

LALAN'S ALL INDIA TEST SERIES

NEET 2022-23

PART TEST-3



PHYSICS , CHEMISTRY, BOTANY & ZOOLOGY

Time : 3 hrs. 20 Min.

Max. Marks:- 720

Date :

INSTRUCTIONS :

1. The test is of **3 hrs. 20 Min.** duration and the TEST BOOKLET contains 200 multiple choice questions (Four options with a single correct answer). 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 from Section B out of 15. **(Candidates are advised to read all 15 questions in each subject of Section B before they start attempting the question paper. In the event of a candidate attempting more than ten questions, the first ten questions answered by the candidate shall be evaluated)**
2. The Test Booklet consists of 200 questions. The maximum marks are **720**.
3. There are four parts in the question paper A, B, C & D consisting of Physics, Chemistry, Botany and Zoology having **50 questions** in each part of equal weightage.

Marking Scheme for MCQs

Correct Answer Four mark (+4), Incorrect Answer Minus one mark (-1), Unanswered No mark (0)

4. There is only one correct response for each question. Filling up more than one response in each question will be treated as wrong response and marks for wrong response will be deducted accordingly.



Name of the Candidate (in Capitals): _____

Roll Number : in figures _____

in words _____

Centre of Examination (in Capitals): _____

Candidate's Signature: _____ Invigilator's Signature _____

PHYSICS

SECTION A

1. Two charges placed in air at a distance 1m exert force 'F' on each other. If these charges placed inside mica at same distance, then the new net force between charges is

(1) $>F$ (2) $< F$
 (3) $= F$ (4) Depends on area of slab

2. A ring of radius R is having uniform line charge density ' λ '. The electric field at the center of ring is

(1) Zero (2) $\frac{\lambda}{2\pi\epsilon_0 R}$

(2) $\frac{\lambda}{2\pi\epsilon_0 R^2}$ (4) $\frac{\lambda}{4\pi\epsilon_0 R}$

3. Four charge of $+1\mu\text{C}, +1\mu\text{C}, -1\mu\text{C}$ and $+1\mu\text{C}$ are placed at the vertices of a square of side $\sqrt{2}\text{cm}$, in sequence. Net force experienced by $0.1\mu\text{C}$ charge at the centre of square

(1) 9N (2) 18N
 (3) 36 N (4) Zero

4. Two identical charges '+q' each are placed at a distance '2d'. A test charge free to move on perpendicular bisector of the line joining the two charge. The test charge will feel maximum force when it is at distance; from mid point of the joining of charge

(1) d (2) 2d

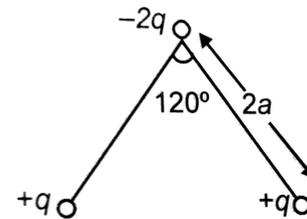
(3) $\frac{d}{\sqrt{2}}$ (4) $\frac{d}{2}$

5. Two short dipoles are placed at a certain distance exert a force 'F' on each other. If distance between them is doubled then the force will become

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

(2) 4F (4) $\frac{F}{16}$

6. The new dipole moment of the system is of the magnitude

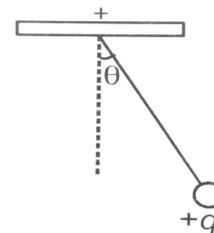


(1) $q \times 2a$ (2) $2q \times 2a$
 (3) $q \times a$ (4) $2 \times (2q \times 2a)$

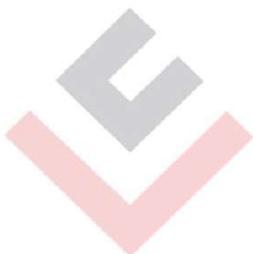
7. An infinite number of charges, each of charge $1\mu\text{C}$ are placed on the X-axis with co-ordinates $x = 1, 2, 4, 8, \dots, \infty$. If a charge 1C is kept at the origin, then net force acting on 1C charge

(1) 900 N (2) 1200 N
 (3) 2400N (4) 36000 N

8. A pendulum oscillates with the time period T. The string, used in the pendulum, is stretchable. The point to which it is attached is given positive charge and the bob is also given positive charge q. The time period of the pendulum will



(SPACE FOR ROUGH WORK)



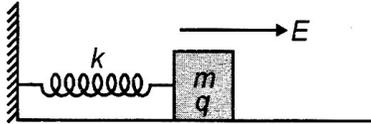
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CLASSES

CRAFTING DREAMS INTO REALITY...

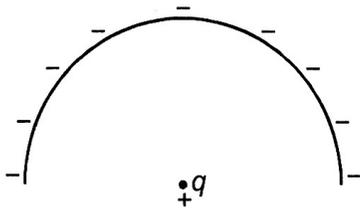
- (1) Increase
 (2) Decrease
 (3) Remain same
 (4) May increase or decrease

9. In the diagram shown below the block has charge q and is attached at one end of the light spring. The surface is smooth and horizontal and the spring is in its natural length. If the electric field E is switched on, the maximum elongation in the spring will be



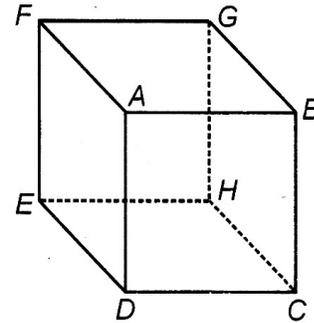
- (1) $\frac{qE}{2k}$ (2) $\frac{qE}{k}$
 (3) $\frac{2qE}{k}$ (4) $\frac{4qE}{k}$

10. A point charge $+q$ is kept at the centre of curvature of thin semicircular wire of length l as shown. The wire has uniformly distributed charge $-q$ on it. The dipole moment of the system is



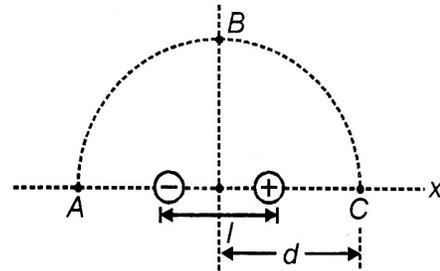
- (1) $\frac{2ql}{\pi^2}$ (2) $\frac{2ql}{\pi}$
 (3) $\frac{\pi}{2}ql$ (4) Zero

11. A point charge q is kept at the vertex B of the cube shown in the diagram. The electric flux linked with the face $BCGH$ is



- (1) $\frac{q}{8\epsilon_0}$ (2) $\frac{q}{6\epsilon_0}$
 (3) $\frac{q}{12\epsilon_0}$ (4) Zero

12. An electric dipole is kept at origin as shown in the diagram. The point A , B , C are on a circular arc with centre of curvature at origin. If the electric fields at A , B and C respectively are \vec{E}_1 , \vec{E}_2 , \vec{E}_3 then which of the following is incorrect? ($d \gg l$)



- (1) $\vec{E}_1 = -\vec{E}_3$ (2) $\vec{E}_1 = -2\vec{E}_2$
 (3) $\vec{E}_1 = \vec{E}_3$ (4) $\vec{E}_3 = -2\vec{E}_2$

(SPACE FOR ROUGH WORK)

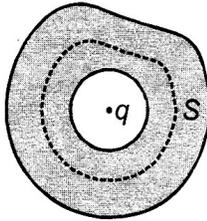


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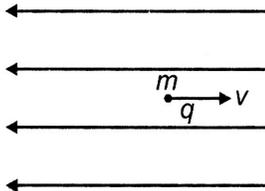
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13. A conducting body has a cavity in it as shown in the diagram below. A point charge q is held at the centre of the cavity. The electric flux linked with the closed surface S (shown dotted) is

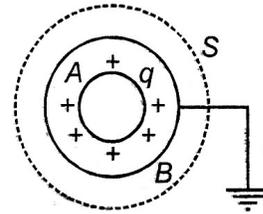


- (1) $\frac{q}{\epsilon_0}$ (2) $\frac{q}{2\epsilon_0}$
 (3) $\frac{q}{6\epsilon_0}$ (4) Zero
14. A neutral bubble made of soap solution has radius R . If some negative charge is given which gets distributed uniformly on the surface of the bubble, radius of the bubble becomes R' then
- (1) $R' > R$ (2) $R' = R$
 (3) $R' < R$ (4) $R' = 0.5R$
15. A particle with charge $+q$ and mass m is projected with velocity v in opposite direction of a uniform electric field E as shown in figure in a gravity free space. After what time the velocity will become $-v$?

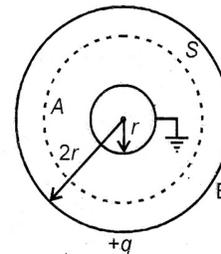


- (1) $\frac{mv}{2qE}$ (2) $\frac{mv}{qE}$
 (3) $\frac{2mv}{qE}$ (4) $\frac{4mv}{qE}$

16. Which of the following statements is correct about a dipole in a non-uniform field?
- (1) Torque is always nonzero
 (2) Net force may be nonzero
 (3) Torque is always zero
 (4) Net force is always zero
17. In the following diagram the shell A is given a charge q and B is earthed. The electric flux linked with the gaussian surface S is

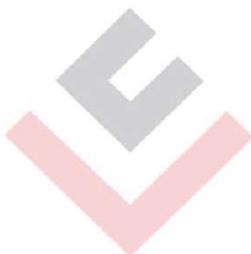


- (1) $\frac{q}{\epsilon_0}$ (2) $\frac{q}{2\epsilon_0}$
 (3) $\frac{2q}{\epsilon_0}$ (4) Zero
18. The conducting shells A and B are arranged as shown below. If charge on the shell B is q then electric flux linked with the spherical gaussian surface S is



- (1) $\frac{q}{\epsilon_0}$ (2) $-\frac{q}{2\epsilon_0}$
 (3) $-\frac{q}{\epsilon_0}$ (4) $\frac{q}{2\epsilon_0}$

(SPACE FOR ROUGH WORK)



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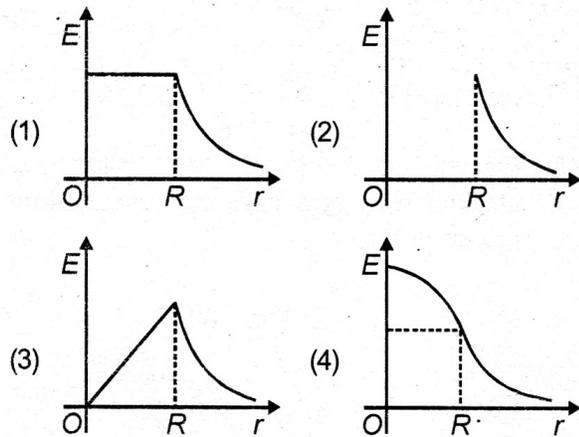
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19. Three charges q , q and $-2q$ are kept at three corners of an equilateral triangle of side a . Magnitude of electric dipole moment of the arrangement is

- (1) $2qa$ (2) $qa\sqrt{2}$
 (3) $qa\sqrt{3}$ (4) qa

20. Charge Q is distributed uniformly in a spherical region of radius R . Which of the following roughly represents the variation of electric field (E) versus distance (r) from the centre of sphere?



21. A point charge q is placed over a horizontal square of side L at a normal distance of $\frac{L}{4}$ from its centre. Electric flux through the square is

- (1) $\phi = \frac{q}{6\epsilon_0}$ (2) $\phi < \frac{q}{6\epsilon_0}$
 (3) $\frac{q}{6\epsilon_0} < \phi < \frac{q}{\epsilon_0}$ (4) $\phi > \frac{q}{\epsilon_0}$

22. A square of side a is lying in xy -plane such that its two adjacent sides are lying on the x and y axes. If an electric field $\vec{E} = E_0\hat{k}$ is applied on the square, then the flux passing through the square is

- (1) E_0a^3 (2) $\frac{E_0a^3}{2}$
 (3) $\frac{E_0a^3}{3}$ (4) E_0a^2

23. The insulation property of air breaks down at $E = 3 \times 10^6$ V/m. The maximum charge that can be given to a sphere of diameter 5 m is approximately

- (1) 2×10^{-5} C (2) 2×10^{-4} C
 (3) 2×10^{-3} C (4) 3×10^{-3} C

24. A charge Q is kept at a perpendicular distance $\frac{a}{2}$ from the centre of a square plate of sides a . The electric flux through the square surface is

- (1) $\frac{Q}{\epsilon_0}$ (2) $\frac{Q}{2\epsilon_0}$
 (3) $\frac{Q}{4\epsilon_0}$ (4) $\frac{Q}{6\epsilon_0}$

(SPACE FOR ROUGH WORK)

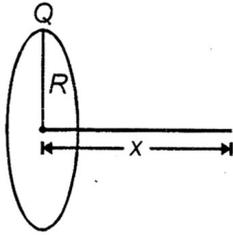


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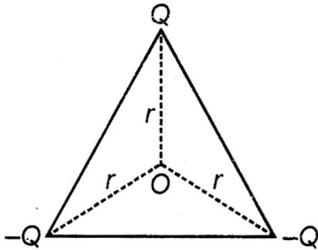
CRAFTING DREAMS INTO REALITY...

25. On the axis of uniformly charged ring of radius R , as shown, the electric field is maximum at



- (1) $x = 0$ (2) $x = \frac{R}{2}$
 (3) $x = R\sqrt{2}$ (4) $x = \frac{R}{\sqrt{2}}$

26. At the three corners of an equilateral triangle charges are placed as shown in figure. The magnitude of electric field at point O is

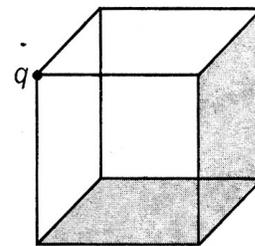


- (1) $\frac{1}{4\pi\epsilon_0} \frac{2Q}{r^2}$ (2) $\frac{1}{4\pi\epsilon_0} \frac{Q}{r^2}$
 (3) $\frac{1}{4\pi\epsilon_0} \frac{Q\sqrt{2}}{r^2}$ (4) $\frac{1}{4\pi\epsilon_0} \frac{Q\sqrt{3}}{r^2}$

27. An electric dipole of moment \vec{P} is released in a uniform electric field \vec{E} from the position of maximum torque. Angular speed of the dipole when \vec{P} becomes parallel to \vec{E} will be [I = moment of inertia of dipole]

- (1) $\sqrt{\frac{2PE}{I}}$ (2) $\sqrt{\frac{PE}{I}}$
 (3) $\sqrt{\frac{4PE}{I}}$ (4) $\sqrt{\frac{2I}{PE}}$

28. If a point charge q is placed at one corner of the cube, then flux linked with the surface shaded in figure is



- (1) $\frac{q}{8\epsilon_0}$ (2) $\frac{q}{3\epsilon_0}$
 (3) $\frac{q}{24\epsilon_0}$ (4) $\frac{q}{12\epsilon_0}$

29. The distance between two point charges is increased by 10%. The force of interaction

- (1) Increases by 10% (2) Decreases by 10%
 (3) Decreases by 17% (4) Increases by 17%

(SPACE FOR ROUGH WORK)

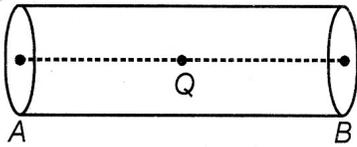


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30. A charge Q is kept at centre of a hollow cylinder as shown. ϕ is the electric flux passing through the cylindrical surface. The flux passing through one plane surface A , is



- (1) $\frac{1}{2}[Q\epsilon_0 - \phi]$ (2) $\frac{1}{2}\frac{Q}{\epsilon_0}$
 (3) $2\left[\frac{Q}{\epsilon_0} - \phi\right]$ (4) $\frac{1}{2}\left[\frac{Q}{\epsilon_0} - \phi\right]$

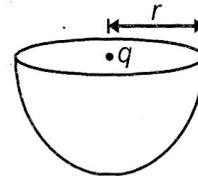
31. The equation of trajectory of a charged particle moving in xy plane in uniform electric field may be

- (1) $y = 2x + 8$ (2) $x = y^2 + 4$
 (3) $y = 2x^2 + 6$ (4) All of these

32. A charged particle q of mass m is released on y -axis at $y = a$ in an electric field $\vec{E} = -4y\hat{j}$. The speed of particle on reaching origin will be

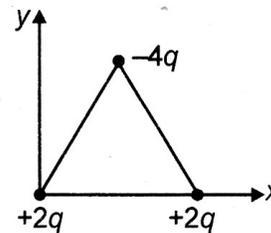
- (1) $\sqrt{\frac{2a}{mq}}$ (2) $\frac{a}{\sqrt{mq}}$
 (3) $2a\sqrt{\frac{q}{m}}$ (4) $2\sqrt{\frac{a}{mq}}$

33. A point charge q is placed at the centre of open face of a hemispherical surface as shown in figure. The flux linked with the surface is



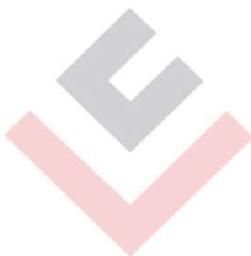
- (1) Zero (2) $\frac{q}{2\epsilon_0}$
 (3) $\frac{q}{\epsilon_0}$ (4) $q\pi r^2$

34. Charge distribution at three vertices of an equilateral triangle of side a is shown in the figure. The net electric dipole moment of the system is



- (1) $2\sqrt{3} qa\hat{j}$
 (2) $-2\sqrt{3} qa\hat{j}$
 (3) $2\sqrt{3} qa\hat{i} + 2\sqrt{3} qa\hat{j}$
 (4) $-2\sqrt{3} qa\hat{i} - 2\sqrt{3} qa\hat{j}$

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35. Eight identical drops of radii ' r '; each having charge ' q ' merge to form a single drop. Potential of new drop is

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

(2) $\frac{q}{\pi\epsilon_0 r}$

(3) $\frac{8q}{4\pi\epsilon_0 r}$

(4) $\frac{q}{4\pi\epsilon_0 (2r)}$

SECTION B

36. The space between the plates of a parallel plate capacitor is filled with the help of three slabs of same thickness and having dielectric constant k_1 , k_2 and k_3 in series. The equivalent dielectric constant of slabs is

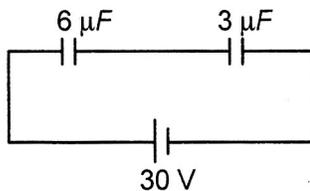
(1) $k_{eq} = k_1 + k_2 + k_3$

(2) $\frac{1}{k_{eq}} = \frac{1}{k_1} + \frac{1}{k_2} + \frac{1}{k_3}$

(3) $k_{eq} = \frac{3k_1 k_2 k_3}{k_1 k_2 + k_2 k_3 + k_1 k_3}$

(4) $k_{eq} = \frac{k_1 + k_2 + k_3}{3}$

37. Two capacitor of capacitance $6 \mu\text{F}$ and $3 \mu\text{F}$ are connected in series with battery of 30 V . Charge on $3 \mu\text{F}$ capacitor at steady state is



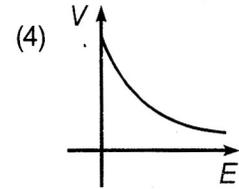
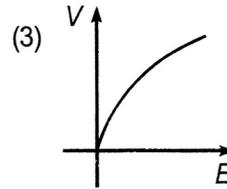
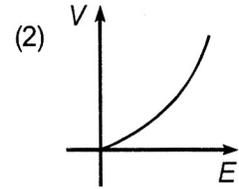
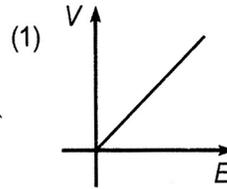
(1) $3 \mu\text{C}$

(2) $1.5 \mu\text{C}$

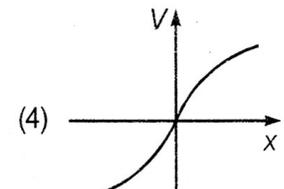
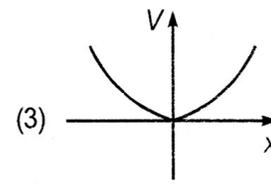
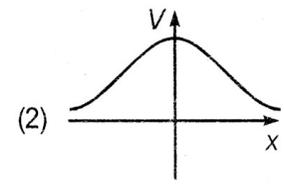
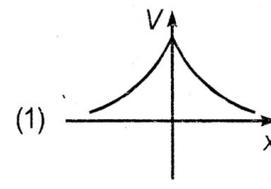
(3) $60 \mu\text{C}$

(4) $900 \mu\text{C}$

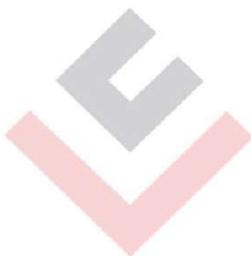
38. If E and V are electric field and electric potential respectively due to a point charge, then which of the following graph best represent their variation?



39. The circular ring carries a uniformly distributed positive charge lies in y - z plane with centre at origin of the coordinate system. If at a point $(x, 0, 0)$ electric potential is V , then which of the following is correct?



(SPACE FOR ROUGH WORK)

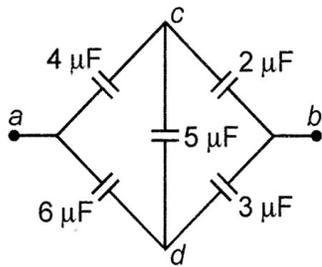


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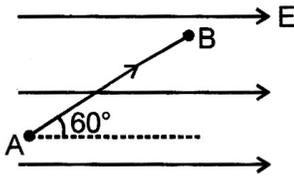
CLASSES

CRAFTING DREAMS INTO REALITY...

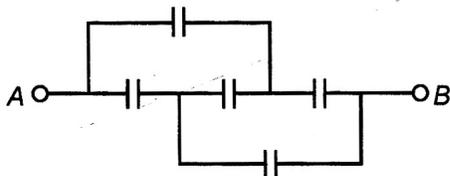
46. The equivalent capacitance between the points 'a' and 'b' in the following network is



- (1) $\frac{10}{3} \mu\text{F}$ (2) $\frac{20}{3} \mu\text{F}$
 (3) $10 \mu\text{F}$ (4) $20 \mu\text{F}$
47. What is the work done by external force to carry a point charge q_0 from point A to B as shown in the diagram? The field intensity is E and distance $AB = d$



- (1) $q_0 Ed$ (2) $-q_0 Ed$
 (3) $-\frac{1}{2}q_0 Ed$ (4) $\frac{1}{2}q_0 Ed$
48. The equivalent capacitance between the points A and B in the following network is (where each capacitor is of capacitance $2 \mu\text{F}$)

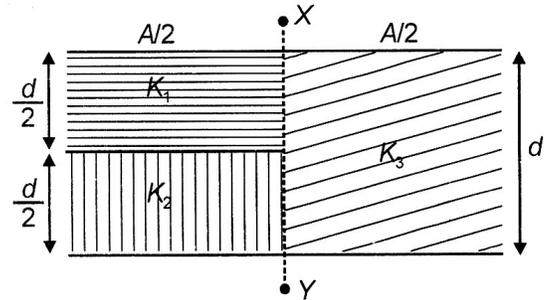


- (1) $2 \mu\text{F}$ (2) $6 \mu\text{F}$
 (3) $12 \mu\text{F}$ (4) $24 \mu\text{F}$

49. The electric potential at a point $P(x,y,z)$ is given by $V = 4x - 3y + 8z$. The electric field at that point is

- (1) $-4\hat{i} + 3\hat{j} - 8\hat{k}$
 (2) $4\hat{i} - 3\hat{j} + 8\hat{k}$
 (3) $-4\hat{i} - 3\hat{j} - 8\hat{k}$
 (4) $4\hat{i} + 3\hat{j} + 8\hat{k}$

50. In the figure, a capacitor is filled with dielectrics. The resultant capacitance between X and Y is (symbols have usual meanings)



- (1) $\frac{2\epsilon_0 A}{d} \left[\frac{1}{K_1} + \frac{1}{K_2} + \frac{1}{K_3} \right]$
 (2) $\frac{\epsilon_0 A}{d} \left[\frac{1}{K_1} + \frac{1}{K_2} + \frac{1}{K_3} \right]$
 (3) $\frac{2\epsilon_0 A}{d} [K_1 + K_2 + K_3]$
 (4) $\frac{\epsilon_0 A}{2d} \left[\frac{2K_1K_2 + K_1K_3 + K_2K_3}{K_1 + K_2} \right]$

(SPACE FOR ROUGH WORK)



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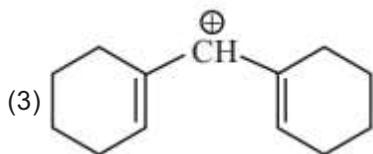
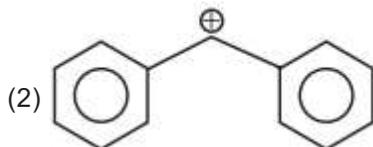
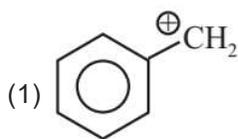
CLASSES

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SECTION A

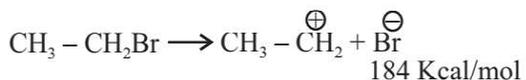
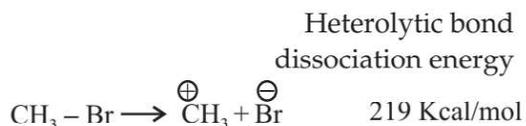
CHEMISTRY

51. Hyperconjugation occurs in



(4) all of these

52. Compound



Notice the heterolytic bond dissociation energy of these compounds. Now, ignoring the contribution of inductive effect, no-bond-resonance energy of ethyl cation can be calculated to be

- (1) 35 Kcal / mol (2) 30 Kcal / mol
(3) 25 Kcal/mol (4) 20 Kcal/mol

53. The sum of coordination number and oxidation number of the metal M in the complex

$[\text{M}(\text{en})_2(\text{C}_2\text{O}_4)]\text{Cl}$ (where en is ethylenediamine) is

- (1) 7 (2) 8
(3) 9 (4) 6

54. Among the following complexes the one which shows zero crystal field stabilization energy (CFSE) is

- (1) $[\text{Mn}(\text{H}_2\text{O})_6]^{3+}$ (2) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$
(3) $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ (4) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$

55. In which of the following coordination entities the magnitude of Δ_o (CFSE in octahedral field) will be maximum (at.no. Co = 27)?

- (1) $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$ (2) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$
(3) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (4) $[\text{Co}(\text{CN})_6]^{3-}$

56. Which of the following does not have a metal carbon bond?

- (1) $\text{Al}(\text{OC}_2\text{H}_5)_3$ (2) $\text{C}_2\text{H}_5\text{MgBr}$
(3) $\text{K}[\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3]$ (4) $\text{Ni}(\text{CO})_4$

57. $-\text{NO}_2$ $\overset{\oplus}{\text{N}}\text{H}_3$ $-\text{F}$
I II III

Among these groups, which of the following orders is correct for the magnitude of their $-\text{I}$ effect?

- (1) I > II > III (2) III > II > I
(3) II > I > III (4) II > III > I

(SPACE FOR ROUGH WORK)

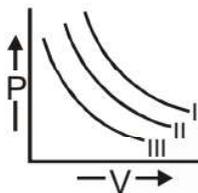


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CLASSES

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64. I, II, III are three isotherms respectively at T_1 , T_2 , T_3 . Temperature will be in order

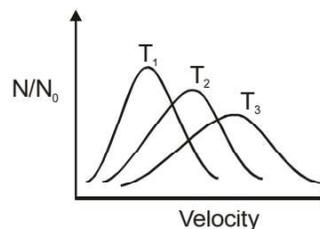


- (1) $T_1 = T_2 = T_3$ (2) $T_1 < T_2 < T_3$
 (3) $T_1 > T_2 > T_3$ (4) $T_1 > T_2 = T_3$
65. To what temperature must a neon gas sample be heated to double its pressure if the initial volume of gas at 75°C is decreased by 15.0%?
- (1) 592 K (2) 492 K
 (3) 542 K (4) 642 K
66. "One gram molecules of a gas at N.T.P. occupies 22.4 litres". This fact was derived from
- (1) Dalton's theory
 (2) Avogadro's hypothesis
 (3) Berzelius hypothesis
 (4) Law of gaseous volume
67. Which mixture of gases at room temperature does not obey Dalton's law of partial pressure?
- (1) NO_2 and O_2 (2) NH_3 and HCl
 (3) CO and CO_2 (4) SO_2 and SO_3
68. 100 mL of O_2 gas diffuses in 10 s. 100 mL of gas 'X' diffuses in 't' sec. Gas 'X' and time 't' can be
- (1) H_2 , 2.5 s (2) SO_2 , 16 s
 (3) CO , 10 s (4) He , 4 s

69. van der Waal's constant 'a' has the dimensions of
- (1) mol L^{-1} (2) $\text{atm L}^2 \text{mol}^{-2}$
 (3) litre mol^{-1} (4) atm L mol^{-2}
70. For a real gas, Z shows
- (1) $Z < 1$, gas is less compressible
 (2) $Z > 1$, gas is more compressible
 (3) $Z = \infty$, for an ideal gas
 (4) $PV \neq nRT$, for real gas
71. At what temperature the RMS velocity of oxygen will be same as that of methane at 27°C ?
- (1) 54°C (2) 327 K
 (3) 600 K (4) 573 K
72. The time taken for a certain volume of gas to diffuse through a small hole was 2 min. Under similar conditions an equal volume of oxygen took 5.65 minute to pass. The molecular mass of the gas is
- (1) 32.0 (2) 11.33
 (3) 4.0 (4) 8.0
73. T_c and P_c of a gas are 400 K and 41 atm. respectively. The V_c is

- (1) $\frac{400R}{41}$ (2) $\frac{150R}{41}$
 (3) $\frac{41R}{400}$ (4) $\frac{300R}{41}$

74. A graph of Maxwell distribution of molecular velocities is plotted below.



Correct order of temperature

- (1) $T_1 > T_2 > T_3$ (2) $T_1 < T_2 < T_3$
 (3) $T_1 = T_2 > T_3$ (4) $T_1 = T_2 = T_3$

(SPACE FOR ROUGH WORK)

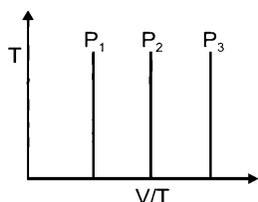


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75. What is the correct increasing order of liquefiability of the gas?
 (1) $H_2 < N_2 < CH_4 < CO_2$
 (2) $H_2 < CO_2 < CH_4 < N_2$
 (3) $CO_2 < CH_4 < N_2 < H_2$
 (4) $CO_2 < CH_4 < H_2 < N_2$
76. Three lines at three different values of constant pressure are given, which of the following relation is correct?



- (1) $P_1 = P_2 = P_3$ (2) $P_1 > P_2 > P_3$
 (3) $P_3 > P_2 > P_1$ (4) Can't predicted
77. A bubble of air is underwater at temperature $15^\circ C$ and the pressure 1.5 bar. If the bubble rises to the surface where the temperature is $25^\circ C$ and the pressure is 1.0 bar what will happen to the volume of the bubble ?
 (1) Volume will become smaller by a factor of 0.70
 (2) Volume will become greater by a factor of 2.5
 (3) Volume will become greater by a factor of 1.6
 (4) Volume will become greater by a factor of 1.1
78. 50 ml of hydrogen diffuses out through a small hole of a vessel, in 20 minutes. The time taken by 40 ml of oxygen to diffuse out is
 (1) 32 minutes (2) 64 minutes
 (3) 8 minutes (4) 12 minutes
79. The average kinetic energy of an ideal gas, per molecule in S.I. units, at $25^\circ C$ will be
 (1) $6.17 \times 10^{-20} J$

- (2) $7.16 \times 10^{-20} J$
 (3) $61.7 \times 10^{-21} J$
 (4) $6.17 \times 10^{-21} J$
80. van der Waal's real gas acts as an ideal gas, at which conditions?
 (1) High temperature, low pressure
 (2) Low temperature, high pressure
 (3) High temperature, high pressure
 (4) Low temperature, low pressure
81. Primary and secondary valencies of Cu in $[Cu(NH_3)_4]SO_4$ is
 (1) 4, 4 (2) 2, 4
 (3) 4, 1 (4) 4, 2
82. Aq. solution of $KCl \cdot MgCl_2 \cdot 6H_2O$ will give test of
 (1) K^+ and Mg^{2+} only (2) K^+ and Cl^- only
 (3) K^+ , Mg^{2+} and Cl^- (4) Mg^{2+} and H_2O only
83. Aqueous solution of $CoCl_3 \cdot 6NH_3$ upon addition with $AgNO_3$ produces 3 moles white precipitate. Primary and secondary valency of metal in this complex is
 (1) 3, 6 (2) 2, 6
 (3) 3, 3 (4) 6, 4
84. Structural formula of tetraaquadichloridochromium(III) chloride
 (1) $[(H_2O)_4Cl_2Cr]Cl_2$ (2) $[Cl_2(H_2O)_4Cr]Cl_3$
 (3) $[Cr(H_2O)_4Cl_2]Cl$ (4) $[Cr(H_2O)_4Cl_3]$
85. The complex $[Cr(H_2O)_5Cl]Br$ and $[Cr(H_2O)_5Br]Cl$ shows
 (1) Linkage isomerism
 (2) Ionisation isomerism
 (3) Hydrate isomerism
 (4) Co-ordination isomerism

(SPACE FOR ROUGH WORK)



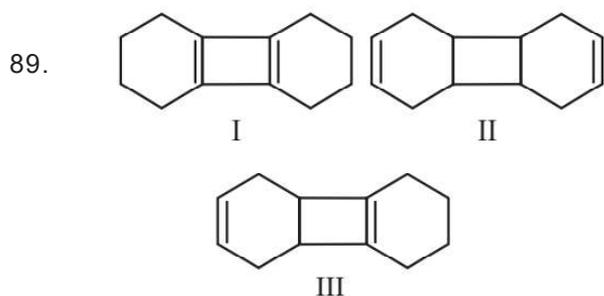
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SECTION B

86. Which of the following is/are inner orbital complex?
 (1) $[\text{Fe}(\text{CN})_6]^{4-}$ (2) $[\text{Cr}(\text{NH}_3)_6]^{3+}$
 (3) $[\text{Mn}(\text{CN})_6]^{3-}$ (4) All of these
87. Which one of the following is paramagnetic in nature?
 (1) $\text{Ni}(\text{CO})_4$ (2) $[\text{Ni}(\text{CN})_4]^{2-}$
 (3) $\text{K}_4[\text{Fe}(\text{CN})_6]$ (4) $[\text{FeF}_6]^{4-}$
88. The spin magnetic moment of iron in $\text{K}_3[\text{Fe}(\text{CN})_6]$
 (1) $\sqrt{3}\text{BM}$ (2) $\sqrt{5}\text{BM}$
 (3) $\sqrt{15}\text{BM}$ (4) $\sqrt{24}\text{BM}$



Among these dienes, which of the following orders of stability is correct?

- (1) $\text{I} > \text{II} > \text{III}$ (2) $\text{III} > \text{II} > \text{I}$
 (3) $\text{II} > \text{III} > \text{I}$ (4) $\text{II} > \text{I} > \text{III}$
90. $\text{HC} \equiv \text{CH}$ (I) $\text{CH}_3 - \text{C} \equiv \text{CH}$ (II)
 $\text{CH}_3 - \text{C} \equiv \text{C} - \text{CH}_3$ (III)

Which of the following orders is correct for heat of combustion of these alkynes?

- (1) $\text{I} > \text{II} > \text{III}$
 (2) $\text{III} > \text{II} > \text{I}$
 (3) $\text{II} > \text{I} > \text{III}$
 (4) $\text{III} > \text{I} > \text{II}$
91. Correct order of power ligands in spectrochemical series
 (1) $\text{I}^- < \text{Br}^- < \text{Cl}^-$ (2) $\text{C}_2\text{O}_4^{2-} < \text{H}_2\text{O} < \text{NCS}^-$
 (3) $\text{NH}_3 < \text{CN}^- < \text{CO}$ (4) All of these
92. Which of the following complex is most stable?
 (1) $[\text{M}(\text{NH}_3)_6]^{2+}$ (2) $[\text{M}(\text{NH}_3)_6]^{3+}$
 (3) $[\text{M}(\text{en})_2(\text{NH}_3)_2]^{3+}$ (4) $[\text{M}(\text{en})_3]^{3+}$
93. The geometry of $[\text{Ni}(\text{CO})_4]$ and $[\text{PdCl}_4]^{2-}$ respectively are
 (1) Both are tetrahedral
 (2) Both are square planar
 (3) Square planar and tetrahedral
 (4) Tetrahedral and square planar
94. Write the increasing order of the value is CFSES (Δ_0) for the following species
 I. $[\text{Co}(\text{NH}_3)_6]^{3+}$
 II. $[\text{Rh}(\text{NH}_3)_6]^{3+}$
 III. $[\text{Ir}(\text{NH}_3)_6]^{3+}$
 (1) $\text{III} < \text{II} < \text{I}$ (2) $\text{I} < \text{II} < \text{III}$
 (3) $\text{II} < \text{I} < \text{III}$ (4) $\text{I} < \text{III} < \text{II}$

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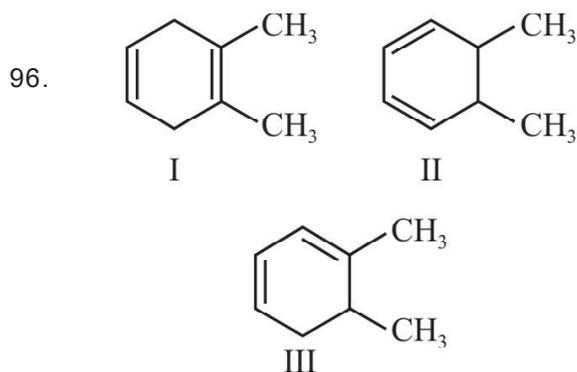


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CLASSES

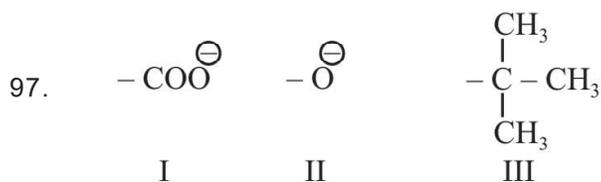
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95. Which of the following is correct statement?
 (1) $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ is coloured complex
 (2) $[\text{Si}(\text{H}_2\text{O})_6]^{4+}$ is colourless complex
 (3) d - d transition is not possible in $[\text{Si}(\text{H}_2\text{O})_6]^{4+}$ complex
 (4) All of these



In which of these compounds, both C = C bonds are not of same length?

- (1) I (2) II
 (3) III (4) I and III



Among these groups, which of the following orders is correct for the magnitude of their +I effect?

- (1) I > II > III (2) III > II > I
 (3) I > III > II (4) II > I > III

98. Which of the following will have greatest molar conductance at infinite dilution?

- (1) $[\text{Pt}(\text{NH}_3)_5\text{Cl}]\text{Cl}_3$ (2) $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}_2$
 (3) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_4]$ (4) $[\text{Pt}(\text{NH}_3)_6]\text{Cl}_4$

99. The coordination number and magnetic moment of the complex $[\text{Cr}(\text{C}_2\text{O}_4)_2(\text{NH}_3)_2]^-$ respectively is

- (1) 6, 3.87 BM (2) 4, 3.87 BM
 (3) 6, 3.46 BM (4) 4, 1.73 BM

100. The value of 'spin only' magnetic moment, follows the correct order?

- (1) $[\text{Fe}(\text{CN})_6]^{4-} > [\text{CoCl}_4]^{2-} > [\text{MnCl}_4]^{2-}$
 (2) $[\text{MnCl}_4]^{2-} > [\text{Fe}(\text{CN})_6]^{4-} > [\text{CoCl}_4]^{2-}$
 (3) $[\text{Fe}(\text{CN})_6]^{4-} > [\text{MnCl}_4]^{2-} > [\text{CoCl}_4]^{2-}$
 (4) $[\text{MnCl}_4]^{2-} > [\text{CoCl}_4]^{2-} > [\text{Fe}(\text{CN})_6]^{4-}$

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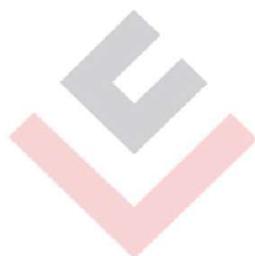
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BOTANY

SECTION A

101. Multiple root cap is found in
 (1) *Ficus* (2) Screwpine
 (3) *Eicchornia* (4) Sugarcane
102. In *Nepenthes*, the pitcher is a modified
 (1) Whole leaf (2) Leaf apex
 (3) Lamina (4) Petiole
103. In *Opuntia* the spines are modification of
 (1) Leaf (2) Branch
 (3) Epidermis (4) Flower
104. Identify in order, the plants showing alternate, opposite and whorled phyllotaxy
 (1) China rose, *Calotropis*, *Nerium*
 (2) China rose, *Nerium*, *Calotropis*
 (3) *Nerium*, China rose, *Calotropis*
 (4) *Nerium*, *Calotropis*, China rose
105. Pneumatophores are characteristics of family
 (1) Loranthaceae (2) Hydrocharitaceae
 (3) Rhizophoraceae (4) Orchidaceae
106. Stilt roots which grow obliquely from basal nodes of culm stem and acting as brace are found in
 (1) Sorghum (2) Maize
 (3) Sugarcane (4) All of these
107. Eye of potato is
 (1) Apical bud
 (2) Condensed axillary bud
 (3) Accessory bud (4) Adventitious bud
108. Homologous organs are
 (1) Phyllode and phylloclade
 (2) Rhizome and Thorn
 (3) Sucker and pitcher
 (4) Corm and haustoria
109. Analogous organs are
 (1) Cucurbita tendril and sweet pea tendril
 (2) Phylloclade and cladode
 (3) Pitcher and bladder
 (4) Corm and rhizome
110. Stem modified into flattened leaf like structure to perform photosynthesis
 (1) phyllode (2) phylloclade
 (3) cladode (4) pitcher
111. Find the incorrect pair
 (1) Compound corymb – Cauliflower
 (2) Raceme – Mustard
 (3) Compound umbel – Mulberry
 (4) Drupe – Coconut
112. The arrangement of the ovules on the placentae developed from the central axis of the ovary is called _____ and found in _____
 (1) Parietal placentation and Citrus
 (2) Axile placentation and Citrus
 (3) Basal placentation and sunflower
 (4) Marginal placentation and Pea
113. Vexillary aestivation is found in
 (1) Pea (2) Sunflower
 (3) china rose (4) none of these
114. Homologous chromosomes separate, while sister chromatids remain associated at their centromeres during
 (1) Anaphase-I
 (2) Anaphase-II
 (3) Anaphase of mitosis
 (4) Telophase-I

(SPACE FOR ROUGH WORK)



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115. If the female gamete of a plant species has four chromosomes, then its parental cell will have
- (1) 16 chromosomes during anaphase-I
 - (2) 4 bivalents aligned on the equatorial plate during metaphase-I
 - (3) 16 tetrads during pachytene
 - (4) 16 chromosomes during G_2 stage
116. A plant species has 10 pg DNA and 8 chromosomes in its pollen grain, then what was the amount of DNA and number of chromosomes in its microspore mother cell at G_1 phase
- (1) 40 pg; 16 chromosomes
 - (2) 20 pg; 16 chromosomes
 - (3) 10 pg; 8 chromosomes
 - (4) 20 pg; 32 chromosomes
117. Select the events which occur twice during meiosis.
- a. Nuclear division
 - b. Division of cytoplasm
 - c. DNA replication
 - d. Bivalent formation
 - e. Equational division
- (1) a and b (2) a, b and e
(3) a, b and d (4) c, d and e
118. Which of the following chemicals act as mitogens?
- (1) Ribonuclease
 - (2) Insulin and gibberellin
 - (3) Azide and cyanide
 - (4) Chalones
119. Select the correct sequence of events which takes place during meiosis II
- a. Condensation of chromatin
 - b. Splitting of centromere
 - c. Chromosome align at the equator
- (1) a → b → c
(2) b → c → a
(3) a → c → b
(4) b → a → c
120. The shorter and longer arms of chromosomes are referred to as
- (1) p and s respectively
 - (2) q and p respectively
 - (3) p and q respectively
 - (4) p and r respectively
121. Splitting of centromere is associated with
- (1) Anaphase I
 - (2) Anaphase
 - (3) Anaphase II
 - (4) Both 2 and 3
122. Pneumatophores and velamen tissue are characteristics of
- (1) Orchids and Rhizophora respectively
 - (2) Rhizophora and Orchids respectively
 - (3) Cuscuta and Orchids respectively
 - (4) Cuscuta and Avicennia respectively
123. Which phase of meiosis is prolonged in oocytes of certain vertebrates
- (1) Diplotene
 - (2) Pachytene
 - (3) Zygotene
 - (4) Diakinesis

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124. Crossing over is observed in
- (1) Leptotene
 - (2) Zygotene
 - (3) Pachytene
 - (4) Diplotene
125. Find the incorrect match
- (1) Dahlia- Fasciculated root
 - (2) Cladode- Ruscus
 - (3) Stem tendril - Pisum satium
 - (4) Mirabilis jalapa- tuberous tap root
126. Find the correct statements
- A. For the purpose of cell division, cyclin and cdc kinase is required
- B. Analogous organs have similar origin.
- C. Metacentric chromosomes appear L shaped during Anaphase.
- D. Anaphase is the shortest phase of karyokinesis
- E. Phyllode is a flattened modified petiole for the purpose of photosynthesis
- F. Cucurbita tendril and Gloriosa tendril are a modification of stem
- (1) A, B, D E
 - (2) A, D, E
 - (3) B, C, E, F
 - (4) A, C, F
127. Which of the following is a modified adventitious root
- (1) Conical root of Carrot
 - (2) Napiform root of Turnip
 - (3) Tuberous root of Sweet potato
 - (4) Tuberous root of 4 'o' clock plant
128. Which is the major check point in Cell division
- (1) G_1 to S transition
 - (2) S to G_2 transition
 - (3) G_2 to M transition
 - (4) M to G_1 transition
129. Ovary is one-chambered but it becomes two chambered due to the formation of a false septum in:
- (1) Dianthus and Primrose
 - (2) Mustard and Argemone
 - (3) Sunflower and Marigold
 - (4) Pea and Lemon
130. Meiosis has evolutionary significance because it results in
- (1) genetically similar daughters
 - (2) four daughter cells
 - (3) eggs and sperms
 - (4) recombinations
131. Which of the following is not a correct floral character of the members of family Solanaceae?
- (1) Flower : Zygomorphic
 - (2) Calyx : Valvate aestivation
 - (3) Stamens : Epipetalous
 - (4) Fruit : Berry or capsule
132. In vexillary aestivation:
- (1) The standard overlaps the wings
 - (2) The standard overlaps the keel
 - (3) The standard is overlapped by keel
 - (4) The keel overlap the wings
133. Which of the following is a false fruit?
- (1) Apple
 - (2) Coconut
 - (3) Mango
 - (4) All of these

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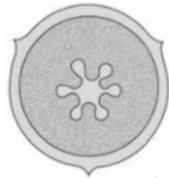


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134. The type of placentation show in the given figure is seen in:



- (1) Dianthus (2) Argemone
(3) China rose (4) Marigold

135. The following diagram can represent the position of the ovary in:



- (1) Brinjal (2) Sunflower
(3) Rose (4) Mustard

SECTION B

136. In monocotyledonous seeds the outer covering of endosperm separates the embryo by a proteinous layer called as:

- (1) Aleurone (2) Scutellum
(3) Testa (4) Tegmen

137. Match each item in Column I with one item in Column II and chose your answer from the codes given below.

Column I	Column II
(Flower)	(Position of ovary)
I. Sunflower	1. Epigynous
II. Mustard	2. Hypogynous
III Plum	3. Perigynous

Codes:

I	II	III
(1) 1	2	3
(2) 2	3	1
(3) 2	1	3
(4) 3	2	1

138. Match the columns A and B.

A	B
a. Marginal placentation	(i) Marigold
b. Axile placentation	(ii) Dianthus
c. Parietal placentation	(iii) Argemone
d. Free central placentation	(iv) China rose
e. Basal placentation	(v) Pea
(1) a-v, b-iv, c-iii, d-ii, e-i	(2) a-v, b-iii, c-iv, d-i, e-ii
(3) d-iv, b-iii, c-v, d-ii, e-i	(4) a-i, b-v, c-iv, d-iii, e-ii

139. The wheat grain has an embryo with one large, shield-shaped cotyledon known as

- (1) epiblast (2) coleorrhiza
(3) scutellum (4) (4) coleoptile

140. The floral diagram shown in the given diagram can be of:



- (1) A plant that produces a chemical that can disrupt mitotic spindle
(2) Deadly night shade
(3) Indigofera plant, a source of dye
(4) A pulse plant

141. What would be the number of chromosomes of the aleurone cells of a plant with 42 chromosomes in its roots tip cells?

- (1) 21 (2) 42
(3) 63 (4) 84

142. Best stage to observe shape, size and number of chromosomes is

- (1) interphase (2) metaphase
(3) prophase (4) telophase

143. A bivalent consists of

- (1) two chromatids and one centromere
(2) two chromatids and two centromeres
(3) four chromatids and two centromeres
(4) four chromatids and four centromeres

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144. Synapsis occurs between
 (1) a male and a female gamete
 (2) mRNA and ribosomes
 (3) spindle fibres and centromere
 (4) two homologous chromosomes
145. During cell division, the spindle fibres attach to the chromosomes at a region called
 (1) chromocentre (2) kinetochore
 (3) centriole (4) chromomere
146. $\oplus \text{K}_{(5)} \overset{\curvearrowright}{\text{C}_{(5)}} \text{A}_5 \text{G}_{(2)}$ is the floral of
 (1) Allium (2) Sesbania
 (3) Petunia (4) Brassica
149. Assertion: In animal cells, the cytokinesis is marked by the appearance of a furrow in plasma membrane.
 Reason: In plant cells, the formation of the new cell wall starts with the formation of simple precursor called phragmoplast which forms the cell plate.
150. Assertion: Every chromosome, during metaphase has two chromatids.
 Reason: Synthesis of DNA takes places in the S-phase of interphase.

In the following questions a statement of assertion (A) is followed by a statement of reason (R).

- (1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark **(1)**.
- (2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark **(2)**.
- (3) If Assertion is true statement but Reason is false, then mark **(3)**.
- (4) If both Assertion and Reason are false statements, then mark **(4)**.
147. Assertion: G_1 phase is the interval between G_2 and initiation of DNA replication.
 Reason: The cell is metabolically inactive during G_1 phase.
148. Assertion: Assimilatory roots can photosynthesize.
 Reason: Assimilatory roots possess chlorophyll.

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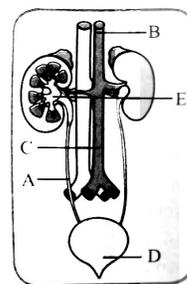
CLASSES

CRAFTING DREAMS INTO REALITY...

ZOOLOGY

SECTION A

151. Which mechanism involves lowering of BP, vasodilation and loss of Na^{++} ?
- (1) Renin-Angiotensin mechanism
 - (2) ANF mechanism
 - (3) ADH release
 - (4) Fall in GFR
152. The kidneys not only remove the waste products from the blood but also play a very important role in maintaining
- (1) Constant composition of the blood irrespective of the nature of the food or fluid intake
 - (2) Blood pressure constant
 - (3) Temperature of the body
 - (4) Equilibrium of the body
153. Ultrafiltration occurs in a glomerulus when
- (1) Hydrostatic exceeds osmotic pressure
 - (2) Osmotic pressure exceeds hydrostatic pressure
 - (3) Capsular hydrostatic pressure exceeds glomerular hydrostatic pressure
 - (4) Colloidal osmotic pressure plus capsular pressure remain less than glomerular hydrostatic pressure
154. Regulation of kidney function of Juxtaglomerular Apparatus (JGA) involves certain steps given below, Arrange them in the correct order
- A. Release of enzyme renin
 - B. Release of aldosterone from adrenal gland
 - C. Reabsorption of Na^+ and water at DCT
 - D. Decrease in blood pressure and blood volume
 - E. Conversion of angiotensinogen to angiotensin
- (1) A, E, B, C, D
 - (2) B, C, A, E, D
 - (3) C, D, A, E, D
 - (4) D, A, E, B, C
155. Which is the best adapted phenomenon for conservation of water?
- (1) Ammonotelism
 - (2) Ureotelism
 - (3) Uricotelism
 - (4) Hydrophobism
156. Vasopressin is mainly responsible for
- (1) Obligatory reabsorption of water through Bowman's capsule
 - (2) Facultative reabsorption of water from DCT
 - (3) Facultative reabsorption of water from Henle's loop
 - (4) Obligatory reabsorption of water from PCT
157. Refer the given figure of human urinary system and select the option that correctly identifies the labeled parts A to E.



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	A	B	C	D	E
(1)	Superior vena cava	Inferior Vena cava	Dorsal aorta	Urethra	Pelvis
(2)	Inferior vena cava	Superior Vena cava	Dorsal aorta	Urinary bladder	Cortex
(3)	Ureter	Inferior vena cava	Dorsal aorta	Urinary Bladder	Pelvis
(4)	Dorsal aorta	Inferior vena cava	Superior vena cava	Urinary bladder	Cortex

158. Match the given columns:

Column-I	Column-II
A. Ammonotelic	1. Aquatic insects
	2. Terrestrial amphibians
	3. Bony fishes
B. Ureotelic	4. Humans
	5. Aquatic amphibians
	6. Reptiles
C. Uricotelic	7. Birds
	8. Cockroach

- | | | |
|-------------|-----------|-----------|
| A. | B. | C. |
| (1) 1, 3, 5 | 2,4 | 6,7,8 |
| (2) 1,2,3 | 3,7,8 | 5,6 |
| (3) 4,6,8 | 1,3,5 | 2,7 |
| (4) 5,7 | 4,6,8 | 1,2,3 |

159. Match the column and find out the correct combination

Column-I	Column-II
A. Urinary bladder	1. Ultrafiltration
B. Malpighian corpuscle	2. Reabsorbs 99% glomerular filtrate
C. Podocytes	3. Store urine
D. Renal tubules	4. Minute spaces for the filtration of blood

- (1) A-1, B-2, C-3, D-4 (2) A-2, B-4, C-1, D-3

- (3) A-4, B-1, C-2, D-3 (4) A-3, B-1, C-4, D-2

160. Which of the following is an incorrect match w.r.t. secretion in human body and excretory wastes it contain?

- (1) Bile-Bilirubin, Biliverdin
 (2) Sweat-NaCl, small amount of urea, lactic acid
 (3) Sebum-Sterols, hydrocarbons and waxes
 (4) Saliva - Lysozyme, ptyalin, thiocyanate

161. Find out the correct statement

- (1) An increase in body fluid volume, stimulate the ADH release
 (2) A fall in glomerular blood flow can activate the JG cells to release renin.
 (3) Angiotensin-II being a powerful vasodilator, Decrease the glomerular blood pressure
 (4) Decrease in the blood flow to the atria of the heart can cause the release of atrial natriuretic factor (ANF)

162. Choose incorrect statement

- (1) Our lungs remove large amounts of CO₂ (180 ml/minute) and also significant quantities of water every day.
 (2) An adult human excretes, on an average, 1 to 1.5 litres of urine per day
 (3) Analysis of urine helps in clinical diagnosis of many metabolic disorders as well as malfunctioning of the kidney
 (4) Urine is slightly acidic (pH 6) has a characteristic odour

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CRAFTING DREAMS INTO REALITY...

163. The increase in osmolarity from outer to inner medullary interstitium is maintained due to:
- Close proximity between Henle's loop and vasa recta
 - Counter current mechanism
 - Selective secretion of HCO_3^- and hydrogen ions in PCT
 - Higher blood pressure in glomerular capillaries
- (1) (iii) and (iv) (2) (i), (ii) and (iii)
 (3) (i) and (ii) (4) Only (ii)
164. Select the correct statement:
- Angiotensin II is a powerful vasodilator.
 - Counter current pattern of blood flow is not observed in vasa recta.
 - Reduction in Glomerular Filtration Rate activates JG cells to release renin.
 - Atrial Natriuretic Factor increases the blood pressure.
165. Match the items given in Column I with those in Column II and select the correct option given below

	Column-I	Column -II
A.	Glycosuria	1. Accumulation of uric acid in joints
B.	Gout	2. Mass of crystallized salts within the kidney
C.	Renal calculi	3. Inflammation in glomeruli
D.	Glomerular	4. Presence of glucose in nephritis urine

- (1) A-3 B-2 C-4 D-1

- (2) A-1 B-2 C-3 D-4
 (3) A-2 B-3 C-1 D-4
 (4) A-4 B-1 C-2 D-3

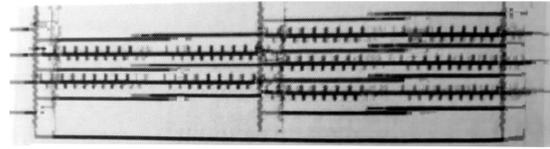
166. Passage of ova through the female reproductive tract is facilitated by the
- Ciliary movement
 - Amoeboid movement
 - Muscular movement
 - All of the above
167. A person is suffering from an age related disorder "X". X is characterised by decreased bone mass and increased chances of fractures. Identify X and its common cause.
- Tetany, increased levels of estrogen
 - Osteoporosis, decreased levels of estrogen
 - Myasthenia gravis, decreased levels of estrogen
 - Muscular dystrophy, increased levels of estrogen
168. All of the following changes occur during contraction of a muscle fibre except one
- Length of actin and myosin filaments remain same
 - Width of H-zone decreases
 - Width of A-band and I-band remain same
 - Actin filament slides over the myosin filaments
169. "X" is a large triangular flat bone situated in the dorsal part of the thorax between the "Y" and the seventh ribs. Identify "X" and "Y"
- X-Patella, Y- Third (2) X-Clavicle; Y - Eight
 - X-Scapula; Y- Sixth (4) X-Scapula; Y- Second

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 CRAFTING DREAMS INTO REALITY...

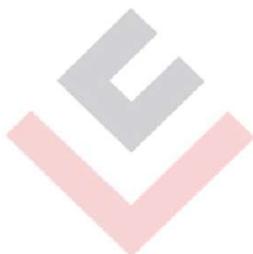
170. In children, the bones are more flexible and brittle because their bones have
- (1) Large quantity of salts and little organic substances
 - (2) Large quantity of organic substances and little salts
 - (3) Well developed haversian system
 - (4) Large number of osteoblasts
171. Which of the following is not the feature of red muscle fibres ?
- (1) They have plenty of mitochondria
 - (2) They have high content of myoglobin
 - (3) They have high amount of sarcoplasmic reticulum
 - (4) They are called aerobic muscles
172. Scapula is a large flat bone of the pectoral girdle situated in the dorsal part of thorax between the
- (1) Last thoracic and third lumbar vertebra
 - (2) Fifth thoracic and seventh lumbar vertebra
 - (3) Second to seventh ribs
 - (4) Second to seventh vertebrae
173. A soccer player suffers a knee injury that damages the tissue holding his upper and lower leg bones together. The damaged tissue is probably a kind of
- (1) Muscle
 - (2) Tendon
 - (3) Ligament
 - (4) Cartilage
174. Which of the following is correct regarding changes in muscle fiber from relaxed to maximum contract state in the given figure?



- (1) The length of the thick and thin myofilaments has changed.
 - (2) Length of both anisotropic and isotropic band has changed.
 - (3) The myosin cross-bridges move on the surface of actin and the thin and thick myofilaments slide past each other.
 - (4) Length of the sarcomere remains same.
175. Select the correct statement regarding the specific disorder of muscular or skeletal system.
- (1) Muscular dystrophy Age related shortening of muscles.
 - (2) Osteoporosis Decrease in bone mass and higher chances of fractures with advancing age.
 - (3) Myasthenia gravis - Autoimmune disorder which inhibits sliding of myosin filaments.
 - (4) Gout Inflammation of joints due to extra^{''}deposition of calcium.
176. Match the column and find out the correct combination

A. Carpals	1. Ankle bones of hind limb
B. Tarsals	2. Ear ossicle
C. Glenoid cavity	3. Wrist bones of forelimb
D. Incus	4. Pectoral girdle

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- (1) A-3 B-1 C-2 D-4
 (2) A-3 B-1 C-4 D-2
 (3) A-2 B-3 C-1 D-4
 (4) A-4 B-3 C-2 D-1

177. Match the columns:

Column A	Column B
A. Ball & Socket joint	1. Between humerus and pectoral girdle
B. Hinge joint	2. Between carpals and metatarsals
C. Gliding joint	3. Between the carpals
D. Saddle joint	4. Knee joint

- (1) A-1 B-4 C-3 D-2
 (2) A-1 B-4 C-2 D-3
 (3) A-2 B-3 C-4 D-1
 (4) A-4 B-1 C-1 D-2

178. Upon preventing acetylcholine from diffusing across a neuromuscular junction, which of the following will not result?

- (1) No action potential will be produced in the affected muscle fibres of plasma membrane.
 (2) The endoplasmic reticulum releases calcium ions (Ca^{2+}) into the cytoplasm
 (3) Myosin will not bind to actin in the affected muscle fibre.
 (4) The affected muscle fibre will fail to contract.

179. Which of the following statement is incorrect?

- (1) All movements lead to locomotion

(2) Ciliary movement help in passage of ova through female reproductive tract

(3) Microfilaments are involved in amoeboid movement

(4) In *Paramecium*, the cilia help in movement of food through cytopharynx and in locomotion as well

180. Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation:

(1)	X=12, Y=7	True ribs are attached dorsally to vertebral column and ventrally to the sternum
(2)	X=12, Y=5	True ribs are attached dorsally to vertebral column and sternum on the two ends
(3)	X=24, Y=7	True ribs are dorsally attached to vertebral column but are free on ventral side
(4)	X=24, Y= 12	True ribs are dorsally attached to vertebral column but are free on ventral side

181. Match the following columns and select the correct option:

Column I	Column II
A. Gout	1. Decreased levels of estrogen
B. Osteoporosis	2. Low Ca^{++} ions in the blood
C. Tetany	3. Accumulation of uric acid crystals
D. Muscular dystrophy	4. Auto immune disorder
	5. Genetic disorder

- (1) A-3 B-1 C-2 D-5
 (2) A-4 B-5 C-1 D-2
 (3) A-1 B-2 C-3 D-4
 (4) A-2 B-1 C-3 D-4

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182. Lack of relaxation between successive stimuli in sustained muscle contraction is known as:

- (1) Spasm (2) Fatigue
(3) Tetanus (4) Tonus

True/False type questions

In the given sentences, select correct option for true/false

183. Given Statement.....

(1) Micturition is reflex action but partially controlled voluntary.

(2) Human can release hypertonic or hypotonic urine as per requirement of body.

(3) Skin helps in removal of nitrogenous excretory substances

(4) H_2O , Na^+ and HCO_3^- reabsorbed in DCT.

(1) FIFF (2) FTTT

(3) TTIT (4) FFTF

184. Given Statement

(1) Liquid concentration 400 mosmol^{-1} in descending capillary's outer side.

(2) Ascending capillary's has liquid concentration 600 mosmol^{-1} , present in the middle part of renal medulla.

(3) Filtrate concentration is 1200 mosmol^{-1} in Henle's loop, towards curved region of medulla in uriniferous tubule

(4) Filtration concentration in DC is 300 mosmol^{-1}

(1) FFTT (2) TFFT

(3) TFFT (4) TTTT

185. For human skeletal system select proper option for true/ false sentence.

(1) Human skull is formed of 22 bones.

(2) Human skeletal system is formed of 206 bones.

(3) In adult human vertebral column is formed by 31 vertebrae.

(4) Appendicular skeletal, in human is formed of 120 bones.

(1) TTFF (2) TFTF

(3) FFTT (4) FTFT

SECTION B

186. Select proper option, for the given statement, whether T/F.

(1) All organisms show movement

(2) All movements are locomotion

(3) Cardiac muscle are innervated by nerves of voluntary nervous system

(4) All organisms show locomotion.

(1) TTFF (2) FTFT

(3) FTTF (4) TFTF

187. Choose the correct statement for hemodialysis unit

(1) Blood drained from a convenient artery is pumped into a dialysing unit after adding heparin

(2) The unit contains a coiled cellophane tube surrounded by dialysing fluid with the blood like composition

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- (3) The nitrogenous wastes gets removed by passive as well as active transport
- (4) The unit absorbs and returns the excess ammonium ions to blood

188. The cleared blood (without nitrogenous wastes) after dialysis is pumped back through a _____ after adding _____ to it.

- (1) Vein, anti-heparin (2) Artery, anti-heparin
(3) Vein, heparin (4) Artery, heparin

189. Read the following statements:

- (i) An individual who is fasting for a long time would excrete abnormal quantities of ketone bodies in urine
- (ii) Haemoglobin is normally not excreted in urine
- (iii) Excess of glucose secretion in urine is a condition called glycosuria
- (iv) In diuretic condition, excess volume of urine passes out
- (v) A human can survive even with one normal kidney if one of the kidney is surgically removed

How many of the above statements are correct?

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

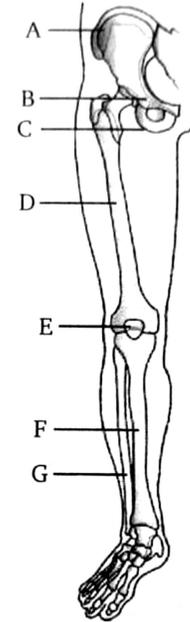
190. GFR in a healthy individual is approximately _____ or _____ per day.

- (1) 125 mL/minute; 18 litres
(2) 125 mL/second; 1800 litres
(3) 1250 mL/minute; 1800 litres
(4) 125 mL/minute; 180 litres

191. The head of humerus articulates with:

- (1) Glenoid cavity (2) Acetabulum
(3) Acromion process (4) Deltoid cavity

192. Identify the parts labelled as A, B, C, D, E, F, G and H for the right pelvic girdle and lower limb bones:



Options	A	B	C	D	E	F	G
(1)	Ilium	Ischium	Pubis	Femur	Patella	Tibia	Fibula
(2)	Pubis	Ilium	Ischium	Femur	Patella	Tibia	Fibula
(3)	Ilium	Pubis	Ischium	Femur	Patella	Fibula	Tibia
(4)	Ilium	Pubis	Ischium	Femur	Patella	Tibia	Fibula

193. The skull region articulates with the superior region of the vertebral column with the help of _____

- (1) 2 pairs (2) 2
(3) 3 (4) 4 pairs

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194. The hyoid bone is present
- (1) At the base of buccal cavity
 - (2) At the base of tongue and above the larynx
 - (3) Both (1) and (2)
 - (4) Above maxilla
195. Intervertebral discs are:
- (1) Cartilaginous
 - (2) Made of muscles only
 - (3) Bony
 - (4) Solely the salts of CaCO_3

ASSERTION & REASON

A - Statement. R - Reason type questions

Select answer of following questions from the options given below

- (1) A and R true, R is explanation of A.
 - (2) A and R true, but R is not explanation of A
 - (3) A is true, R is false
 - (4) A is false, R is true
- 196.. Statement A: NH_2 , Synthesized in the body, is to be removed in same or another form
- Reason R: NH_3 is not soluble in water
197. Statement A : Vasopressin increases permeability of H_2O in DCT.
- Reason R : In absence of Vasopressin there is decrease in reabsorption of H_2O and dilute urine increase

198. Statement A: Mammalian animals living in desert, has concentrated urine.
- Reason R : Length of Henle's loop is very less in these animals.
199. Statement A: Hinge joint is found between first and second vertebrae
- Reason R: Synovial joint is found between vertebrae
200. Statement A: During muscle contraction I band shortens.
- Reason R: During muscle contraction myosin fibre contracts.

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