TECHNO INDIA GROUP OF PUBLIC SCHOOLS

Dt. 04-08-2025

NEET (XII)

Monthly Mock Test - 1 (August-2025)

Time Allowed: **3 hours** Maximum Marks: **720**

General Instructions:

1. This test will be a 3 hours Test, Maximum Marks 720.
2. This test consists of 180 questions of Physics, Chemistry and Biology. All questions are COMPULSORY to attempt.
3. Each question is of 4 marks.
4. There are three parts in the question paper, consisting Part-I Physics (Q. No. 1 to 45), Part-II Chemistry (Q. no. 46 to 90), Part-III Biology (Q. no. 91 to 180).
5. There will be only one correct choice in the given four choices for each question. For each question 4 marks will be awarded for correct choice, 1 mark will be deducted for incorrect choice and zero mark will be awarded for unattenuated question.
6. Any textual, printed or written material, mobile phones, calculator, etc. is not allowed for the students appearing for the test.
7. All calculations / written work should be done in the rough sheet provided.

Space For Rough Works

PHYSICS

1. If q be the inducing charge, then charge induced on a body having dielectric constant k is given by

① $-q\left(1-\frac{1}{k}\right)$ ② $q\left(1+\frac{1}{k}\right)$ ③ $-q$ ④ $-\frac{q}{k}$

2. If q be the inducing charge, then charge induced on a conducting body is

① q ② -q ③ $q/_2$ ④ $-q/_4$

3. If n drops each of charge q and radius r combine to form a bigger drop, then charge density on the bigger drop is x times the charge density of the smaller drop, then x =

① n ② $\sqrt{n}$ ③ $(n)^{1/3}$ ④ $(n)^{2/3}$

4. To have the same force both in air and medium (dielectric strength = k) between to fixed charges q, and q_2 with separation d in medium, dair =

① $\frac{d}{k}$ ② $\frac{d}{\sqrt{k}}$ ③ d ④ $d\sqrt{k}$

5. If the coulombic force between two charge particles having charges q, and q_2 is to be maximum then each should have a charge

① $(q_1 - q_2)/_2$ ② $\sqrt{q_1 \times q_2}$ ③ $(q_1 + q_2)/_2$ ④ $\frac{q_1^2}{q_2}$

6. The force between two identical conducting bodies having charges Q and –2Q separated by a distance d in air is F. If the body is kept in contact and then kept at the same distance d again in air, then repulsive force is

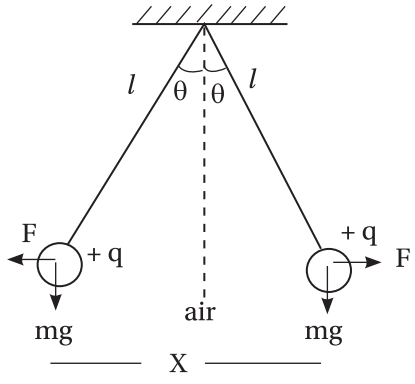
① F/4 ② F/2 ③ F/8 ④ 2F

7. If two changes q_1 and q_2 are separated by a distance d, then the distance (x) between the charge q, and the null point is given by x =

① $\frac{d}{\sqrt{\left(\frac{q_2}{q_1}\right)+1}}$ ② $\frac{d}{\sqrt{\left(\frac{q_2}{q_1}\right)-1}}$ ③ both (a) and (b) ④ none of the above

8. Two charges Q each are at a distance r from each other in air. If a third charge Q' is placed at a distance $(r/_2)$ from each charge, then all the charges are in equilibrium. Then Q' =

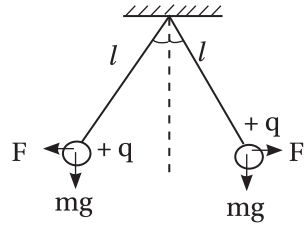
① – Q/4 ② Q/4 ③ Q/2 ④ – Q/2

9. 

$\frac{F}{mg} =$

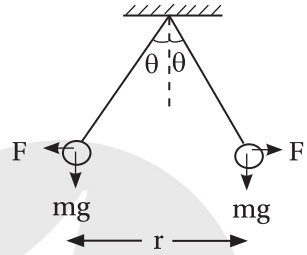
① tan θ ② $\frac{x}{2L}$ ③ both (a) & (b) ④ cot θ

10. If the whole set-up is taken in a satellite into space, the tension in each string is



① $\frac{1}{4\pi\in_0}\cdot\frac{q^2}{2l^2}$ ② $\frac{1}{4\pi\in_0}\cdot\frac{q^2}{4l^2}$ ③ $\frac{1}{4\pi\in_0}\cdot\frac{q}{l^2}$ ④ $\frac{1}{4\pi\in_0}\cdot\frac{2q^2}{l^2}$

11. If the balls are suspended in a liquid of density d and the separation between the balls remains same, where p is the density of material of ball, then dielectric strength of liquid is



① $\frac{d'}{d'-d}$ ② $\frac{d'}{d'+d}$ ③ $\frac{d'}{d}$ ④ $\frac{d}{d'}$

12. Intensity of electric field at some point p on the axis of uniformly charged ring at a distance x from centre of ring is (R = radius of ring)

① $\frac{k\ qx}{R^2+x^2}$ ② $\frac{kqx}{\sqrt{R^2+x^2}}$ ③ $\frac{kqx}{\left(R^2+x^2\right)^{\frac{3}{2}}}$ ④ $\frac{kq\,R}{\left(R^2+x^2\right)^{\frac{3}{2}}}$

13. Intensity of electric field near an infinite rod of linear charge density λ is

① $\frac{\lambda}{2\pi\in_0 r}$ ② $\frac{\lambda}{\pi\in_0 r}$ ③ $\frac{2\lambda}{\pi\in_0 r}$ ④ $\frac{\lambda}{4\pi\in_0 r}$

14. Intensity of the electric field near a non conducting infinite sheet of charge, (where σ is the surface charge density) is

① $\frac{\sigma}{\in_0}$ ② $\frac{2\sigma}{\in_0}$ ③ $\frac{\sigma}{2\in_0}$ ④ $\frac{\sigma}{3\in_0}$

15. Intensity of the electric field in between the plates of a charged parallel plate capacitor is

① $\frac{\sigma}{\in_0}$ ② $\frac{2\sigma}{\in_0}$ ③ $\frac{\sigma}{2\in_0}$ ④ $\frac{\sigma}{3\in_0}$

16. If two equal and unlike charges are placed on the vertices of an equilateral triangle of side a, then the intensity of the electric field at the third vertex is

① $\frac{2\,kq}{a^2}$ ② $\sqrt{3}\,\frac{kq}{a^2}$ ③ $\frac{kq}{a^2}$ ④ $\frac{kq}{2a^2}$

17. If two equal like charges are placed at the two vertices of an equilateral triangle, then intensity of the electric field at the third vertex is given by $\sqrt{3}$ E , where E =

① $\frac{2kq}{a^2}$ ② $\frac{kq}{a^2}$ ③ $\frac{kq}{2a^2}$ ④ $\frac{kq}{4a^2}$

18. If four charges +q coulomb each are placed at the four vertices of a square of side a, then intensity of the electric field at the intersection of the diagonals is

① 0 ② $\frac{kq}{a^2}$ ③ $\frac{2kq}{a^2}$ ④ $\frac{4kq}{a^2}$

19. If three charges +q coulomb each are placed at the three corners of an equilateral triangle, then the intensity of the electric field at the intersection of the medians is

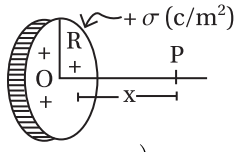
① $\frac{kq}{a^2}$ ② $\frac{2kq}{a^2}$ ③ $\frac{\sqrt{3}kq}{a^2}$ ④ 0

20. [dipole moment] =

① $M^\circ L T A$ ② $M^\circ L T^2 A$ ③ $M^\circ L T A^2$ ④ $M^\circ L^2 T A$

21. The work done in deflecting the dipole (P = dipole moment) in uniform electric field E through an angle θ is given by

① PE (1 – cos θ) ② PE (1 + cos θ) ③ PE (1 + sin θ) ④ PE (1 – sin θ)

22. Metal disc 

axis of disc

① $\frac{\sigma}{2\epsilon_0}\left(1+\frac{x}{\sqrt{R^2+x^2}}\right)$ ② $\frac{\sigma}{2\epsilon_0}\left(1-\frac{x}{\sqrt{R^2+x^2}}\right)$ ③ $\frac{\sigma}{\epsilon_0}\left(1-\frac{x}{\sqrt{R^2+x^2}}\right)$ ④ $\frac{\sigma}{2\epsilon_0}\left(1+\frac{R}{\sqrt{x^2+R^2}}\right)$

23. Two long straight parallel wires carry linear charges λ_1 and λ_2 per unit length. The distance between them is d. The magnitude of force exerted on length of one due to charge on the other. (Force per unit length)

① $\frac{\lambda_1\lambda_2}{\pi\epsilon_0 d}$ ② $\frac{2\lambda_1\lambda_2}{\pi\epsilon_0 d}$ ③ $\frac{\lambda_1.\lambda_2}{2\pi\epsilon_0 d}$ ④ $\frac{\sqrt{2}.\lambda_1.\lambda_2}{\pi\epsilon_0 d}$

24. If the line charge a in a non-conducting cylinder of radius R, then electric field at a distance r (r < R) from the axis is

① $\frac{\lambda r}{2\pi\epsilon_0 R^2}$ ② $\frac{\lambda r}{\pi\epsilon_0 R^2}$ ③ $\frac{\lambda R}{2\pi\epsilon_0 r^2}$ ④ $\frac{2\lambda r}{\pi\epsilon_0 R^2}$

25. Electric field due to a non-conducting charged sphere (P c/m^3) of radius R, for r < R

① $\frac{pr}{2\epsilon_0}$ ② $\frac{pr}{\epsilon_0}$ ③ $\frac{pr}{3\epsilon_0}$ ④ $\frac{pr}{4\epsilon_0}$

26. Match the column:

Column–I		Column–II	
(a)	Certain positive change is given to a conductor. Then its potential.	(i)	Uniform
(b)	Potential inside a changed spherical shell is	(ii)	remain same through the conductor
(c)	$V_0(5x^2 - 10x - 9)$ volts, then electric field at x = 1m.	(iii)	–10 N/C
(d)	$V(5x^2 - 10x - 9)$ volts, then electric flux at x = 2 m.	(iv)	zero

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

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

Cont.. 6

Assertion–Reason (27–28):

Direction: These question consist of two statement each, printed as Assertion and Reason. While answering these question you are required to choose any one of the following four option

(a) If both (A) & (R) are true & (R) is the correct explanation of the (A).

(b) If both (A) & (R) one true but (R) is not the correct explanation of (A).

(c) If the (A) is true & (R) is false.

(d) If the (A) is false & at (A) is true.

27. **Assertion (A):** If two paralled beams of protons one in same direction then these beams repel each other.

Reason (R): Like changes repel each other while unlike changes attract each other.

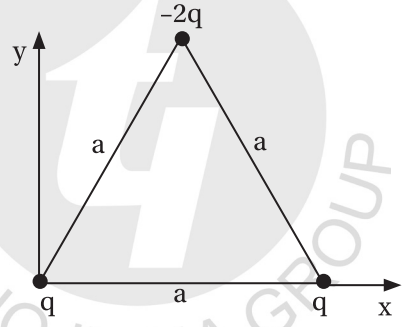
28. **Assertion (A):** The lighting conductor at the top of a building has sharp pointed ends.

Reason (R): The surface change density at sharp points is very high resulting in of electric wind.

29. If E_a be the electric field strength of a short dipole at a point on its axial line and E_a that on the equational line at the same distance, then

① $E_a = 2E_a$ ② $E_a = 2E_e$ ③ $E_a = E_e$ ④ $E_a = 4E_e$

30. Electric charges q, q_1, –2q are placed at the corners of an equilateral triangle ABC of side l. The magnitude of electric dipole moment of the system is



① ql ② $2ql$ ③ $\sqrt{3}ql$ ④ $4ql$

31. An electric dipole of moment p is placed with its centre at the origin along the x-axis. The electric field at a point P, whose position vector makes an angle θ with the x-axis, will make an angle ..... With the x-axis, when $\tan\alpha = (\tan\theta)/2$

① α ② θ ③ $\theta + \alpha$ ④ $\theta + 2\alpha$

32. An electric dipole is placed among the x-axis at the origin O. A point P is at a distance of 20 cm from this origin such that OP makes an angle $\pi/3$ with the x-axis. If the electric field at P makes an angle θ with the x-axis, the value of θ would be

① $\frac{\pi}{3}$ ② $\frac{\pi}{3} + \tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$ ③ $\frac{2\pi}{3}$ ④ $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

33. Two identical pendulums A and B are suspended from the same point. Both are given positive charge, with A having more charge than B. They diverge and reach equilibrium with the suspension of A and B making angles θ_1 and θ_2 with the vertical respectively.

① $\theta_1 > \theta_2$ ② $\theta_1 < \theta_2$

③ $\theta_1 = \theta_2$ ④ The tension in A is greater than that in B

34. A soap bubble is given a negative charge, then its radius

① Decreases

② Increases

③ Remains unchanged

④ Nothing can be predicted as information is insufficient

35. Two spheres carrying charges +6μC and +9μC, separated by a distance d, experiences a force of repulsion F. When a charge of –3μC is given to both the spheres and kept at the same distance as before, the new force of repulsion is

① 3F ② F/9 ③ F ④ F/3

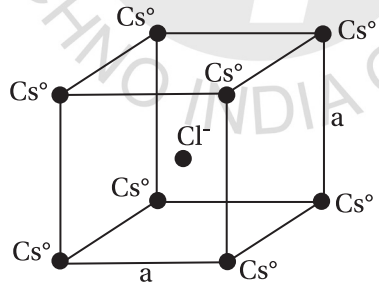
36. A charge Q is divided into two parts of q and Q–q. If the coulomb repulsion between them when they are separated is to be maximum, the ratio of $\frac{Q}{q}$ should be

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

37. A point charge q is situated at a distance r on axis from one end of a thin conducting rod of length L having a charge Q [Uniformly distributed along its length]. The magnitude of electric force between the two is

① $\frac{2KQ}{r(r+L)}$ ② $\frac{KQq}{r^2}$ ③ $\frac{KQq}{r(r-L)}$ ④ $\frac{KQq}{r(r+L)}$

38. In the basic CsCl crystal structure, Cs° and Cl^- ions are arranged in a bcc configuration as shown in the figure. The net electrostatic force exerted by the eight Cs° ions on the Cl^- ion at center is



① $\frac{1}{4\pi\in_0}\frac{4e^2}{3a^2}$ ② $\frac{1}{4\pi\in_0}\frac{16e^2}{3a^2}$ ③ $\frac{1}{4\pi\in_0}\frac{32e^2}{3a^2}$ ④ Zero

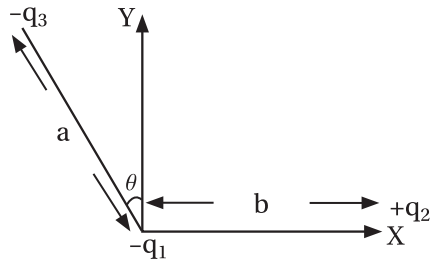
39. Identify incorrect for electric charge q

① Quantized ② Conserved ③ Additive ④ Non-transferable

40. Three identical charges are placed at the vertices of an equilateral triangle of side length r. The force experienced by each charge. (if $K = 1/4\pi\in_0$) is

① $2k\frac{q^2}{r^2}$ ② $\frac{kq^2}{2r^2}$ ③ $\sqrt{3}k\frac{q^2}{r^2}$ ④ $\frac{kq^2}{\sqrt{2}r^2}$

41. Three charges $-q_1 + q_2$ and $-q_3$ are place as shown in the figure. The x-component of the force on q_1 is proportional to



① $\frac{q_2}{b^2}-\frac{q_1}{a^2}\cos\theta$ ② $\frac{q_2}{b^2}-\frac{q_1}{a^2}\sin\theta$ ③ $\frac{q_1}{b^1}-\frac{q_2}{a^2}\cos\theta$ ④ $\frac{q_2}{b^2}-\frac{q_1}{a^2}\sin\theta$

42. There is a uniform electric field of strength $10^3 Vm^{-1}$ along Y-axis. A body of mass 1 gm and charge 10^{-6} C is projected into the field from origin along the positive X-axis with a velocity of 10 ms^{-1}. Its speed in ms^{-1} after 10s is (Neglect gravitation)

① 10 ② $5\sqrt{2}$ ③ $10\sqrt{2}$ ④ 20

43. An electron with a velocity of 2.4×10^6 ms^{-1} files into a uniform electric field of intensity 135 Vm^{-1}. It moves along a field line until it comes to rest. The distance travelled by the electron before coming to rest within the field is

① 0.12 m ② 0.6 m ③ 0.4 m ④ 0.2 m

44. A sphere carrying charge is just at rest without falling down touching a vertical wall, by applying a horizontal electric field 100 NC^{-1}. The charge on the ball is 0.01 C. If the coefficient of friction between wall and sphere is 0.2, mass of the sphre is ($g = 10\ m/s^2$)

① 2 kg ② 20 gm ③ 2 g ④ 0.2 kg

45. A particle of mass 1 Kg and carrying 0.01 C is at rest on an inclined plane of angle 30° with horizontal when an electric field of $\frac{490}{\sqrt{3}}Nc^{-1}$ applied parallel to horizontal, the coefficient of friction is

① 0.5 ② $1\sqrt{3}$ ③ $\sqrt{3/2}$ ④ $\sqrt{3/7}$

CHEMISTRY

46. 6.02×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of solution is :

① 0.01 M ② 0.001 M ③ 0.1 M ④ 0.02 M

47. Which of the following is dependent on temperature ?

① Molality ② Molarity ③ Molefraction ④ Weigh percentage

48. At a given emperature, total Vapour pressure in torr of a mixture of a volatile components A and B is given by: $P = 120 - 75\ x_B$.

hence, vapour pressues of pure A and B respectively (in torr) are :

① 120, 75 ② 120, 195 ③ 120, 45 ④ 75, 45

49. Aluminium phosphate is 100% ionised in 0.01 molecule aqueous solution. Hence, $\frac{\Delta T_b}{K_b}$ is :

① 0.01 ② 0.015 ③ 0.0175 ④ 0.02

50. A 5% solution of cane sugar (Molar mass 342) is isotonic with 1% of a solution of an unknown solute. The molar mass of unknown solute in g/mole is :

① 136.2 ② 171.2 ③ 68.4 ④ 34.2

51. The boiling point of 0.2 mol(kg)$^{-1}$ solution of x in water is greater than equimolal solution of Y in water. Which one of the following statements is true in this case ?

① X is undergoing dissociation in water

② Molecular mass of X is greater than the molecular mass of Y

③ Molecular mass of X is is less than the molecular mass of Y

④ Y is undergoing dissociation in water while X undergoes no change

52. Which of the following electrolytes has the same value of Van't Hoff's factor : (i) as that of $Al_2(SO_4)_3$ (if all are 100% ionised)

① K_2SO_4 ② $K_3(Fe(CN)_6)$ ③ $Al(NO_3)_3$ ④ $K_4(Fe(CN)_6)$

53. The Van't Hoff factor, i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively :

① less than and less than one ② greater than one and less than one

③ greater than one and greater than one ④ less than one and greater than one

54. The molar conductively of a 0.5 mol/dis^3 solution of $AgNO_3$ with electrolytic conductively of 5.76×10^{-3} s cm^{-1} at 298 k is :

① 2.88 s cm^2/mol ② 11.52 s cm^2/mol ③ 0.086 s cm^2/mol ④ 28.8 s cm^2/mol

55. An increase in equivalent conductance of a strong electrolyte with dilution is mainly due to :

① increase in ionic mobility of ions

② 100% ionisation of electrolyte at normal dilution

③ increase in both, ie number of ions and ionic mobility of ions

④ increase in number of ions.

56. A device that converts energy of combustion of fuels like hydrogen and methane directly into electrical energy is known as :

① fuel cell ② electrolytic cell ③ dynamo ④ Ni-Cd cell.

57. The pressure of H_2 required to make the potential of H_2-electrode zero in pure water at 298 k is :

① 10^{-12} atm ② 10^{-10} atm ③ 10^{-4} atm ④ 10^{-14} atm

58. A button cell used matches, function as following :

$Zn(s) + Ag_2O(s) + H_2O(l) \rightleftharpoons 2Ag(s) + Zn^{2+}(aq) + 2OH^{\ominus}aq$

If half-cell potentials are :

Given : $Zn^{2+}(aq) + 2e^{\ominus} \longrightarrow Zn(s)$; $E^\circ = -0.76$ v
$Ag_2O(s) + H_2O(l) + 2e^{\ominus} \longrightarrow 2Ag(s) + 2OH^{\ominus}(aq)$; $E^\circ = +0.34$
the cell potential will be :

① 0.42 ② 0.84 v ③ 7.34 v ④ 1.10 v

59. The quantity of electricity required to oxidised 0.1 mole of MnO_4^{2-} completely to $MnO_4^{\ominus}$ is

① 96500 c ② 2×96500 c ③ 9650 c ④ 196.50 c

60. Zinc can be coated on iron to produce galvanised iron but the reverse is not possible. It is because :

① Zinc is lighter than iron

② Zinc has lower melting point than iron

③ Zinc has lower negative electrode potential than iron

④ Zinc has higher negative electrode

61. The weight of silver (at wt 108) displaced by a quantity of electricity, which displaces 5600 ml of O_2 at STP. will be :

① 5.4 g ② 10.8 g ③ 54 g ④ 108 g

62. Standard electrode potential of three metals X, Y and Z are –1.2 v, + 0.5 v and – 3.0 v respectively. The reducing power of these metals will be :

① Y > X > Z ② Z > X > Y ③ X > Y > Z ④ Y > Z > X

63. If the E^0_{cell} for a given reaction has a negative value, than which of the following given the correct relationships for the values of ΔG° and keq ?

① $\Delta G^\circ < 0$; keq > 1 ② $\Delta G^\circ < 0$; keq < 1 ③ $\Delta G^\circ > 0$; keq < 1 ④ $\Delta G^\circ > 0$; keq > 1

64. Which of he following lanthanoid ions is diamagnetic ?
(Atomic numbers : Ce = 58, Sm = 62, Eu = 63, Yb = 70).

① Sm^{2+} ② Eu^{2+} ③ Yb^{2+} ④ Ce^{2+}

65. Which of the following ions will exhibit colour in aqueous solution ?

① La^{3+} (Z = 57) ② Ti^{3+} (Z = 22) ③ Lu^{3+} (Z = 71) ④ Sc^{3+} (Z = 21)

66. The density of 3 M solution of sodium chloride is 1.252 g$(mL)^{-1}$. The molality of the solution will be [Molar mass of NaCl = 58.5 g$(mol)^{-1}$]

① 2.60 m ② 2.18 m ③ 2.79 m ④ 3.00 m

67. Vapour pressure of pure Benzene is 119 torr and that of toluene is 37.0 torr at the same temperature. Mole fraction of toluene in vapour phase which is in equilibrium with a solution of benzene and toluene having mole fraction of toluene 0.050 will be

① 0.137 ② 0.237 ③ 0.435 ④ 0.205

68. 12 g of a non-volatile solute dissolved in 108 g of water produces the relative lowering of vapour pressure of 0.1. The molecular mass of the solute is :

① 80 ② 60 ③ 20 ④ 40

69. k_f for water is 1.86 k kg $(mol)^{-1}$. If your automobile radiator holds 1 kg of water, how many grams of ethylene glycol ($C_2H_6O_2$) must you add to get the freezing point of the solution lowered to 2.8°C?

① 72 g ② 93 g ③ 39 g ④ 27 g

70. If sodium sulphate is considered to be completely dissociated into cations and anions in aqueous solution, the change in freezing point of water (ΔT_f) when 0.01 mole of sodium sulphate is dissolved in 1 kg of water, is : (k_f = 1.86 k kg mol^{-1})

① 0.0372 k ② 0.0558 k ③ 0.0744 k ④ 0.0186 k

71. A 2% sucrose is isotonic with 1.5% solution of an unknown substance. Calculate the molecular mass of the unknown substance.

① 56 g ② 156 g ③ 256.5 g ④ 36.5 g

72. The standard reduction potential for Fe^{2+}/Fe and Sn^{2+}/Sn electrodes are –0.44 V and –0.14 V respectively. For the cell reaction :

$Fe^{2+} + Sn \rightarrow Fe + Sn^{2+}$, the standard e.m.f is :

① +0.30 V ② –0.58 V ③ +0.58 V ④ –0.30 V

73. What will be the standard cell potential of galvanic cell with the following reaction?

$2\,Cr\,(s) + 3Cd^{2+}\,(aq) \rightarrow 2Cr^{3+}\,(aq) + 3Cd\,(s)$

[Given : E^0Cr^{3+}/Cr = –0.74 V; E^0Cd^{2+}/Cd = –0.40 V]

① +0.74 V ② +1.14 V ③ +0.34 V ④ –0.34 V

74. In the cell,

$Zn\,|\,Zn^{2+}\,(C_1)\;||\;Cu^{2+}\,(C_2)\,|\,Cu$

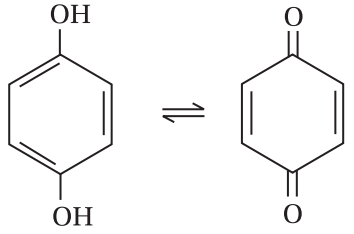
$E_{un} - E^0_{cell} = 0.0591$ V. The ratio of $\frac{C_1}{C_2}$ at 298 k is

① 2.0 ② 100 ③ 10^{-2} ④ 1.0

75. A 110 watt, 110 Volt lamp is connected in series with an electrolytic cell containing $CdSO_4$. What mass of Cadmium will be deposited by the current flowing for 10 hours? [Atomic mass of Cd = 112.4]

① 20.9 g ② 9 g ③ 17 g ④ 26 g

76. The cell reaction involving quinhydrone electrode is :



$+ 2H^+ + 2e^-;\; E^0 = 1.30$ V

What will be the electrode potential at pH = 3?

① 1.48 V ② 1.20 V ③ 1.10 V ④ 1.30 V

77. The specific conductance of a saturated solution of AgCl is k Q^{-1} cm^{-1}. The limiting conductances of Ag^+ and Cl^- are x and y respectively. The solubility product AgCl is :

① $\frac{1000k}{x+y}$ ② $\left(\frac{1000k}{x+y}\right)^2$ ③ $\frac{1000\times143.5\times k}{x+y}$ ④ $\frac{40^3\times143.6\times k}{x+y}$

78. The E^0_{cell} of the reaction :

$MnO_4^- + Fe^{2+} + H^+ \rightarrow Mn^{2+} + Fe^{3+} + H_2O$ is 0.59 V at 25°C. The equilibrium constant for the reaction is :

① 50 ② 10 ③ 10^{50} ④ 10^5

79. At 25°C, the equivalent conductance at infinite dilution of HCl, CH_3COONa and NaCl are 426.1, 91.0 and 126.45 $cm^2\,\Omega^{-1}\,(eq\,V)^{-1}$ respectively. Λ^α for CH_3COOH [in $cm^2\,\Omega^{-1}\,(eq\,V)^{-1}$] is :

① 391.6 ② 390.6 ③ 380.6 ④ 309.6

80. 0.5 Faraday of electricity was passed to deposit all the copper present in 500 ml of $CuSO_4$ solution. What was the molarity of this solution?

① 1 M ② 0.5 M ③ 0.25 M ④ 2.5 M

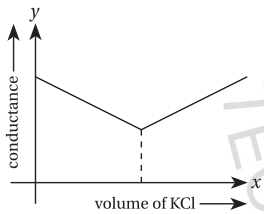
81. $E^0_{Na^+/Na} = -2.71V$; $E^0_{Mg^{2+}/Mg} = -2.37V$

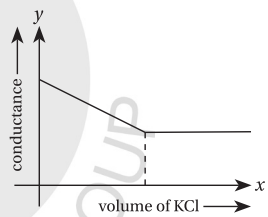
$E^0_{Fe^{2+}/Fe} = -0.44V$; $E^0_{Cr^{3+}/Cr} = -0.41V$

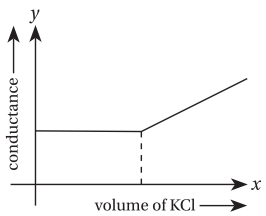
Based on this data, which is the poorest reducing agent?

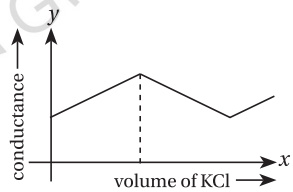
① Na^+ ② Mg^{2+} ③ Fe^{2+} ④ Cr^{3+}

82. Which of the following type of plot would you expect from the titration of $AgNO_3$ against KCl solution?

① 

② 

③ 

④ 

83. The equivalent conductances of CH_3COONa, HCl and NaCl at infinite dilution are 91, 426 and 126 $s\,cm^2\,(eq)^{-1}$ respectively at 25°C. The equivalent conductance of 1 (M) CH_3COOH solution is 19.55 $s^1\,cm^2\,(eq)^{-1}$. The pH of solution is :

① 5.3 ② 4.3 ③ 2.3 ④ 1.3

84. Cell reaction is spontaneous, when

① E^0_{red} is negative ② ΔG^0 is negative ③ $E^0_{oxidation}$ is positive ④ ΔG^0 is positive

85. $Zn|Zn^{2+}(C_1)||Zn^{2+}(C_2)|Zn$ for this cell ΔG is negative if

① $C_1 = C_2$ ② $C_1 > C_2$ ③ $C_2 > C_1$ ④ none of these

86. The spin only magnetic moment value of $Cr(CO)_6$ is (in B.M.):

① 0 ② 2.84 ③ 4.90 ④ 5.92

87. How many moles of acidified $FeSO_4$ solution can be completely oxidised by one mole of $KMnO_4$.

① 10 ② 5 ③ 6 ④ 2

88. The colour of $KMnO_4$ is due to

① L $\rightarrow$ M change transfer transition ② $\sigma \rightarrow {}^*\sigma$ transition

③ M $\rightarrow$ L charge transfer transition ④ d — d transition

89. Arrange Ce^{3+}, La^{3+}, Pm^{3+} and Yb^{3+} in increasing order of their ionic radii.

① $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$ ② $Ce^{3+} < Yb^{3+} < Pm^{3+} < La^{3+}$

③ $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$ ④ $Pm^{3+} < La^{3+} < Ce^{3+} < Yb^{3+}$

90. Which of the following arrangements does not represent the correct order of the property stated against it?

① Sc < Ti < Cr < Mn : No. of oxidation states

② $V^{2+} < Cr^{2+} < Mn^{2+} < Fe^{+2}$: Paramagnetic behavior

③ $Ni^{2+} < Co^{2+} < Fe^{2+} < Mn^{2+}$: Ionic size

④ $Co^{3+} < Fe^{3+} < Cr^{3+} < Sc^{+3}$: Stability in aqueous solution

Biology

91. Zygote divides by an asymmetric mitotic division to form two cells. Out of these, the cells towards the chalazal side is called.

① Apical cell ② Basal cell ③ Both ① and ② ④ None

92. Basal cell divides to produce _____ .

① haustorium ② suspensor ③ hypobasal cell ④ epibasal cell

93. The part of embryonal axis above the level of cotyledon is called _____ .

① epicotyl ② hypocotyl ③ plumule ④ radicle

94. Root cap is enclosed in an undifferentiated sheath in monocot seed, called _____

① epicotyl ② coleoptile ③ coleorhiza ④ radicle

95. Which stage, in the development of embryo, is almost similar in monocots and dicots?

① Torpedo – shaped stage ② Heart-shaped stage

③ Octant stage ④ Globular stage

96. Cellular endosperm is found in

① *Datura* ② *Arachis* ③ *Acer* ④ *Malva*

97. Poor growth of endosperm results in the formation of –

① viable seed ② dormant seed ③ germinating seed ④ non-viable seed

98. Aleurone tissue secretes –

① hydrolytic enzymes ② Protease enzyme ③ amylase enzyme ④ All of these

99. Which of the following structures is regarded as the third integument ?

① Operculum ② Endosperm ③ Aril ④ Caruncle

100. True polyembryony occurs in

① *Citrus* ② *Mangifera* ③ *Opuntia* ④ All of these

101. More than one pollen tube entering into the ovule and fertilising synergids occur in –

① *Argemone mexicana* ② *Brassica* ③ *Nicotiana rustica* ④ *Nymphea*

102. In apospory, seed arises from

① embryo sac ② nucellar cell ③ egg cell ④ synergid

103. Identify the odd one with respect to apospory.

① grass ② *Taraxacum* ③ *Parthenium* ④ *Rubus*

104. A parthenocarpic fruit with seed is

① orange ② apple ③ mango ④ coconut

105. Which of the following hormones can induce parthenocarpy ?

① Auxin ② Gibberellin ③ Both (A) and (B) ④ Cytokinin

106. Parthenocarpy is induced by environment in

① Apple ② Citrus ③ Banana ④ Capsicum

107. *Vitis vinifera* is a

① seedless fruit ② parthenocarpic fruit ③ Both (A) & (B) ④ None

108. The junction between ovule and funicle is called –

① hilum ② nucellus ③ *micropyle* ④ tapetum

109. Spermatids are produced as a result of

① spermiogenesis ② meiosis I

③ meiosis II ④ spermatocytogenesis

110. Spermiogenesis changes _____ .

① Spermatogonium to primary spermatocytes

② primary spermatocytes to secondary spermatocytes

③ seconday spermatocytes to spermatids

④ spermatids to spermatozoa

111. The process of release of sperms from seminiferous tubules is known as –

① spermiation ② spermiogenesis ③ spermatogenesis ④ None of these

112. A mature spermatozoa is _____ μm in diameter.

① 10 - 15 ② 15 – 20 ③ 2 – 5 ④ 0.1 – 1

113. Middle piece of mammalian sperm shows :

① mitochondria ② centriole only

③ acrosome ④ nucleus and mitochondria

114. Sperm lysins in acrosome are :

① hyaluronidase ② proteinase ③ Both A and B ④ DNA ase

115. The activity of FSH, during spermatogenesis, is suppressed by

① inhibin ② androgens ③ prolactin ④ LH

116. Graafian follicle is formed with the action of _____

① FSH ② LH ③ GnRH ④ Oxytocin

117. The processes of spermatogenesis and sperm differentiation are under the control of

① FSH ② LH ③ GnRH ④ Oxytocin

118. The mature oocytes are attached to the wall of follicle with the help of :

① endometrium ② corpus luteum ③ cumulus oophorus ④ zona pellucida

119. Which of the following does not have any role in oogenesis?

① polar body ② oocyte ③ primary follicle ④ FSH

120. Which of the following does not form the covering of ovum ?

① Zona pellucida ② Inner membrane

③ Corona radiata ④ External membrane

121. The lower pole of ovum is known as –

① vegetal pole ② animal pole ③ transitory pole ④ None of these

122. Oestrous cycle is the characterisic of :

① human females ② mammalian females

③ primate females ④ non-primate females

123. Loss of reproductive capacity in a woman after a certain age is the result of

① menstrual cycle ② ageing ③ menopause ④ menarche

Assertion and Reason :

Directions: Read the following questions and choose any one of the following four responses.

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D: Assertion is wrong but Reason is correct.

124. **Assertion (A) :** Sertoli cells are involved in the process of spermatogenesis.

Reason (R) : Sertoli cells provide nutrition to developing sperms.

① A ② B ③ C ④ D

125. **Assertion (A) :** First meiotic division in primary oocytes results in the formation of two equal sized cells.

Reason (R) : One of these cells is functional.

① A ② B ③ C ④ D

126. **Assertion (A) :** Only a single functional female gamete is formed from each primary oocyte.

Reason (R) : Meiosis in each primary oocyte gives rise to only one cell, which functions as ovum.

① A ② B ③ C ④ D

127. Sexually transmitted diseases are also known as :

① venereal diseases ② fungal diseases ③ congenital diseases ④ topical diseases

128. Gonorrhoea is caused by a bacterium :

① *Neisseria* ② *Campylobacter*

③ *Clostridium* ④ *Salmonella typhimurium*

129. Trichonomiasis is caused by

① virus ② protozoa ③ bacteria ④ fungi

130. The preventive measures of STDs include :

① hygienic sexual practices ② avoiding multiple sex partners

③ use of condom ④ All of the above

131. The failure to achieve a clinical pregnancy even after 12 months of regular unprotected sexual intercourse is called –

① eunochoidism ② sterility ③ infertility ④ abortion

132. The condition of near absence of sperms in the semen is

① polyspermia ② azoospermia ③ aspermia ④ oligospermia

133. The term ZIFT stands for :

① Zygote Intra Fallopian Transfer ② Zygote Inter Fallopian Transfer

③ Zygote In Fallopian Transfer ④ Zygote Intra Follicular Transfer

134. When was the first test tube baby born in India ?

① 6th August, 1986 ② 7th March, 1984 ③ 25th May, 1972 ④ 3rd October, 1978

135. The technique that combines both IVF and ICSI is

① Pre-implantation genetic diagnosis ② ZIFT

③ IUT ④ IUI

136. Reproductive and child health care programmes include creating awareness about –

① STDs ② Adolescence and associated issues

③ Hygienic sexual practices ④ All of the above

137. Which of the following is not a natural method of avoiding pregnancy ?

① Abstinence ② Pills

③ Lactational amenrrhoea ④ Temperature method

138. The female equivalent of the condom is called

① vault ② femidom ③ diaphragm ④ cap

139. The spermicides commonly used to prevent pregnancy are available in the form of :

① foams ② tablets ③ jellies ④ All of these

140. Which of the following may act as a spermicide ?

① Zinc sulphate ② Magnesium sulphate ③ Boric acid ④ Both A and C

141. Oral pills usually act by

① inhibiting FSH secretion ② preventing sperm penetration

③ preventing blastocyst implantation ④ All of the above

142. Which one of the following is a second generation IUD ?

① Progestasert ② Rings ③ Lippes loop ④ Copper T-200

143. The surgical method used by women to avoid pregnancy is

① vasectomy ② tubectomy ③ articifial insemination ④ MTP

144. A technique misused to determine the sex of the child is

① Amniocentesis ② MTP ③ Vasectomy ④ GIFT

145. Which of the following is not a non-allelic gene interaction ?

① Epistasis ② Duplicate gene

③ Incomplete dominance ④ Complementary gene

146. Pleiotropy occurs when a gene has

① a complementary gene elsewhere

② a small effect on one trait

③ reversible effects on the phenotype, depending on age

④ many effects on the phenotype

147. Two non-allelic gene produce the new phenotype when present together, but fail to do so independently. This is called –

① epistasis ② polygene

③ non complementary gene ④ complementary gene

148. Complementary genes were demonstrated by Bateson in

① *Capsella* ② *Lathyrus odoratus* ③ Summer squash ④ *Mirabilis jalapa*

149. If a dominant gene pair masks the expression of the other gene pair, it will be

① recessive epistasis ② dominant epistasis

③ duplicate genes interaction ④ inhibitory genes interaction

150. The duplicate genes are also called –

① multiple alleles ② inhibitory factors

③ pseudoalleles ④ supplementary genes

151. Polygenic inheritance is controlled by

① 1 gene ② 2 genes ③ 3 genes ④ both B and C

152. In F2 generation, how many shades of skin colour are obtained in polygenic inheritance?

① 4 ② 6 ③ 7 ④ 9

153. The genes which seem to behave like alleles and have minimum chances of crossing over are called

① isoalleles ② pseudoalleles ③ Both (A) and (B) ④ multiple alleles

154. When alleles exhibit themselves within the same phenotype, it is

① pseudoalleles ② multiple alleles ③ isoalleles ④ None

155. Different mutations referrable to the same locus of a chromosome, gives rise to

① multiple alleles ② pseudoalleles ③ polygenes ④ oncogenes

156. ABO blood group is an example of

① pseudoalleles ② isoalleles

③ multiple alleles ④ incomplete dominance

157. The phenomenon of mutation results in

① alteration of DNA sequences ② changes in the genotype of an organism

③ changes in the phenotype of an organism ④ All of the above

158. Alteration in chromosomes results in

① abnormalities or aberrations ② recombination or abnormalities

③ aberrations or replications ④ replication or recombination

159. Duplication of same chromosome leads to

① Allopolyploids ② Autoallopolyploids ③ Both (A) and (B) ④ Autopolyploids

160. Tetrasomic and nullisomic can be represented respectively, as

① 2n + 2 and 2n – 2 ② 2n – 2 and 2n + 2 ③ 2n + 1 and 2n – 1 ④ 2n – 1 and 2n + 1

161. In man, which of the following genotypes and phenotypes may be the correct result of anuploidy in sex chromosome ?

① 22 pairs + XXY males ② 22 pairs + XX females ③ 22 pairs + XY females ④ None of these

162. Before a deletion occurred, the gene sequence was ABCDEF. Now it is _____ .

① ABDBEF ② FEDCBA ③ ABDEF ④ ABEDCF

163. The exchange of chromosomal parts between non homologous chromosomes is called

① translocation ② transcription ③ transduction ④ translation

164. Rearrangement of a group of genes within the chromosome in such a way, that their order in chromosome is the same but position is diferent, is referred to as

① inversion ② translocation ③ deletion ④ interchange

165. The site in the gene, at which mutations occur with high frequency is

① recons ② hotspots ③ mutons ④ palindromes

166. Point mutation occurs due to

① change in the base pairs of DNA ② change in a single base pair of DNA

③ alteration in the base pairs of DNA ④ aberrations in the base pairs of DNA.

167. Type of gene mutation, which involves the replacement of purine with pyrimidine or vice versa, or the substitution of one type of base with another type of base is

① transition ② transduction ③ translation ④ transversion

168. A mutational event, which changes the codon UGG to UAG is called

① non-sense mutation ② point mutation

③ mis-sense mutation ④ frameshift mutation

169. A mutation that changes a codon specifying one amino acid to a termination codon is called a

① mis-sense mutation ② transition mutation

③ non-sense mutation ④ frameshift mutation

170. Frameshift mutation occurs when

① base is added ② base is added or deleted ③ base is deleted ④ None of the above

171. Which of the following rRNAs act as structural RNA as well as ribozyme in bacteria ?

① 5 sr RNA ② 18 sr RNA ③ 23 sr RNA ④ 5.8 sr RNA

172. Taylor conducted the experiments to prove semi conservative mode of chromosome replication on

① *Vinca rosea* ② *Vicia faba*

③ *Drosophila melanogaster* ④ *E. coli*

173. A molecule that can act as a genetic material must fulfill the traits given below, except

① it should be able to express itself in the form of Mendelian characters.

② it should be able to generate its replica

③ it should be unstable structurally and chemically

④ it should provide the scope for slow changes that are required for evolution.

174. Which of the following statements is incorrect ?

① Cellulose is a polysaccharide

② Uracil is a pyrimidine

③ Glycine is a sulphur containing amino acid

④ Sucrose is a disaccharide

175. In sea urchin DNA, which is double strande d, 17% of the bases were shown to be cytosine . The percentages of the other 3 bases, expected to be present in this DNA, are

① G/34%, A/24.5%, T/24.5%

② G/17%, A/16.5%, T/32%

③ G/17%, A/33%, T/33%

④ G/8.5%, A/50%, T/24.5%

176. Which one of the following is not applicable to RNA ?

① Complementary base pairing

② 5' phosphoryl acid; 3' hydroxyl ends

③ Heterocyclic nitrogenous bases

④ Chargaff's rule

177. Match the following Columns :

Column–I		Column–II	
A	VNTR	1.	Largest gene
B	Introns and exons	2.	DNA fingerprinting
C	Dystrophin	3.	Bulk DNA
D	Satellite DNA	4.	Splicing

Codes

	A	B	C	D
①	3	4	1	2
②	2	4	1	3
③	2	1	4	3
④	4	1	2	3

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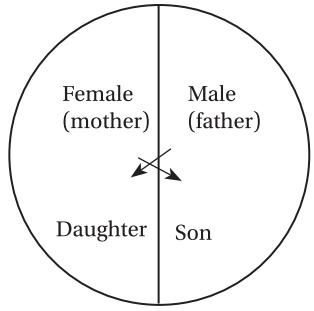
178. **Assertion (A) :** Transcription unit is often monocistronic in eukaryotes and polycistronic in prokaryotes.

Reason (R) : Exons do not appear in mature RNA, introns do.

① A ② B ③ C ④ D

179. Represented below is the inheritance pattern of a certain type of trait in humans. Which one of the following conditions could be an example of this pattern?



① Phenylketonuria ② Sickle cell anaemia ③ Haemophilia ④ Thalassemia

180. A normal visioned man, whose father was colourblind, marries a woman whose father was also colourblind. They have their first child as a daughter. What are the chances that this child will be colourblind?

① 100% ② 0% ③ 50% ④ 25%