 V/m (4) 20 V/m

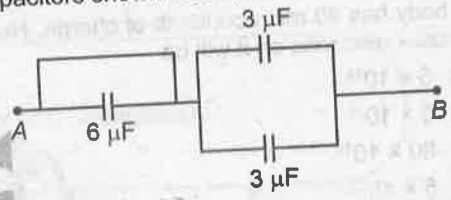
12. The rupture of air medium occurs at $E = 6 \times 10^6$ V/m. The maximum charge that can be given to a uniformly charged sphere of diameter 4 m will be
(1) $\frac{4}{3} \times 10^{-3}$ C
(2) $\frac{8}{3} \times 10^{-3}$ C
(3) 4×10^{-3} C
(4) 8×10^{-3} C

13. Two conducting spheres of radii 2 cm and 4 cm are uniformly charged. If electric potential at the surface of both spheres are equal, then ratio of their surface charge density will be
(1) 2 : 1 (2) 4 : 1
(3) 16 : 1 (4) 1 : 1

14. The unit of electric flux is
(1) $\frac{\text{N m}}{\text{C}}$
(2) volt m^3
(3) volt m
(4) $\frac{\text{N m}}{\text{C}^2}$

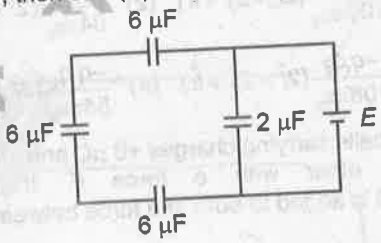
15. A capacitor is connected to a battery. The force of attraction between the plates when the separation between them is halved
(1) Remains the same (2) Becomes eight times
(3) Becomes four times (4) Becomes two times

16. The equivalent capacitance of the arrangement of capacitors shown below, between point A and B is



(1) 3 μF (2) 6 μF
(3) 1 μF (4) 4 μF

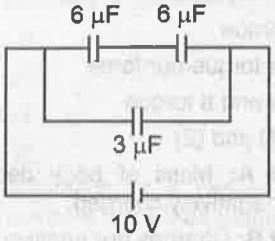
17. If charge on 2 μF capacitor as shown in figure is 20 μC, then emf (E) of the battery will be



(1) 5 V
(2) 20 V
(3) 10 V
(4) 40 V

Space for Rough Work

18. If initial charge on all the capacitors were zero, then work done by the battery in the circuit shown is



(1) 0.6 mJ (2) 0.3 mJ
(3) 200 μJ (4) 400 μJ

19. **Assertion:** Free electron always moves from region of lower potential to higher potential.

Reason: Electric force on test charge is independent of its mass.

(1) Both Assertion & Reason are true and Reason is the correct explanation of Assertion.
(2) Both Assertion & Reason are true but Reason is not the correct explanation of Assertion.
(3) Assertion is true but Reason is false.
(4) Both Assertion and Reason are false.

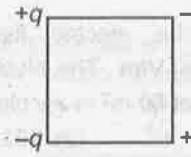
20. If the plates of a parallel plate capacitor connected to a battery are moved apart, then

A. the charge stored in it, decreases
B. its capacitance increases
C. the ratio of charge to its potential decreases
D. the energy stored in it, increases

Choose the most appropriate answer from the options given below.

(1) A and B only
(2) A and C only
(3) A, C and D only
(4) B and C only

21. Four charges are arranged at the corners of a square of side $\sqrt{2}a$ as shown. The net electric potential at the centre of square will be



(1) $\frac{q}{\pi\varepsilon_0 a}$ (2) $\frac{q}{4\pi\varepsilon_0 a}$
(3) $\frac{q}{2\sqrt{2}\pi\varepsilon_0 a}$ (4) Zero

22. If a uniformly charged spherical shell of radius 10 cm has potential V at a distance of 5 cm from its centre, then the potential at a distance of 20 cm from the centre will be

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

23. Some quantities are given in column-I and their units are given in column-II. Match the quantity with its correct unit and choose the correct option (symbols have their usual meaning)

Column-I		Column-II	
(A)	$\frac{\sigma^2}{\varepsilon_0}$	(P)	$\frac{C^2}{J\,m}$
(B)	ε_0	(Q)	farad
(C)	$\frac{A\varepsilon_0}{d}$	(R)	$\frac{J}{m^3}$
(D)	$\frac{V}{E}$	(S)	metre

(1) A→R, B→P, C→Q, D→S
(2) A→P, B→R, C→S, D→Q
(3) A→S, B→P, C→Q, D→R
(4) A→Q, B→R, C→S, D→P

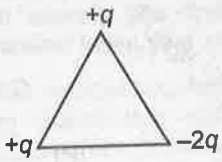
Space for Rough Work

24. In a space the electric field is given by $\vec{E} = (4\hat{i} + 2\hat{j} + 3\hat{k})$ V/m. The electric flux through a surface of area of 50 m^2 in z-y plane is
(1) 100 Vm (2) 400 Vm
(3) 200 Vm (4) 150 Vm

25. The electric potential V as a function of x-coordinate is given by $V = (4x^2 - 8x - 4)$ volt. The value of electric field at $x = 2$ m is
(1) $-8\hat{i}$ V/m (2) $8\hat{i}$ V/m
(3) $-4\hat{i}$ V/m (4) $4\hat{i}$ V/m

26. The work done by external force to take an electron slowly from point where potential is –60 volt to another point where potential is –20 volt is given by
(1) 40 eV (2) 60 eV
(3) –40 eV (4) –60 eV

27. Three charges are placed at the corners of an equilateral triangle as shown in figure. The option which is true for electric potential V and the electric field intensity E at the centre of the triangle is



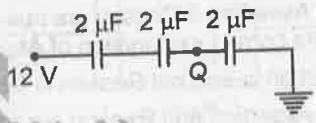
(1) $V = 0, E = 0$
(2) $V = 0, E \neq 0$
(3) $V \neq 0, E = 0$
(4) $V \neq 0, E \neq 0$

28. Two point charges placed at a distance r in air exert force F on each other. The value of distance R at which they experience force $2F$ when placed in a medium of dielectric constant $K = 8$ is
(1) r (2) $\frac{r}{2}$
(3) $2r$ (4) $\frac{r}{4}$

29. If an electric dipole is kept in a uniform electric field, then it may experience
(1) Only torque
(2) Neither torque nor force
(3) A force and a torque
(4) Both (1) and (2)

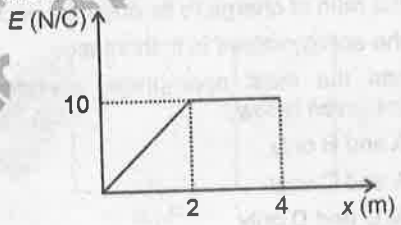
30. **Statement A:** Mass of body decreases slightly when it is negatively charged.
Statement B: Charges are additive in nature.
(1) Both statement A and statement B are correct
(2) Both statement A and statement B are incorrect
(3) Statement A is incorrect and statement B is correct
(4) Statement A is correct and statement B is incorrect

31. In the given circuit, the electric potential at point Q will be



(1) 10 V (2) 4 V
(3) 8 V (4) 6 V

32. Figure shows the variation of electric field intensity E versus position x. If potential at $x = 0$ is zero, then potential at $x = 4$ m will be



(1) –20 V
(2) 20 V
(3) –30 V
(4) 30 V

Space for Rough Work

33. The capacitance of an isolated spherical conductor having diameter R is

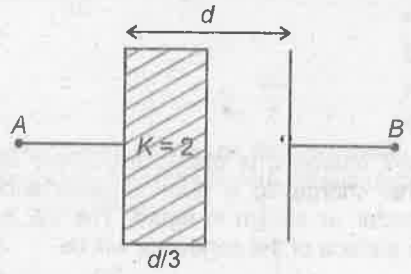
(1) $4\pi\varepsilon_0 R$

(2) $2\pi\varepsilon_0 R$

(3) $8\pi\varepsilon_0 R$

(4) $6\pi\varepsilon_0 R$

34. The capacitance of a capacitor given below is (where symbols have their usual meaning)



(1) $\frac{6A\varepsilon_0}{5d}$ (2) $\frac{3A\varepsilon_0}{5d}$

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

35. Two charges $3q$ and q are placed at a distance l apart. Another charged particle Q is placed in between them (at mid-point). If resultant force on q is zero then the value of Q is

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

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

SECTION-B

36. Electric potential in a region is given by $V = -4x + 3y$, then magnitude of the electric field is (All quantities are in SI unit)

(1) 4

(2) 3

(3) 5

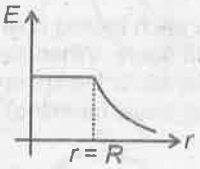
(4) 6

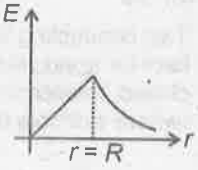
37. A, B, C and D are points in a uniform electric field as shown. The electric potential will be same at points

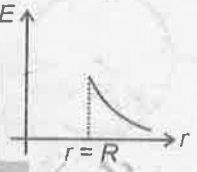
(1) A, C (2) A, D

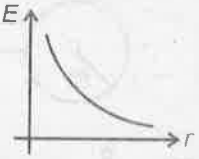
(3) C, B (4) B, D

38. Which graph best represents the variation of electric field intensity (E) as a function of distance (r) from the centre of uniformly charged solid sphere of radius R?

(1) 

(2) 

(3) 

(4) 

39. A battery does 300 J of work in charging an uncharged capacitor. The energy stored in the capacitor is

(1) 300 J (2) 150 J

(3) 75 J (4) 600 J

40. A 20 μF capacitor is charged to a potential difference of 100 V. Now it is disconnected from battery and connected to another uncharged capacitor in parallel. If the common potential difference becomes 40 V, then capacitance of second capacitor is

(1) 10 μF

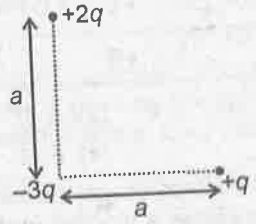
(2) 20 μF

(3) 30 μF

(4) 40 μF

Space for Rough Work

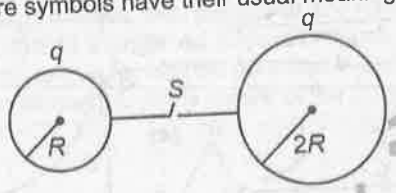
41. The net electric dipole moment of the system as shown in figure is (where symbols have their usual meaning)



(1) $\sqrt{3}qa$ (2) $3qa$

(3) qa (4) $\sqrt{5}qa$

42. Two conducting spheres, each having charge q are kept far apart as shown in figure. When switch S is closed, then common potential of the sphere, will be (where symbols have their usual meaning)



(1) $\frac{q}{4\pi\varepsilon_0 R}$

(2) $\frac{q}{6\pi\varepsilon_0 R}$

(3) $\frac{q}{3\pi\varepsilon_0 R}$

(4) $\frac{3q}{4\pi\varepsilon_0 R}$

43. You are travelling in a car during a thunderstorm. In order to protect yourself from lightning, you would prefer to

(1) Remain in the car

(2) Take shelter under tree

(3) Get out and be flat on the ground

(4) Touch the nearest electrical pole

44. You are given an arrangement of three point charges q, $3q$ and xq separated by equal distances from each other so that electric potential energy of the system is zero. Then value of x is

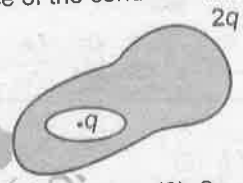
(1) $-\frac{2}{3}$

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

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

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

45. A point charge q is placed inside the cavity and another charge $2q$ is given to outer surface of a conductor as shown in figure. The net charge on outer surface of the conductor will be



(1) q (2) $2q$

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

46. A hollow charged metal sphere has radius r. If the potential difference between its surface and a point at distance $2r$ from centre is V. The electric field intensity at a distance $2r$ from the centre is

(1) $\frac{V}{2r}$ (2) $\frac{V}{4r}$

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

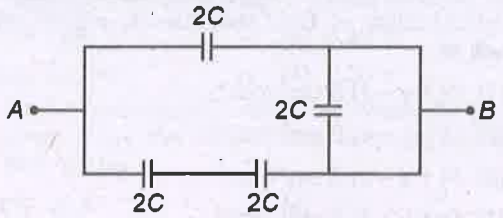
47. An electric dipole when placed in a uniform electric field has zero potential energy. The angle between dipole moment and electric field is

(1) 180° (2) Zero

(3) 60° (4) 90°

Space for Rough Work

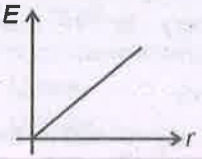
48. The equivalent capacitance between point *A* and *B* as shown in figure will be (where symbols have their usual meaning)

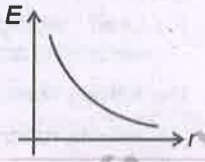


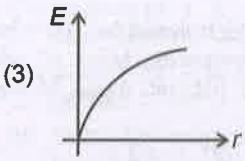
(1) $3C$ (2) C

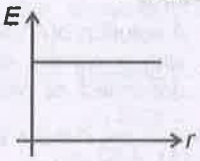
(3) $2C$ (4) $\frac{3C}{2}$

49. The correct graph of electric field intensity (E) due to uniformly charged infinite wire versus distance (r) from the wire will be

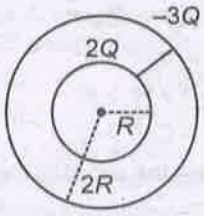
(1) 

(2) 

(3) 

(4) 

50. Two concentric conducting shells are initially charged with $2Q$ and $-3Q$ as shown. Now both the shells are joined by a conducting wire. When charge stops flowing, the charge on the outer sphere will be



(1) $2Q$
(2) $-3Q$
(3) $-Q$
(4) Q

[CHEMISTRY]

SECTION-A

51. If the mole fraction of urea in an aqueous solution is 0.04 then the molality of urea in the solution will be

(1) 4.7 m (2) 1.6 m

(3) 2.3 m (4) 3.1 m

52. Consider the following solutions

(a) Bromoethane and chloroethane

(b) Ethanol and acetone

(c) Phenol and aniline

(d) Carbon disulphide and acetone

The solutions which show positive deviation from Raoult's law are

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

(3) (a), (b) and (d) only (4) (b) and (d) only

53. Mass of concentrated HNO_3 solution required to prepare 500 mL of 4 M HNO_3 solution is (concentrated HNO_3 is 70% (w/w) HNO_3)

(1) 250 g (2) 180 g

(3) 120 g (4) 330 g

54. The standard Gibbs energy of the cell in which the following reaction takes place is

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

(Given: $E^\circ_{Ag^+/Ag} = 0.80$ V ; $E^\circ_{Ni^{2+}/Ni} = -0.25$ V)

(1) -405.25 kJ mol^{-1}

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

(3) -180.45 kJ mol^{-1}

(4) -315.25 kJ mol^{-1}

Space for Rough Work

55. A solution of $CuSO_4$ is electrolysed for 100 minutes with a current of 3.86 amperes. Mass of copper deposited at cathode is (Atomic mass of copper = 63.5 u)
(1) 4.52 g (2) 12.82 g
(3) 7.62 g (4) 5.72 g

56. Correct order of limiting molar conductivity of the given ions in water at 298 K is
(1) $H^+ > K^+ > Mg^{2+} > Ca^{2+}$
(2) $H^+ > Ca^{2+} > Mg^{2+} > K^+$
(3) $Ca^{2+} > Mg^{2+} > H^+ > K^+$
(4) $H^+ > Mg^{2+} > Ca^{2+} > K^+$

57. Given below are the two statements:
Statement I: The solutions which obey Raoult's law over the entire range of concentration are knwon as ideal solution.
Statement II: For ideal solution, $\Delta_{mix}H = 0$ and $\Delta_{mix}V = 0$.
In the light of above statements, choose the correct answer.
(1) Statement I is correct but statement II is incorrect
(2) Both statement I and statement II are correct
(3) Both statement I and statement II are incorrect
(4) Statement I is incorrect but statement II is correct

58. If mass percent (w/w%) of methanol in aqueous solution is 24% then the molality of methanol in the solution will be
(1) 4.25 m (2) 9.87 m
(3) 6.71 m (4) 7.85 m

59. If 0.05 M $BaCl_2$ solution undergoes 90% dissociation at 27°C then the osmotic pressure of the solution will be (R = 0.083 L bar mol^{-1} K^{-1})
(1) 3.5 bar (2) 6.1 bar
(3) 2.3 bar (4) 4.8 bar

60. If the molar conductance of KBr, HBr and CH_3CH_2COOK at infinite dilution are x, y and z S cm^2 mol^{-1} respectively then the molar conductance of CH_3CH_2COOH at infinite dilution will be
(1) (x + y – z) S cm^2 mol^{-1}
(2) (z + y – x) S cm^2 mol^{-1}
(3) (x + z – y) S cm^2 mol^{-1}
(4) (x + y + z) S cm^2 mol^{-1}

61. Consider the following statements
(a) In mercury cell, the cathode used is a paste of KOH and ZnO.
(b) A secondary cell after use can be recharged by passing current through it in opposite direction.
(c) Lead storage battery is an example of secondary cell.
The correct statements are
(1) (a) and (b) only (2) (b) and (c) only
(3) (a) and (c) only (4) (a), (b) and (c)

62. If 9 g of glucose is dissolved in 250 g of water then freezing point of the solution will be (K_f of water = 1.86 K kg mol^{-1})
(1) –0.372°C (2) –1.225°C
(3) –2.25°C (4) –0.815°C

63. The molar conductivity of 0.25 mol/dm^3 solution of KCl with electrolytic conductivity 2.6×10^{-2} S cm^{-1} at 298 K will be
(1) 104 S cm^2 mol^{-1} (2) 145 S cm^2 mol^{-1}
(3) 84 S cm^2 mol^{-1} (4) 181 S cm^2 mol^{-1}

64. If the pH of the solution is 8 then the reduction potential of hydrogen electrode at 298 K will be (partial pressure of H_2 = 1 bar)
(1) +0.473 V (2) –0.473 V
(3) –0.946 V (4) +0.946 V

Space for Rough Work

65. Standard electrode potential of Sn^{2+}/Sn couple is –0.14 V and that for Cu^{2+}/Cu couple is +0.34 V. These two couples in their standard state are connected to make a cell. The cell potential will be
(1) 0.96 V (2) 0.48 V
(3) 0.20 V (4) 0.36 V

66. On the electrolysis of water by passing 10 faradays of electricity, the volume of O_2 liberated at anode at STP will be
(1) 22.4 L (2) 28 L
(3) 56 L (4) 67.2 L

67. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.8 g mL^{-1}. The volume of the concentrated acid required to make 250 mL of 2 M H_2SO_4 solution is
(1) 45.25 mL (2) 61.64 mL
(3) 27.78 mL (4) 35.21 mL

68. Consider the following concentration terms
(a) Molality (b) Mole fraction
(c) Molarity (d) (w/V)%
The concentration terms which depend on temperature are
(1) (a), (b) and (c) only
(2) (c) and (d) only
(3) (a) and (b) only
(4) (a) and (c) only

69. 0.2 m aqueous solution of which of the given species will have highest freezing point, (consider 100% dissociation of electrolytes)
(1) Sodium chloride (2) Urea
(3) Calcium chloride (4) Aluminium sulphate

70. Given below are the two statements:
Statement I: Conductivity of iron is more than copper at 298.15 K.
Statement II: CuO acts as a semiconductor.
In the light of above statements, choose the correct answer.
(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

71. If vapour pressure of two volatile liquids A and B at 25°C are 360 mm Hg and 210 mm Hg respectively then vapour pressure of the solution obtained by mixing 43 g of A and 25 g of B will be (molecular mass of A = 86 u and molecular mass of B = 100 u)
(1) 260 mm Hg (2) 290 mm Hg
(3) 310 mm Hg (4) 275 mm Hg

72. If molality of the dilute solution is doubled then the value of molal elevation constant (K_b) will be
(1) Doubled (2) Unchanged
(3) Quadrupled (4) Halved

73. A solution containing 3 g per dm^3 of urea is isotonic with a 8% (w/V) solution of a non-volatile, non-electrolytic solute at 27°C temperature. The molecular mass of the solute is
(1) 800 u (2) 1000 u
(3) 1200 u (4) 1600 u

74. Consider the following statements
(a) Henry's law constant is a function of the nature of the gas.
(b) Henry's law constant of CO_2 is greater than argon at 298 K.
(c) At high altitudes the partial pressure of oxygen is less than that at the ground level.
The correct statements are
(1) (a) and (b) only (2) (b) and (c) only
(3) (a) and (c) only (4) (a), (b) and (c)

75. If resistance of a conductivity cell filled with 0.1 M NaCl solution is 90 Ω and conductivity of the solution is 1.21 S m^{-1} then the value of cell constant will be
(1) 1.81 cm^{-1} (2) 1.09 cm^{-1}
(3) 2.43 cm^{-1} (4) 4.81 cm^{-1}

Space for Rough Work

76. Given below are the two statements, one is labelled as Assertion A and other is labelled as Reason R.

Assertion (A): Conductivity always decreases with decrease in concentration both for weak and strong electrolytes.

Reason (R): On decreasing concentration of the electrolytes the number of ions per unit volume that carry the current in the solution decreases.

In light of the above statements choose the correct answer.

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

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

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

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

77. The number of electrons delivered at cathode during electrolysis by a current of 4 ampere for 5 minutes is

(1) 7.5×10^{21}

(2) 2.5×10^{24}

(3) 1.5×10^{22}

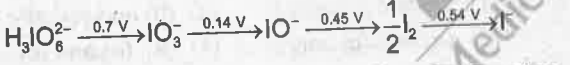
(4) 1.6×10^{19}

78. On electrolysis of dilute sulphuric acid using platinum electrodes, the products obtained at cathode and anode respectively are

(1) H_2 and SO_2 (2) H_2 and O_2

(3) H_2S and SO_2 (4) H_2 and H_2S

79. Consider the change in oxidation state of iodine corresponding to different emf values as shown in the diagram below:



The species which will undergo disproportionation are

(1) IO_3^- and I^- (2) IO_3^- and IO^-

(3) IO^- and I_2 (4) IO_3^- and I_2

80. For a cell involving one electron, $E^\circ_{cell} = 0.295$ V at 298 K then the equilibrium constant for the cell reaction will be [Given that $\frac{2.303\ RT}{F} = 0.059$ V at T = 298 K]

(1) 1.0×10^8 (2) 1.0×10^5

(3) 1.0×10^{10} (4) 1.0×10^{12}

81. Match List I with List II.

	List I (Salt with percentage dissociation)		List II (van't Hoff factor)
a.	KBr, 100% dissociation	(i)	2.6
b.	$MgBr_2$, 75% dissociation	(ii)	2.8
c.	Na_2SO_4, 80% dissociation	(iii)	2.5
d.	$AlCl_3$, 60% dissociation	(iv)	2

The correct match is

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

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

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

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

82. If 12 g of a non-electrolyte solute is dissolved in 100 g of n-heptane to reduce its vapour pressure to 90% then the molar mass of the solute will be

(1) 150 g mol^{-1}

(2) 96 g mol^{-1}

(3) 108 g mol^{-1}

(4) 80 g mol^{-1}

83. If $E^\circ_{Fe^{2+}/Fe} = -0.44$ V and $E^\circ_{Fe^{3+}/Fe^{2+}} = 0.77$ V then the value of $E^\circ_{Fe^{3+}/Fe}$ will be

(1) 0.11 V

(2) 0.33 V

(3) –0.037 V

(4) –0.403 V

Space for Rough Work

84. Given below are the two statements:

Statement I: During the electrolysis of aqueous NaCl solution using platinum electrodes the products are NaOH, Cl_2 and H_2.

Statement II: Electrolysis of molten NaCl using inert electrodes, gives sodium metal and Cl_2 gas at respective electrodes.

In the light of above statements, choose the correct answer.

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

(2) Both statement I and statement II are correct

(3) Both statement I and statement II are incorrect

(4) Statement I is incorreot but statement II is correct

85. For strong electrolyte, which of the following relations about Λ_m and Λ_m° is correct? (A is constant and C is the concentration of electrolyte)

(1) $\Lambda_m = \Lambda_m^\circ - AC^2$ (2) $\Lambda_m = \Lambda_m^\circ - AC$

(3) $\Lambda_m = \Lambda_m^\circ - AC^{1/2}$ (4) $\Lambda_m = \Lambda_m^\circ + AC^{1/2}$

SECTION-B

86. The standard electrode potential (E°) values of Mg^{2+}/Mg, Ni^{2+}/Ni, Au^{3+}/Au, Fe^{2+}/Fe are –2.36 V, –0.25 V, 1.40 V, –0.44 V, respectively. The correct order of reducing power of metals is

(1) Au > Ni > Fe > Mg (2) Mg > Ni > Fe > Au

(3) Mg > Fe > Ni > Au (4) Ni > Au > Mg > Fe

87. If ΔG° for a cell reaction has negative value then which of the following gives the correct relationships for the values of E°_{cell} and K_{eq}?

(1) $E^\circ_{cell} > 0$; $K_{eq} < 1$

(2) $E^\circ_{cell} > 0$; $K_{eq} > 1$

(3) $E^\circ_{cell} < 0$; $K_{eq} > 1$

(4) $E^\circ_{cell} < 0$; $K_{eq} < 1$

88. Given below are the two statements:

Statement I: In lead storage battery, zinc rod acts as anode.

Statement II: In lead storage battery, 38% solution of NaOH is used as an electrolyte.

In the light of above statements, choose the correct answer.

(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

89. If the mole fraction of O_2 in air is 0.2 and Henry's law constant for the solubility of O_2 gas in water at 298 K is 4.0×10^4 bar then the number of mole of O_2 from air dissolved in 15 moles of water at 298 K and 4 bar pressure will be

(1) 1×10^{-4}

(2) 2×10^{-2}

(3) 3×10^{-4}

(4) 2×10^{-4}

90. Given below are the two statements:

Statement I: Ethanol-water mixture forms maximum boiling azeotrope at a specific composition.

Statement II: The solutions which show a large positive deviation from Raoult's law form maximum boiling azeotrope at a specific composition.

In the light of above statements, choose the correct answer.

(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

91. If the molar conductivity of 0.05 M weak acid (HA) is 12 S cm^2 mol^{-1} then the dissociation constant of acid HA will be (Given: $\lambda^\circ_{H^+} = 350$ S cm^2 mol^{-1} and $\lambda^\circ_{A^-} = 50$ S cm^2 mol^{-1})

(1) 1.2×10^{-6} (2) 4.5×10^{-5}
(3) 7.5×10^{-7} (4) 3.2×10^{-6}

92. Match List I with List II.

List I (Cell type)		List II (Cathode used)
a. Leclanche cell	(i)	Grid of lead packed with PbO_2
b. Mercury cell	(ii)	Copper rod
c. Daniell cell	(iii)	Paste of HgO and carbon
d. Lead storage battery	(iv)	Graphite rod

The correct match is

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

93. If the electrical resistance of a column of 0.05 M NaCl solution of diameter 2 cm and length 20 cm is 4×10^3 ohm then the conductivity of the solution will be

(1) 1.6 S m^{-1} (2) 0.16 S m^{-1}
(3) 0.32 S m^{-1} (4) 3.2 S m^{-1}

94. Number of faradays of electricity required for the conversion of 1.5 mole of dichromate ions to Cr^{3+} ions in acidic medium is

(1) 6 F (2) 4 F
(3) 1.5 F (4) 9 F

95. Consider the following galvanic cell

$Zn(s)|Zn^{2+}(1 \times 10^{-6}\ M)||Ag^+(1 \times 10^{-1}\ M)|Ag(s)$

If $E^\circ_{Zn^{2+}/Zn} = -0.76$ V and $E^\circ_{Ag^+/Ag} = 0.80$ V then the emf of the cell will be

(1) 0.158 V (2) 1.56 V
(3) 1.678 V (4) 2.225 V

96. One faraday of electricity is passed through three electrolytic cells connected in series containing Ag^+, Mg^{2+} and Au^{3+} ions respectively. The mole ratio in which Ag, Mg and Au are deposited at the electrode is

(1) 1 : 1 : 1 (2) 3 : 2 : 1
(3) 6 : 3 : 2 (4) 1 : 2 : 3

97. Consider the following statements

(a) Two solutions having same osmotic pressure at a given temperature are called hypotonic solutions.
(b) Reverse osmosis is used in desalination of sea water.
(c) Measurement of osmotic pressure is widely used to determine molar masses of proteins, polymers and other macromolecules.

The correct statements are

(1) (a) and (b) only (2) (b) and (c) only
(3) (c) only (4) (a), (b) and (c)

98. If 6.84 g of cane sugar is dissolved in 100 g of water then the boiling point of the solution will be (K_b of water = 0.52 K kg mol^{-1})

(1) 101.1°C (2) 100.8°C
(3) 101.5°C (4) 100.1°C

99. 800 mL of 4 M NaOH solution is mixed with 800 mL of 1 M NaOH solution. The molarity of the resultant solution will be

(1) 2.8 M (2) 2.5 M
(3) 1.8 M (4) 3.1 M

100. Which of the following set is true for a solution showing negative deviation from Raoult's law?

(1) $\Delta H_{mix} > 0, \Delta G_{mix} < 0, \Delta S_{mix} < 0$
(2) $\Delta H_{mix} < 0, \Delta G_{mix} < 0, \Delta S_{mix} > 0$
(3) $\Delta H_{mix} < 0, \Delta G_{mix} < 0, \Delta S_{mix} < 0$
(4) $\Delta H_{mix} > 0, \Delta G_{mix} > 0, \Delta S_{mix} > 0$

Space for Rough Work

[BOTANY]

SECTION-A

101. The structure which forms the body of ovule can be associated with all of the given functions, **except**
(1) Megasporogenesis
(2) Storage of reserve food
(3) Embryo formation as in *Citrus*
(4) Attachment of ovule to placenta

102. In over 60 percent of angiosperms, pollen grains are shed at **A** which is the result of **B** .

Read the given statement and choose the **correct** option for **A** and **B** respectively.

	A	B
(1)	3-celled stage	Meiosis
(2)	2-celled stage	Amitosis
(3)	2-celled stage	Asymmetric mitosis
(4)	3-celled stage	Symmetric mitosis

103. In a typical angiospermic plant, at least how many meiotic and mitotic divisions respectively are required for the formation of two male gametes from a pollen mother cell?
(1) 2, 1
(2) 1, 2
(3) 1, 3
(4) 3, 1

104. Nucellus is **not** completely consumed and remains inside the mature seeds of
(1) Wheat
(2) Groundnut
(3) Maize
(4) Black pepper

105. Read the following statements and choose the **correct** option.

Statement (A): Pollination by water is quite rare in flowering plants and is limited to about 30 genera, mostly monocotyledons.

Statement (B): All aquatic plants are pollinated by water.
(1) Only statement (A) is correct
(2) Only statement (B) is correct
(3) Both the statements (A) and (B) are correct
(4) Both the statements (A) and (B) are incorrect

106. The proximal end of the filament of stamen is attached to the
(a) Thalamus (b) Sepal
(c) Petal (d) Anther
The **correct** one(s) is/are
(1) (d) only
(2) (a) and (c) only
(3) (b) only
(4) (b) and (c) only

107. Which of the following features is **not** true for the terminal bilobed structure of stamen?
(1) It consists of four microsporangia
(2) It contains sporogenous tissue
(3) Each lobe has two theca
(4) It does not have sterile tissue

108. In *Michelia*
(1) Gynoecium has single carpel
(2) Carpels are not fused together
(3) Basal bulged part of the pistil is absent
(4) Gynoecium has many and fused carpels

Space for Rough Work

109. Read the given statements and mark them as **true** (T) or **false** (F) w.r.t. angiosperms.

(A) Continued self-pollination results in inbreeding depression.

(B) Embryo development precedes endosperm development.

(C) Only a small proportion of plants use biotic agents for pollination.

(D) In unisexual female flowers, after emasculation bagging is done.

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

110. Pollination by wind

(1) Occurs in all families of dicots

(2) Is more common amongst abiotic pollinations

(3) Is not found in grasses

(4) Assures transfer of right type of pollen to stigma

111. Generative cell of angiospermic pollen grain is characterised by

(1) Large size and dense cytoplasm

(2) Abundant food reserve and irregularly shaped nucleus

(3) Small size and spindle-shape

(4) Having tube nuclei and male gametes

112. Which of the following promotes cross-pollination in plants?

(1) Homogamy

(2) Bud-pollination

(3) Cleistogamy

(4) Self-incompatibility

113. Maize plant

(1) Produces light and sticky pollen grains

(2) Has single ovule in each ovary

(3) Has nectaries in flowers

(4) Produces heavy and non-sticky pollen grains

114. Which one of the following statements is **correct**?

(1) Chasmogamous flowers do not open at all

(2) Xenogamy occurs only by wind pollination

(3) Common pansy shows the presence of both cleistogamous and chasmogamous flowers

(4) Geitonogamy is genetically similar to xenogamy

115. Read the following statements of **Assertion** (A) and **Reason** (R) and choose the **correct** option.

Assertion (A): Ovules generally differentiate a single megaspore mother cell in nucellus.

Reason (R): Mostly, megaspore mother cell in a typical flowering plant forms only one megaspore.

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

(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

116. Pollen grains can be fossilized, because of the presence of

(1) Pollenkitt (2) Sporopollenin

(3) Cellulose and pectin (4) Cellulose and lignin

117. If an angiospermic male plant is tetraploid and female plant is diploid, the ploidy level of endosperm will be

(1) Tetraploid

(2) Pentaploid

(3) Haploid

(4) Hexaploid

Space for Rough Work

118. Plants, like papaya, can prevent
(1) Autogamy and geitonogamy
(2) Autogamy, but not geitonogamy
(3) Both geitonogamy and xenogamy
(4) Only xenogamy

119. In angiosperms, microsporogenesis
(1) Occurs in vasculated sterile tissue called connective
(2) Results in the formation of stamens
(3) Involves reductional division
(4) Forms megaspore with the help of meiosis

120. Identify the **incorrect** statement.
(1) Cytoplasm of pollen grain is surrounded by plasma membrane
(2) Pollen grains represent the male gametophytes in angiosperms
(3) Higher animals are not reported as pollinators for plant species
(4) Flowers pollinated by flies produce foul odour to attract them

121. The flowers pollinated by abiotic agents possess all of the following characters, **except**
(1) They are packed into inflorescence
(2) Pollen grains are never surrounded by mucilaginous covering
(3) They need not produce nectar
(4) They produce light weight pollen grains

122. The fruit in strawberry
(1) Develops only from the ovary
(2) Develops without the process of fertilisation
(3) Develops from other floral parts along with ovary
(4) Are seedless and produced by the application of auxin

123. Synergid cells of egg apparatus generally
(1) Present at the basal part of ovule
(2) Have micropylar vacuole and chalazal nucleus
(3) Show cytoplasmic polarity similar to egg cell
(4) Lack a cell wall on their chalazal side at maturity

124. How many mitotic generations are required for the formation of a typical embryo sac from megaspore mother cell?
(1) 3
(2) 18
(3) 30
(4) 6

125. Which of the following statements is **incorrect**?
(1) Double fertilisation involves both syngamy and triple fusion
(2) Endothecium helps in the dehiscence of anther
(3) Pollen grains are rich in nutrients, and their products are used in the form of tablets and syrups
(4) To ensure that only the desired pollens fall on the stigma in artificial hybridisation process, bisexual flowers showing protogyny cannot be selected

126. Find the **incorrect** statement.
(1) *Orobanche* and *Striga* are parasitic plants
(2) 2000 years old viable seeds of *Phoenix dactylifera* were excavated from Arctic Tundra
(3) Orchid's fruit contain thousands of tiny seeds
(4) Hard seed coat provides protection to young embryo

127. All of the following are advantages of seed to angiosperms, **except**
(1) Generation of new genetic combinations
(2) Helps in dispersal to new habitats
(3) Helps in nourishment of young seedlings
(4) It forms the basis of agriculture

Space for Rough Work

128. Match the following column I with column II and choose the **correct** option.

	Column I		Column II
a.	Scutellum	(i)	Undifferentiated sheath enclosing radicle and root cap
b.	Coleoptile	(ii)	Remains of second cotyledon in monocots
c.	Coleorhiza	(iii)	Shield shaped cotyledon in grasses
d.	Epiblast	(iv)	Hollow foliar structure enclosing shoot apex and few leaf primordia

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

129. The cell responsible for megaspore formation in angiosperm differentiates from
(1) Integument in the chalazal region
(2) The parenchymatous tissue which is protected by integuments in the micropylar region
(3) Integument in micropylar region
(4) The basal part of ovule

130. Find the **odd** one out w.r.t ploidy level.
(1) Cells of funicle
(2) Sporogenous tissue of anther
(3) Cells of nucellus
(4) Generative cell of pollen grain

131. The portion of the embryonal axis below the level of cotyledon in a seed is
(1) Hypocotyl
(2) Epicotyl
(3) Plumule
(4) Coleoptile

132. The embryo sac in a flowering plant represents
(1) Megasporangium
(2) Female gametophyte
(3) Female gamete
(4) Functional microspore

133. Outer layer of seed coat is
(1) Tegmen
(2) Testa
(3) Coleorhiza
(4) Funicle

134. What would be the number of chromosomes in a cell of aleurone layer of seed in a monocot plant species having 20 chromosomes in its diploid cell?
(1) 20
(2) 10
(3) 40
(4) 30

135. Select the **odd** one out w.r.t. structures present in megasporangium.
(1) Integument
(2) Sporoderm
(3) Funicle
(4) Micropyle

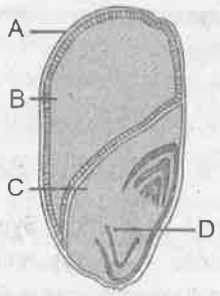
SECTION-B

136. Polar nuclei in embryo sac are
(1) Present in large central cell
(2) Separated from each other by their own cell walls
(3) Situated inside the antipodals
(4) Also known as vegetative cells

137. The inner wall of pollen grain is made up of
(1) α-cellulosic fibrous bands
(2) Hemi-cellulose and protein
(3) Cellulose and pectin
(4) Sporopollenin

Space for Rough Work

138. Observe the diagram of a seed carefully and choose the **correct** option.



(1) C represents coleoptile
(2) A represents aleurone layer
(3) B represents a triploid nutritive tissue
(4) D represents plumule

139. Read the following **Assertion** (A) and **Reason** (R) and choose the **correct** option.

Assertion (A): In cotton, pollen is released before the stigma becomes receptive.

Reason (R): Bisexual flowers are always protogynous.

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

(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

140. Apomixis is a form of asexual reproduction which mimics sexual reproduction as in this process
(1) There is no seed formation
(2) Thalamus is associated with fruit formation
(3) Seed formation occurs without fertilisation
(4) Fertilisation leads to fruit formation

141. All of the following are true regarding outer layer of pollen grain, **except**
(1) Exhibits fascinating array of patterns and designs
(2) Possesses germ pores
(3) Contains most resistant organic material
(4) Contains enzyme that degrades the outer layer

142. Read the following statements and choose the **correct** option.

Statement (A): Some species of Asteraceae and grasses have specialised mechanism of seed production without fertilisation

Statement (B): If hybrids are made into apomicts, there is segregation of characters in the hybrid progeny.

(1) Only statement (A) is incorrect
(2) Only statement (B) is incorrect
(3) Both the statements (A) and (B) are correct
(4) Both the statements (A) and (B) are incorrect

143. In a typical angiospermic embryo sac, the egg apparatus is
(1) 7-celled and 8-nucleate
(2) 8-celled and 7-nucleate
(3) 3-celled and 3-nucleate
(4) 7-celled and 3-nucleate

144. Which of the following plant is pollinated by insects?
(1) Water lily
(2) *Vallisneria*
(3) *Hydrilla*
(4) *Zostera*

145. How many megaspore mother cells are required to produce 6 embryo sacs in a typical angiospermic plant?
(1) 3
(2) 6
(3) 5
(4) 2

Space for Rough Work

146. All of the following are advantages of cleistogamy, **except**
(1) Ensures seed formation
(2) Pollinators are not required
(3) Provide limited genetic diversity in offsprings
(4) Not costly for the plant

147. Viability period of pollen grains
(1) Can be increased by storing them at very low temperature
(2) Is same for all dicot plants
(3) Depends upon the chromosome number of a species
(4) Is more than three months in all cereals

148. In plants such as *Commelina*, the possible type of pollination can be
(1) Only autogamy
(2) Only xenogamy
(3) Only geitonogamy
(4) Autogamy, geitonogamy and xenogamy

149. In adventive embryony, embryos in mango can arise from
(1) Haploid egg (2) Synergids
(3) Nucellar cells (4) Antipodals

150. Which of the following events is **not** associated with pollen-pistil interaction?
(1) Pollen deposition on the stigma
(2) Entry of pollen tube into the ovule
(3) Transfer of pollen-grain to the stigma
(4) Pollen germination on stigma

[ZOOLOGY]

SECTION-A

151. Which of the following reproductive events initiates before puberty in human females?
(1) Gametogenesis
(2) Fertilization
(3) Implantation
(4) Gestation

152. Choose the **incorrect** statement w.r.t. reproductive events in humans.
(1) Transfer of male and female gametes in female reproductive tract is called insemination.
(2) Formation of ovum ceases in women around the age of fifty years.
(3) There are remarkable differences between the reproductive events that occur in the male and in the female.
(4) Sperm formation continues even in the old men.

153. The sex of the human embryo is determined by the presence of
(1) Autosomes in the ovum
(2) X chromosome in the ovum
(3) Autosomes in the sperm
(4) Either X or Y chromosome in the sperm

154. In human females, mammary glands differentiate during __A__ and secrete milk __B__.
Choose the option which fills the blanks A and B **correctly**.

	A	B
(1)	Puberty	Towards the end of implantation
(2)	Pregnancy	After child-birth
(3)	Child-birth	During lactation
(4)	Menarche	Before child-birth

Space for Rough Work

155. State the following statements as **true (T)** or **false (F)** w.r.t. human males.

A. The reproductive system is located in the pelvis region except the external genitalia.

B. The penis is the male external genitalia whose enlarged end is covered by a loose fold of skin called the glans penis.

C. The testes are situated outside the abdominal cavity within a pouch called scrotum.

D. Scrotum helps in maintaining high temperature necessary for fertilization.

Select the **correct** option.

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

156. In a human male, about how many testicular lobules are present in testes?

(1) 250
(2) 500
(3) 250-300
(4) 600-700

157. In human males, choose the cells which are not present outside the seminiferous tubules.

(1) Sertoli cells
(2) Leydig cells
(3) Immunologically competent cells
(4) Interstitial cells

158. The epididymis leads to vas deferens that ascends to the abdomen and loops over the

(1) Urethra
(2) Ejaculatory duct
(3) Urinary bladder
(4) Seminal vesicle

159. Given below are two statements:

Statement I: After spermiogenesis, sperm heads become embedded in the interstitial cells.

Statement II: Sperms are finally released from the seminiferous tubules by the process called spermatogenesis.

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

(1) Both statement I and statement II are correct
(2) Only statement I is correct
(3) Only statement II is correct
(4) Both statement I and statement II are incorrect

160. Choose the **correct** option to complete the analogy w.r.t. a functional mammary gland present in a human female.

Mammary lobes : 15-20 : : Mammary ducts : ____

(1) 5-10
(2) 10-15
(3) 15-20
(4) 20-25

161. Choose the **odd** one w.r.t. male sex accessory ducts in humans.

(1) Seminiferous tubules
(2) Rete testis
(3) Vasa efferentia
(4) Epididymis

162. Choose the unpaired structure that is present in the human male reproductive system.

(1) Vas deferens
(2) Seminal vesicle
(3) Prostate gland
(4) Bulbourethral gland

Space for Rough Work

163. Read the following statements A and B w.r.t. humans.

Statement A: Penis is made up of special tissue that helps in its erection to facilitate intrauterine insemination.

Statement B: Seminal plasma is rich in sperms, glucose, calcium and certain enzymes.

Choose the **correct** option.

(1) Both statements A and B are correct
(2) Only statement A is correct
(3) Only statement B is correct
(4) Both statements A and B are incorrect

164. Match column I and column II w.r.t. humans.

	Column I		Column II
a.	Leydig cells	(i)	Provide nutrition to the male germ cells
b.	Sertoli cells	(ii)	Present in ovarian follicles
c.	Granulosa cells	(iii)	A gonadotropin which stimulates synthesis of androgens in males, acts on these cells
d.	Primary spermatocyte	(iv)	Periodically undergoes meiosis

Choose the **correct** option.

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

165. Given below are two statements: one is labelled as **assertion (A)** and the other is labelled as **reason (R)**.

Assertion (A): In human females, differentiation of gametes occurs after the completion of meiosis.

Reason (R): Ootid is produced after the completion of meiosis which is considered as female gamete formed within the ovary.

In the light of above statements, choose the correct answer from the options given below.

(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

166. The functions of male sex accessory ducts and glands are maintained by the

(1) Somatostatins (2) Androgens
(3) Cortisol (4) FSH

167. In the 28 days ovarian cycle of a fertile female ovulation takes place typically on

(1) 28th day of the uterine cycle
(2) 1st day of the ovarian cycle
(3) 5th day of the uterine cycle
(4) 14th day of the ovarian cycle

168. In humans, fertilization usually occurs in the

(1) Fundus of uterus
(2) Posterior part of vagina
(3) Ampullary region of oviducts
(4) Infundibulum region of fallopian tubes

169. Which of the following structures are not included in the external genitalia of human females?

(1) Vagina (2) Mons pubis
(3) Labia minora (4) Clitoris

170. Secretions of how many of the structures given in the box below are essential for maturation and motility of sperms?

Epididymis, bulbourethral gland, prostate gland, seminal vesicle, rete testis

Select the **correct** option.

(1) Five (2) Three
(3) Four (4) Two

Space for Rough Work

171. Which of the following is an unpaired structure present in the reproductive system of a human female?
(1) Ovary (2) Cervix
(3) Mammary gland (4) Oviduct

172. In human females, identify the funnel-shaped structure, edges of which possess finger-like projections that help in the collection of ovum after ovulation.
Choose the **correct** option.
(1) Fimbriae (2) Ampulla
(3) Infundibulum (4) Isthmus

173. Choose the **incorrect** statement w.r.t. ovary of a human female.
(1) Ovaries are the primary female sex organs that produce a peptide hormone.
(2) Each ovary is about 2 to 4 cm in length and located on both sides of upper abdomen.
(3) Stroma of each ovary is divided into outer cortex and inner medulla.
(4) Each ovary is connected to the pelvic wall and uterus by ligaments.

174. Levels of all of the following hormones increase several folds during pregnancy in human females, **except**
(1) Estrogen
(2) Cortisol
(3) Prolactin
(4) Luteinising hormone

175. Read the following statements w.r.t. humans.
(a) During fertilization, a sperm comes in contact with the zona pellucida layer of the ovum and induces changes in the membrane that block the entry of additional sperms.
(b) All the events of menstrual cycle stop during pregnancy due to increase in the levels of gonadotropins.
(c) The follicular phase is immediately followed by menstrual phase.
(d) The first menstruation begins at puberty which is called menstrual cycle.
Choose the **correct** option.
(1) Statements (a), (b) and (c) are correct
(2) Statements (a), (b), (c) and (d) are incorrect
(3) Statements (b) and (c) are correct
(4) Statements (b), (c) and (d) are incorrect

176. Select the **odd** one w.r.t. female accessory ducts.
(1) Oviduct
(2) Womb
(3) Fallopian tube
(4) Hymen

177. If because of some reason, vas deferens in a human male gets blocked, sperms will not be transferred from
(1) Rete testis to vasa efferentia
(2) Rete testis to epididymis
(3) Epididymis to ejaculatory duct
(4) Testis to epididymis

178. If pregnancy does not occur after ovulation in a female, then the corpus luteum
(1) Remains alive and functional after the next menstruation
(2) Remains active to secrete luteinizing hormone
(3) Degenerates within a short time leading to decreased levels of progesterone
(4) Produces progesterone up till next pregnancy

179. Which of the following will cause ovulation by positive feedback effect on hypothalamus?
(1) High concentration of progesterone
(2) High concentration of estrogen
(3) Low concentration of FSH only
(4) Low concentration of gonadotropins

Space for Rough Work

180. Match list-I and list-II w.r.t. humans.

	List-I		List-II
a.	Gestation period	(i)	Body is covered with fine hair
b.	First movement of the foetus	(ii)	Foetus is fully developed
c.	By the end of 2nd trimester	(iii)	Observed during the 5th month of gestation
d.	By the end of 3rd trimester	(iv)	Duration of pregnancy

Choose the **correct** option.

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

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

181. Complete development and function of the seminiferous tubules present in human testis do not require

(a) FSH (b) Testosterone

(c) Somatostatin

Select the **correct** option.

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

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

182. In human females, after menarche, menstruation occurs only when

(1) There is an abrupt increase in progesterone levels during the secretory phase

(2) GnRH continues to increase leading to increase in gonadotropins

(3) Ovum released from mature Graafian follicle is not fertilized

(4) There is implantation of the fertilized egg

183. Which of the following phases is of shortest duration in menstrual cycle of a woman?

(1) Menstrual phase (2) Ovulatory phase

(3) Secretory phase (4) Proliferative phase

184. Increase in the levels of progesterone and estrogen in human females

(1) Stimulates ovarian follicles to grow

(2) Increases milk secretion from mammary glands

(3) Promotes thickening of the endometrium

(4) Stimulates hypothalamus to release neurogenic hormones

185. Read the following statements w.r.t. humans.

(a) Embryogenesis starts in fallopian tube and embryo enters in uterine cavity at blastocyst stage.

(b) Implantation takes place within the uterine cavity in blastocyst stage.

(c) The inner cell mass gets attached to the endometrium and differentiates into the embryo.

Choose the **correct** option.

(1) Statements (a) and (b) are correct but statement (c) is incorrect

(2) Statement (a) is incorrect but statements (b) and (c) are correct

(3) Statements (a), (b) and (c) are correct

(4) Statements (a), (b) and (c) are incorrect

SECTION-B

186. During spermiogenesis, the spermatids get attached to

(1) Leydig cells (2) Sertoli cells

(3) Spermatocytes (4) Spermatogonia

187. In human males, FSH acts on the Sertoli cells and stimulates secretion of some factors which help in the process of spermiogenesis. It occurs mainly because

(1) FSH is a gonadotropin

(2) Spermatogenesis is completed before spermiogenesis

(3) Receptors for FSH are bound to the membrane of Sertoli cells

(4) Membrane bound receptors for LH are absent in Sertoli cells

Space for Rough Work

188. Read the following statements A and B w.r.t. a woman and choose the **correct** option.

Statement A: Uterus is a pear-shaped structure that is connected with the first part of oviduct.

Statement B: Myometrium of uterus exhibits strong voluntary contractions during the delivery of the baby.

(1) Both statement A and statement B are correct
(2) Both statement A and statement B are incorrect
(3) Only statement A is correct
(4) Only statement B is correct

189. Choose the **correct** option to complete the analogy.

Foetal ejection reflex : Oxytocin : : Milk ejection reflex : _____

(1) Prolactin
(2) Oxytocin
(3) Progesterone
(4) Estrogen

190. Which of the following options represents the correct sequence of different parts of mammary glands?

(1) Alveoli → Mammary tubules → Mammary ducts → Mammary ampulla → Lactiferous ducts
(2) Lactiferous ducts → Mammary tubules → Mammary ducts → Alveoli → Mammary ampulla
(3) Mammary ampulla → Lactiferous ducts → Alveoli → Mammary tubules → Mammary ducts
(4) Alveoli → Mammary ampulla → Mammary ducts → Mammary tubules → Lactiferous ducts

191. Choose the structural and functional unit between the developing embryo/foetus and maternal body.

(1) Chorionic villi
(2) Endometrium
(3) Placenta
(4) Umbilical cord

192. In humans, puberty generally hits after the age of 8 years because before that

(1) Receptors present on gonads are non-responsive towards sex hormones
(2) Testes and ovaries do not respond to GnRH
(3) Gonadotropins cannot stimulate pituitary gland as their receptors are absent on it
(4) The hypothalamus fails to secrete GnRH in a pulsatile manner

193. In human females, the signals for parturition originate from the fully developed foetus and placenta which induce

(1) Release of prolactin from maternal hypothalamus in the blood
(2) Mild uterine contractions called foetal ejection reflex
(3) Feedback inhibition between uterine contractions and oxytocin secretion
(4) Neuroendocrine mechanism to release oxytocin from foetal pituitary

194. **Assertion (A):** In a woman, twins may arise from a single ovum or from two ova ovulated in a menstrual cycle.

Reason (R): One fertilized ovum gives rise to identical twins after separation of blastomeres and two ova after fertilization produce non-identical twins.

In the light of above statements, choose the **correct** answer from the options given below:

(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

Space for Rough Work

195. Match column I and column II w.r.t. humans.

	Column I		Column II
a.	Nucleus of sperm	(i)	Possesses numerous mitochondria
b.	Middle piece of sperm	(ii)	Seminal plasma along with sperms
c.	Semen	(iii)	Anterior portion is covered by a structure that aids in fertilisation
d.	Acrosome	(iv)	Cap-like structure filled with enzymes

Choose the option with only **correct** match.

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

196. The stem cells which have the potency to give rise to all the tissues and organs are present in
(1) Trophoblast (2) Amnion
(3) Inner cell mass (4) Yolk sac

197. For normal fertility, at least what per cent of sperms in a normal human ejaculate must have normal shape and size as well as must show vigorous motility?
(1) 24% (2) 60%
(3) 40% (4) 50%

198. In human females, meiosis I starts in primary oocytes during embryonic development period but it is completed within
(1) Fallopian tube after fertilization
(2) Graafian follicle before ovulation
(3) Tertiary follicle before ovulation
(4) Graafian follicle during fertilization

199. In humans, all of the following events of sexual reproduction occur in female reproductive tract, **except**
(1) Fertilization (2) Insemination
(3) Spermiation (4) Capacitation

200. **Assertion (A):** Surgical removal of ovary during the second month of gestation in a human female leads to abortion.

Reason (R): The corpus luteum secretes large amounts of progesterone which is essential for maintenance of the endometrium necessary for pregnancy.

In the light of above statements, choose the **correct** answer from the options given below:
(1) Both (A) and (R) are true but (R) is not the correct explanation of (A)
(2) (A) is true but (R) is false
(3) Both (A) and (R) are false
(4) Both (A) and (R) are true and (R) is the correct explanation of (A)

❑ ❑ ❑

Space for Rough Work

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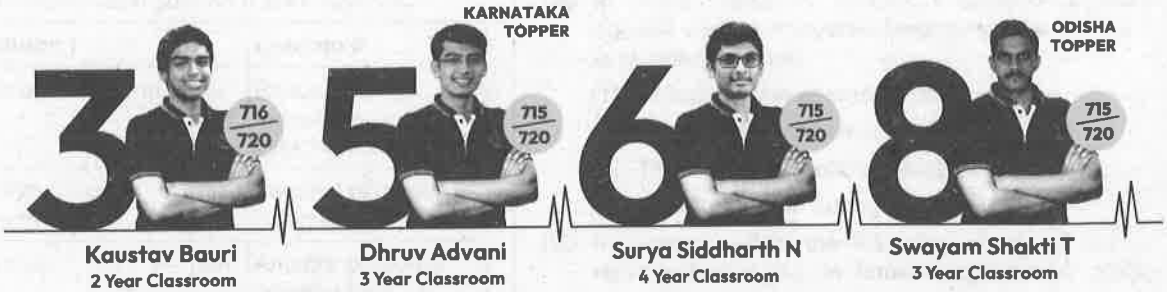

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