THE SOUTH POINT

Holidays' Homework, 2023-24

Class: XII- Science

Subject - English (Core)

Section- A (Reading Skills)

(Let's Read, Comprehend and Answer)

Select the Articles/ Write -ups on- "Science", "Cleanliness", "Sports", " Food Habits" " Ill -Effects of Smoking", "Politics" , "Obesity", " Women Empowerment", "Education" each containing 250-300 words from the English newspaper. Cut the Articles and paste them in your notebook. Frame 8 questions on each of them and write their answer also.

Section – B (Creative Writing Skills)

(Let 's Compose)

1.Write any four Notices.

2. Design Invitations formal and informal both.(Any five)

3. Write Articles on:-

1. "Women Empowerment".
2. "Discipline"
3. "Technology- It's Uses and Misuses".
4. "Environment and Sustainability"

Section- C (Literature)

(Let's Check Literary Flavour)

Flamingo- Learn and write the textual exercises of:

Ch 1- "The Last Lesson"

Ch 2 – "Lost Spring"

Poem-1 "My Mother at Sixty Six" Poem-2 "Keeping Quiet"

Vistas- Ch-1 'The Third Level' , Ch-2 "The Tiger King"

Creativity- At a Glance

(Let's Exhibit Creativity)

1. Make a portfolio. It should be attractive.

2. Design an Invitation Card for the "Annual Day Celebrations" and "Teacher's Day Celebrations."

4. Make a Project on" Global Warming".

(Art- Integrated Activity)

Select any two English Poets of Manipur and Haryana each and paste their photographs on A4 size coloured sheet .Write about their birth ,life, education, works, awards & honours and special achievements. It should be catchy.

Multiple Choice Questions 18

CLASS BASED QUESTIONS

1. Charge and Coulomb's Law

1. A solid spherical conductor of radius R has a spherical cavity of radius $a(a<R)$ at its centre. A charge $+Q$ is kept at the center. The charge at the inner surface, outer and at a position $r(a<r<R)$ are respectively

(a) $+Q,-Q,0$ (b) $-Q,+Q,0$

(c) $0,-Q,0$ (d) $+Q,0,0$

2. There are two metallic spheres of same radii, but one is solid and the other is hollow, then

(a) Solid sphere can be given more charge

(b) Hollow sphere can be given more charge

(c) They can be charged equally (maximum)

(d) None of the above

3. When 10^{19} electrons are removed from a neutral metal plate, the electric charge on it is

(a) -1.6 C (b) $+1.6$ C

(c) 10^{+19} C (d) 10^{-19} C

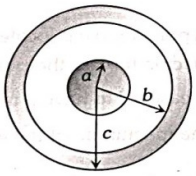
4. A solid conducting sphere of radius a has a net positive charge $2Q$. A conducting spherical shell of inner radius b and outer radius c is concentric with the solid sphere and has a net charge $-Q$. The surface charge density on the inner and outer surfaces of the spherical shell will be

(a) $-\frac{2Q}{4\pi b^2}, \frac{Q}{4\pi b^2}$

(b) $-\frac{Q}{4\pi b^2}, \frac{Q}{4\pi b^2}$

(c) $0, \frac{Q}{4\pi b^2}$

(d) None of the above



5. Identify the wrong statement in the following. Coulomb's law correctly describes the electric force that

(a) Binds the electrons of an atom to its nucleus

(b) Binds the protons and neutrons in the nucleus of an atom

(c) Binds atoms together to form molecules

(d) Binds atoms and molecules together to form solids

6. A conductor has been given a charge -3×10^{-7} C by transferring electron. Mass increase (in kg) of the conductor and the number of electrons added to the conductor are respectively

(a) 2×10^{-16} and 2×10^{31} (b) 5×10^{-31} and 5×10^{19}

(c) 3×10^{-19} and 9×10^{16} (d) 2×10^{-18} and 2×10^{12}

7. Five balls numbered 1 to 5 are suspended using separate threads. Pairs (1, 2), (2, 4) and (4, 1) show electrostatic attraction, while pair (2, 3) and (4, 5) show repulsion. Therefore ball 1 must be

(a) Positively charged

(b) Negatively charged

(c) Neutral

(d) Made of metal

8. A conducting sphere of radius R and carrying a charge q is joined to a conducting sphere of radius $2R$ and carrying a charge $-2q$. The charge flowing between them will be

(a) $\frac{q}{3}$ (b) $\frac{2q}{3}$

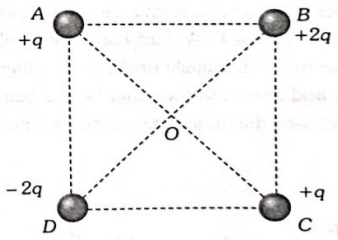
(c) q (d) $\frac{4q}{3}$

9. Two equal point charges each of $3\mu C$ are separated by a certain distance in metres. If they are located at $(\hat{i}+\hat{j}+\hat{k})$ and $(2\hat{i}+3\hat{j}+3\hat{k})$, then the electrostatic force between them is

(a) $9\times10^{3}N$ (b) $9\times10^{-3}N$

(c) $10^{-3}N$ (d) $9\times10^{-2}N$

10. Four charges are arranged at the corners of a square $ABCD$, as shown in the adjoining figure. The force on the charge kept at the centre O is



(a) Zero (b) Along the diagonal AC

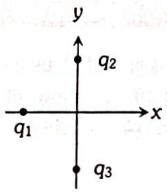
(c) Along the diagonal BD (d) Perpendicular to side AB

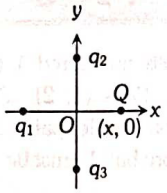
11. Two-point charges $+3\mu C$ and $+8\mu C$ repel each other with a force of 40 N. If a charge of $-5\mu C$ is added to each of them, then the force between them will become

(a) -10 N (b) $+10$ N

(c) $+20$ N (d) -20 N

12. In figure two positive charges q_2 and q_3 fixed along the y-axis, exert a net electric force in the + x-direction on a charge q_1 fixed along the x-axis. If a positive charge Q is added at $(x,0)$, the force on q_1

(i) 

(ii) 

(a) Shall increase along the positive x-axis

(b) Shall decrease along the positive x-axis

(c) Shall point along the negative x-axis

(d) Shall increase but the direction changes because of the intersection of Q with q_2 and q_1

13. Electric charges of $1\mu C, -1\mu C$ and $2\mu C$ are placed in air at the corners A, B and C respectively of an equilateral triangle ABC having length of each side 10 cm. The resultant force on the charge at C is

(a) 0.9 N (b) 1.8 N

(c) 2.7 N (d) 3.6 N

14. Three charges each of magnitude q are placed at the corners of an equilateral triangle, the electrostatic force on the charge placed at the center is (each side of triangle is L)

(a) Zero (b) $\frac{1}{4\pi\varepsilon_0}\frac{q^2}{L^2}$

(c) $\frac{1}{4\pi\varepsilon_0}\frac{3q^2}{L^2}$ (d) $\frac{1}{12\pi\varepsilon_0}\frac{q^2}{L^2}$

15. Two identical conducting spheres carry identical charges. If the spheres are set at a certain distance apart, they repel each other with a force F. A third conducting sphere, identical to the other two, but initially uncharged, is then touched to one sphere, and then into the other before being removed. The force between the original two spheres is now

(a) $\frac{F}{2}$ (b) $\frac{F}{4}$

(c) $\frac{3F}{4}$ (d) $\frac{3F}{8}$

2. Electric Field and Potential

1. The electric field inside a spherical shell of uniform surface charge density is

(a) Zero

(b) Constant, less than zero

(c) Directly proportional to the distance from the centre

(d) None of the above

2. An electron and a proton are in a uniform electric field, the ratio of their accelerations will be

(a) Zero

(b) Unity

(c) The ratio of the masses of proton and electron

(d) The ratio of the masses of electron and proton

3. A proton and an electron are placed in a uniform electric field

(a) The electric forces acting on them will be equal

(b) The magnitude of the forces will be equal

(c) Their accelerations will be equal

(d) The magnitude of their accelerations will be equal

4. The number of electrons to be put on a spherical conductor of radius $0.1m$ to produce an electric field of 0.036N/C just above its surface is

(a) 2.7×10^5 (b) 2.6×10^5

(c) 2.5×10^5 (d) 2.4×10^5

5. The electric field near a conducting surface having a uniform surface charge density σ is given by

(a) $\frac{\sigma}{\varepsilon_0}$ and is parallel to the surface

(b) $\frac{2\sigma}{\varepsilon_0}$ and is parallel to the surface

(c) $\frac{\sigma}{\varepsilon_0}$ and is normal to the surface

(d) $\frac{2\sigma}{\varepsilon_0}$ and is normal to the surface

6. A point dipole is located at the origin in some orientation. The electric field at the point (10 cm, 10 cm) on the x-y plane is measured to have a magnitude $1.0\times10^{-3}\,V/m$. What will be the magnitude of the electric field at the point (20cm, 20cm

(a) $5.0\times10^{-4}\,V/m$

(b) $2.5\times10^{-4}\,V/m$

(c) It will depend on the orientation of the dipole

(d) $1.25\times10^{-4}\,V/m$

7. The distance between a proton and electron both having charge 1.6×10^{-19} $coulomb$, of a hydrogen atom 10^{-10} $metre$. The value of intensity of electric field produced on electron due to proton will be

(a) $2.304\times10^{-10}N/C$ (b) $14.4\,V/m$

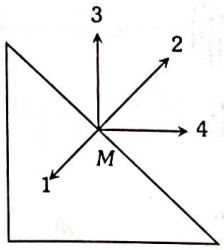
(c) $16\,V/m$ (d) $1.44\times10^{11}N/C$

8. Two-point charges of 20μC and 80μC are 10cm apart. Where will the electric field strength be zero on the line joining the charges from 20μC charge

(a) 0.1cm (b) 0.04 cm

(c) 0.033 cm (d) 0.33 cm

9. Three identical point charges, as shown are placed at the vertices of an isosceles right-angled triangle. Which of the numbered vectors coincides in direction with the electric field at the mid-point M of the hypotenuse



(a) 1 (b) 2

(c) 3 (d) 4

10. Two charges +5μC and +10μC are placed 20 *cm* apart. The net electric field at the mid-Point between the two charges is

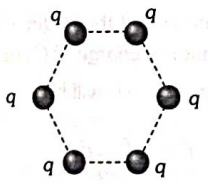
(a) 4.5×10^6 *N/C* directed towards +5μC

(b) 4.5×10^6 *N/C* directed towards +10μC

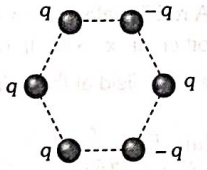
(c) 13.5×10^6 *N/C* directed towards +5μC

(d) 13.5×10^6 *N/C* directed towards +10μC

11. Figures below show regular hexagons, with charges at the vertices. In which of the following cases the electric field at the central is not zero



(1)



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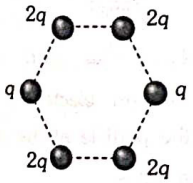

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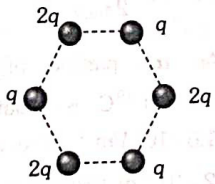


(4)

(a) 1 (b) 2

(c) 3 (d) 4

12. An electron enters in an electric field with its velocity in the direction of the electric lines of force. Then

(a) The path of the electron will be a circle

(b) The path of the electron will be a parabola

(c) The velocity of the electron will decrease

(d) The velocity of the electron will increase

13. Two infinite parallel metal planes, contain electric charges with charge densities $+\sigma$ and $-\sigma$ respectively and they are separated by a small distance in air. If the permittivity of air is ε_0 then the magnitude of the field between the two planes with its direction will be

(a) σ/ε_0 towards the positively charged plane

(b) σ/ε_0 towards the negatively charged plane

(c) $\sigma/(2\varepsilon_0)$ towards the positively charged plane

(d) 0 and towards any direction

14. A positively charged particle moving along x-axis with a certain velocity enters a uniform electric field directed along positive y-axis. Its

(a) Vertical velocity changes but horizontal velocity remains constant

(b) Horizontal velocity changes but vertical velocity remains constant

(c) Both vertical and horizontal velocities change

(d) Neither vertical nor horizontal velocity changes

15. A conducting sphere of radius $R=20$ *cm* is given a charge $Q=16\mu C$. What is $\vec{E}$ at centre

(a) $3.6\times10^6\,N/C$ (b) $1.8\times10^6\,N/C$

(c) Zero (d) $0.9\times10^6\,N/C$

16. An electron moving with the speed 5×10^6 *m* per sec is shouted parallel to the electric field of intensity $1\times10^3\,N/C$. Field is responsible for the retardation of motion of electron. Now evaluate the distance travelled by the electron before coming to rest for an instant (mass of $e=9\times10^{-31}Kg$. charge $=1.6\times10^{-19}C$)

(a) 7 m (b) 0.7 mm

(c) 7 cm (d) 0.7 cm

17. If an insulated non-conducting sphere of radius R has charge density ρ. The electric field at a distance r from the centre of sphere ($r < R$) will be

(a) $\frac{\rho R}{3\varepsilon_0}$ (b) $\frac{\rho r}{\varepsilon_0}$

(c) $\frac{\rho r}{3\varepsilon_0}$ (d) $\frac{3\rho R}{\varepsilon_0}$

18. The wrong statement about electric lines of force is

(a) These originate from positive charge and end on negative charge

(b) They do not intersect each other at a point

(c) They have the same form for a point charge and a sphere

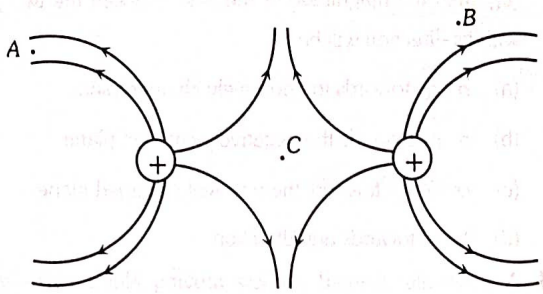
(d) They have physical existence

19. An infinite line charge produce a field of 7.182×10^8 N/C at a distance of 2 *cm*. The linear charge density is

(a) 7.27×10^{-4} C/m (b) 7.98×10^{-4} C/m

(c) 7.11×10^{-4} C/m (d) 7.04×10^{-4} C/m

20. The figure below shows the electric field lines due to two positive charges. The magnitudes E_A, E_B and E_C of the electric fields at points A, B and C respectively are related as



(a) $E_A > E_B > E_C$ (b) $E_B > E_A > E_C$

(c) $E_A = E_B > E_C$ (d) $E_A > E_B = E_C$

21. Under the action of a given coulombic force the acceleration of an electron is $2.5\times10^{22} m/s^2$. Then the magnitude of the acceleration of a proton under the action of same force is nearly

(a) $1.6\times10^{-19} m/s^2$ (b) $9.1\times10^{31} m/s^2$

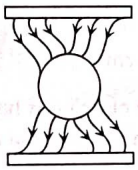
(c) $1.5\times10^{19} m/s^2$ (d) $1.6\times10^{27} m/s^2$

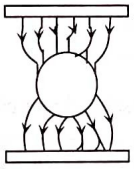
22. An electron initially at rest falls a distance of $1.5\,cm$ in a uniform electric field of magnitude $2\times10^4 N/C$. The time taken by the electron to fall this distance is

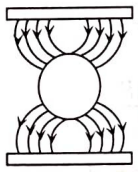
(a) $1.3\times10^2 s$ (b) $2.1\times10^{-12} s$

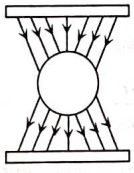
(c) $1.6\times10^{-10} s$ (d) $2.9\times10^{-9} s$

23. A metallic sphere is kept in between two oppositely charged plate. The most appropriate representation of the field lines is

(a) 

(b) 

(c) 

(d) 

24. A point charge $+q$ is placed at a distance d from an isolated conducting plane. The field at a point P on the other side of the plane is

(a) Directed perpendicular to the plane and away from the plane

(b) Directed perpendicular to the plane but towards the plane

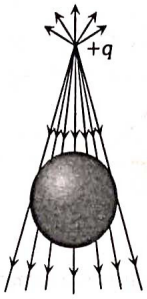
(c) Directed radially away from the point charge

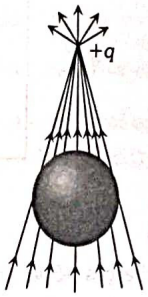
(d) Directed radially towards the point charge

25. A point positive charge is brought near an isolated conducting sphere (figure). The electric field is best given by

(a) 

(b) 

(c) 

(d) 

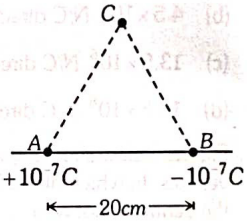
26. Two points charges $+10^{-7} C$ and $-10^{-7} C$ are placed at A and B, 20 cm apart as shown in the figure. Calculate the electric field at C, 20 cm apart from both A and B

(a) $1.5\times10^{-5} N/C$

(b) $2.2\times10^4 N/C$

(c) $3.5\times10^6 N/C$

(d) $3.0\times10^5 N/C$



27. A rod lies along the x-axis with one end at the origin and the other at $x \to \infty$. It carries a uniform charge $\lambda C/m$. The electric field at the point $x = -a$ on the axis will be

(a) $\vec{E} = \frac{\lambda}{4\pi\varepsilon_0 a}(-\hat{i})$ (b) $\vec{E} = \frac{\lambda}{4\pi\varepsilon_0 a}(\hat{i})$

(c) $\vec{E} = \frac{\lambda}{2\pi\varepsilon_0 a}(-\hat{i})$ (d) $\vec{E} = \frac{\lambda}{2\pi\varepsilon_0 a}(\hat{i})$

28. An $\alpha-$ particle of mass $6.4\times10^{-27} kg$ and charge $3.2\times10^{-19} C$ is situated in a uniform electric field of $1.6\times10^5 Vm^{-1}$. The velocity of the particle at the end of $2\times10^{-2} m$ path when it starts from rest is

(a) $2\sqrt{3}\times10^5 ms^{-1}$ (b) $8\times10^5 ms^{-1}$

(c) $16\times10^5 ms^{-1}$ (d) $4\sqrt{2}\times10^5 ms^{-1}$

29. Two charges each equal to $\eta q (\eta^{-1} < \sqrt{3})$ are placed at the corners of an equilateral triangle of side a. The electric field at the third corner is E_3 then (where $E_0 = q/4\pi\varepsilon_0 a^2$)

(a) $E_3 = E_0$ (b) $E_3 < E_0$

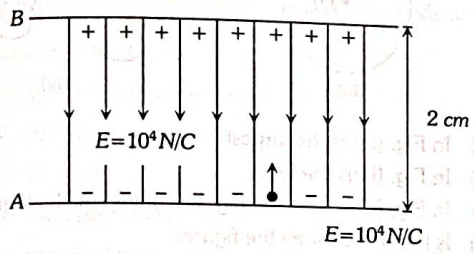
(c) $E_3 > E_0$ (d) $E_3 \geq E_0$

30. The distance between charges $5\times10^{-11}C$ and $-2.7\times10^{-11}C$ is 0.2 *m*. The distance at which a third charge should be placed in order that it will not experience any force along the line joining the two charges is

(a) 0.44 *m* (b) 0.65 *m*

(c) 0.554 *m* (d) 0.350 *m*

31. An electron is released from the bottom plate *A* as shown in the figure ($E=10^4 N/C$). The velocity of the electron when it reaches plate *B* will be nearly equal to



(a) $0.85\times10^7 m/s$ (b) $1.0\times10^7 m/s$

(c) $1.25\times10^7 m/s$ (d) $1.65\times10^7 m/s$

32. A charge $+q$ is placed somewhere inside the cavity of a thick conducting spherical shell of inner radius R_1 and outer radius R_2. A charge Q is placed at a distance $r>R_2$ from the centre of the shell. Then the electric field in the hollow cavity

(a) Depends on both $+q$ and Q

(b) Is zero

(c) Is only that due to Q

(d) Is only that due to $+q$

33. An infinite number of electric charges each equal to 5 *nano-coulomb* (magnitude) are placed along *X*-axis at $x=1cm$, $x=2$ cm, $x=4$ cm $x=8$ cm ..... and so on. In the setup if the consecutive charges have opposite sign, then the electric field in *Newton/Coulomb* at $X=0$ is

$\left[\frac{1}{4\pi\varepsilon_0}=9\times10^9 N-m^2/c^2\right]$

(a) 12×10^4 (b) 24×10^4

(c) 36×10^4 (d) 48×10^4

34. Two-point charges $(+Q)$ and $(-2Q)$ are fixed on the *X*-axis at positions a and $2a$ from origin respectively. At what positions on the axis, the resultant electric field is zero

(a) Only $x=\sqrt{2}a$ (b) Only $x=-\sqrt{2}a$

(c) Both $x=\pm\sqrt{2}a$ (d) $x=\frac{3a}{2}$ only

35. Two equal negative charges $-q$ is fixed at points $(0, a)$ and $(0, -a)$ on the *Y*-axis. A positive charge 'q' is released from rest at the point $(x<<a)$ on the *x*-axis. What is the frequency of motion

(a) $\sqrt{\frac{2q^2}{4\pi\varepsilon_0 ma^3}}$ (b) $\sqrt{\frac{4q^2}{2\pi\varepsilon_0 ma^3}}$

(c) $\sqrt{\frac{q^2}{2\pi\varepsilon_0 ma^3}}$ (d) $\sqrt{\frac{q^2}{\pi\varepsilon_0 ma^3}}$

36. A charged particle of mass $5\times10^{-5}kg$ is held stationary in space by placing it in an electric field of strength $10^7 NC^{-1}$ directed vertically downwards. The charge on the particle is

(a) $-20\times10^{-5}\mu C$

(b) $-5\times10^{-5}\mu C$

(c) $5\times10^{-5}\mu C$

(d) $20\times10^{-5}\mu C$

37. In Millikan's oil drop experiment an oil drop carrying a charge Q is held stationary by a potential difference $2400V$ between the plates. To keep a drop of half the radius stationary the potential difference had to be made $600V$. What is the charge on the second drop

(a) $\frac{Q}{4}$ (b) $\frac{Q}{2}$

(c) Q (d) $\frac{3Q}{2}$

3. Electric Dipole

1. A given charge is situated at a certain distance from an electric dipole in the end-on position experiences a force F. If the distance of the charge is doubled, the force acting on the charge will be

(a) $2F$ (b) $F/2$

(c) $F/4$ (d) $F/8$

2. The ratio of electric field and potential (E/V) at midpoint of electric dipole, for which separation is *l*

(a) $1/l$ (b) l

(c) $2/l$ (d) None of these

3. The electric field due to an electric dipole at a distance r from its centre in axial position is E. If the dipole is rotated through an angle of $90°$ about its perpendicular axis, the electric field at the same point will be

(a) E (b) $E/4$

(c) $E/2$ (d) $2E$

4. An electric dipole coincides on Z-axis and its mid-point is on origin of the co-ordinate system. The electric field at an axial point at a distance z from origin is $\vec{E}_{(z)}$ and electric field at an equatorial point at a distance y from origin is $\vec{E}_{(y)}$. Here $z = y >> a$, so $\left|\frac{\vec{E}_{(z)}}{\vec{E}_{(y)}}\right| = ...$

(a) 1 (b) 4

(c) 3 (d) 2

5. A water molecule has an electric dipole moment 6.4×10^{-30} cm when it is in vapour state. The distance in metre between the centre of positive and negative charge of the molecule is

(a) 4×10^{-10} (b) 4×10^{-11}

(c) 4×10^{-12} (d) 4×10^{-13}

6. The distance between H^+ and Cl^- ions in HCl molecule is 1.28 Å. What will be the potential due to this dipole at a distance of 12 Å on the axis of dipole

(a) 0.13 V (b) 1.3 V

(c) 13 V (d) 130 V

7. Two electric dipoles of moment p and 64 p are placed in opposite direction on a line at a distance of 25 cm. The electric field will be zero at point between the dipoles whose distance from the dipole of moment p is

(a) 5 cm (b) 25/9 cm

(c) 10 cm (d) 4/13 cm

4. Electric Flux and Gauss's Law

1. The S.I. unit of electric flux is

(a) Weber (b) Newton per coulomb

(c) Volt × metre (d) Joule per coulomb

2. The inward and outward electric flux for a closed surface in units of $N\text{-}m^2/C$ are respectively 8×10^3 and 4×10^3. Then the total charge inside the surface is

[where ε_0 = permittivity constant]

(a) 4×10^3 C (b) -4×10^3 C

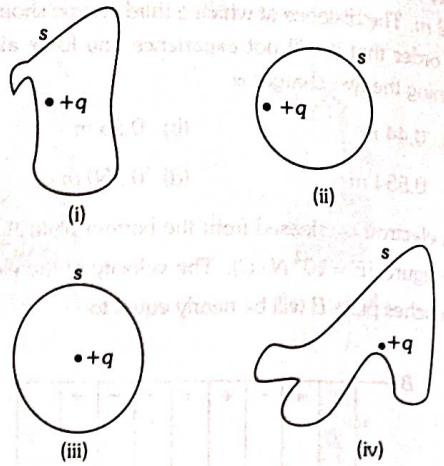
(c) $\frac{(-4\times10^3)}{\varepsilon}C$ (d) $-4\times10^3\varepsilon_0 C$

3. In a region, the intensity of an electric field is given by $\vec{E} = 2\hat{i} + 3\hat{j} + \hat{k}$ in NC^{-1}. The electric flux through a surface $\vec{S} = 10\hat{i}\ m^2$ in the region is

(a) $5\ Nm^2C^{-1}$ (b) $10\ Nm^2C^{-1}$

(c) $15\ Nm^2C^{-1}$ (d) $20\ Nm^2C^{-1}$

4. The electric flux through the surface



(a) In Fig. (iv) is the largest

(b) In Fig. (iii)is the least

(c) In Fig. (ii) is same as Fig. (iii) but is smaller than Fig. (i

(d) Is the same for all the figures

5. A charge q is placed at the centre of the open end cylindrical vessel. The flux of the electric field through t surface of the vessel is

(a) Zero (b) $\frac{q}{\varepsilon_0}$

(c) $\frac{q}{2\varepsilon_0}$ (d) $\frac{2q}{\varepsilon_0}$

6. It is not convenient to use a spherical Gaussian surface to fi the electric field due to an electric dipole using Gaus theorem because

(a) Gauss's law fails in this case

(b) This problem does not have spherical symmetry

(c) Coulomb's law is more fundamental than Gauss's law

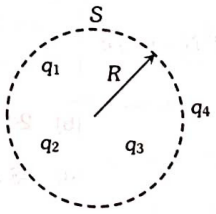
(d) Spherical Gaussian surface will alter the dipole mome

7. Which of the following will represent coulomb's law?

(a) $\oint \vec{E}.d\vec{S} = \frac{q}{\varepsilon_0}$ (b) $\oint \vec{E}.d\vec{l} = 0$

(c) $\oint \vec{H}.d\vec{S} = 0$ (d) $\oint \vec{H}.d\vec{l} = \mu_0 I$

8. q_1, q_2, q_3 and q_4 are point charges located at points as sho in the figure and S is a spherical Gaussian surface of radius Which of the following is true according to the Gauss's law



(a) $\oint_s (\vec{E}_1 + \vec{E}_2 + \vec{E}_3).d\vec{A} = \frac{q_1 + q_2 + q_3}{2\varepsilon_0}$

(b) $\oint_s (\vec{E}_1 + \vec{E}_2 + \vec{E}_3).d\vec{A} = \frac{(q_1 + q_2 + q_3)}{\varepsilon_0}$

(c) $\oint_s (\vec{E}_1 + \vec{E}_2 + \vec{E}_3).d\vec{A} = \frac{(q_1 + q_2 + q_3 + q_4)}{\varepsilon_0}$

(d) None of the above

9. The electric intensity due to an infinite cylinder of radius R and having charge q per unit length at a distance $r(r > R)$ from its axis is

(a) Directly proportional to r^2

(b) Directly proportional to r^3

(c) Inversely proportional to r

(d) Inversely proportional to r^2

5. Capacitance

1. The potential to which a conductor is raised, depends on

(a) The amount of charge

(b) Geometry and size of the conductor

(c) Both (a) and (b)

(d) None of these

2. A 500 μF capacitor is charged at a steady rate of 100 μC/second. The potential difference across the capacitor will be 10 V after an interval of

(a) 5 sec (b) 25 sec

(c) 20 sec (d) 50 sec

3. 64 drops each having the capacity C and potential V are combined to form a big drop. If the charge on the small drop is q, then the charge on the big drop will be

(a) $2q$ (b) $4q$

(c) $16q$ (d) $64q$

4. A parallel plate capacitor is charged. If the plates are pulled apart

(a) The capacitance increases

(b) The potential difference increases

(c) The total charge increases

(d) The charge and potential difference remain the same

5. If the charge on a capacitor is doubled, the value of its capacitance C will be

(a) Doubled (b) Halved

(c) Remain the same (d) None of these

6. The potentials of the two plates of capacitor are +10V and –10 V. The charge on one of the plates is 40 C. The capacitance of the capacitor is

(a) 2 F (b) 4 F

(c) 0.5 F (d) 0.25 F

7. An air-filled parallel plate capacitor has capacity C. If distance between plates is doubled and it is immersed in a liquid, then capacity becomes twice. Dielectric constant of the liquid is

(a) 1 (b) 2

(c) 3 (d) 4

8. The potential energy of a charged parallel plate capacitor is U_0. if a slab of dielectric constant k is inserted between the plates, then the new potential energy will be

(a) $\frac{U_0}{k}$ (b) U_0k^2

(c) $\frac{U_0}{k^2}$ (d) U_0^2

9. A parallel plate condenser has a capacitance 50μF in air and 110μF when immersed in an oil. The dielectric constant 'k' of the oil is

(a) 0.45 (b) 0.55

(c) 1.10 (d) 2.20

10. A parallel plate capacitor is charged to a potential difference of 50 volts. It is then discharged through a resistance for 2 seconds and its potential drops by 10 volts. Calculate the fraction of energy stored in the capacitance

(a) 0.14 (b) 0.25

(c) 0.50 (d) 0.64

11. Consider a parallel plate capacitor with plates 20 cm by 20 cm and separated by 2 mm. The dielectric constant of the material between the plates is 5. The plates are connected to a voltage source of 500 V. The energy density of the field between the plates will be close to

(a) $2.65 J/m^3$ (b) $1.95 J/m^3$

(c) $1.38 J/m^3$ (d) $0.69 J/m^3$

12. C,V,U and Q are capacitance, potential difference, energy stored and charge of parallel plate capacitor respectively. The quantities that increases when a dielectric slab is introduced between the plates without disconnecting the battery are

(a) V and C (b) V and U

(c) U and Q (d) V and Q

(e) U but not Q

13. There is an air filled 1pF parallel plate capacitor. When the plate separation is doubled and the space is filled with wax, the capacitance increases to 2pF. The dielectric constant of wax is

(a) 2 (b) 4

(c) 6 (d) 8

14. A parallel plate capacitor has a plate area of 50 cm^2 and plate separation of 1.0 cm. A potential difference of 200 $volt$ is applied across the plates with air as the dielectric between plates. The battery is then disconnected and a piece of Bakelite of dielectric constant 4.8 inserted which fills the complete volume between the plates. The capacitance before and after inserting Bakelite are respectively

(a) 44pF; 211.2pF (b) 4.4pF; 211.2pF

(c) 4.4pF;21.21pF (d) 21.12pF; 44pF

15. The capacity of a condenser in which a dielectric of dielectric constant 5 has been used, is C. If the dielectric is replaced by another with dielectric constant 20, the capacity will become

(a) $C/4$ (b) $4C$

(c) $C/2$ (d) $2C$

16. In a parallel-plate capacitor with plate area A and charge Q, the force on one plate because of the charge on the other is equal to

(a) $\frac{Q^2}{\varepsilon_0 A^2}$ (b) $\frac{Q^2}{2\varepsilon_0 A^2}$

(c) $\frac{Q^2}{\varepsilon_0 A}$ (d) $\frac{Q^2}{2\varepsilon_0 A}$

17. The capacitance of a parallel plate capacitor with air as medium is $3\mu F$. With the introduction of a dielectric medium between the plates, the capacitance becomes $15\mu F$. The permittivity of the medium is

(a) 5 (b) 15

(c) $0.44\times10^{-10}\ C^2N^{-1}m^{-2}$ (d) $8.854\times10^{-11}\ C^2N^{-1}m^{-2}$

18. When a dielectric material is introduced between the plates of a charged condenser then electric field between the plates

(a) Decreases (b) Increases

(c) Remain constant (d) First (b) then (a)

19. A variable condenser is permanently connected to a 100 V battery. If the capacity is changed from $2\mu F$ to $10\mu F$, then change in energy is equal to

(a) $2\times10^{-2}\ J$ (b) $2.5\times10^{-2}\ J$

(c) $3.5\times10^{-2}\ J$ (d) $4\times10^{-2}\ J$

20. A parallel plate capacitor having a plate separation of 2 mm is charged by connecting it to a 300 V supply. The energy density is

(a) $0.01\ J/m^3$ (b) $0.1\ J/m^3$

(c) $1.0\ J/m^3$ (d) $10\ J/m^3$

6. Grouping of Capacitors

1. Three capacitors are connected in the arms of a triangle ABC as shown in figure 5 V is applied between A and B. The voltage between B and C is

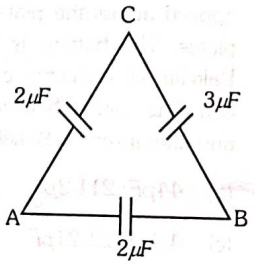
(a) 2 V

(b) 1 V

(c) 3 V

(d) 1.5 V

(e) 0.5 V

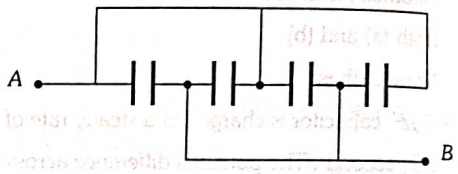


2. Two capacitors connected in parallel having the capa C_1 and C_2 are given 'q' charge, which is distributed a them. The ratio of the charge on C_1 and C_2 will be

(a) $\frac{C_1}{C_2}$ (b) $\frac{C_2}{C_1}$

(c) C_1C_2 (d) $\frac{1}{C_1C_2}$

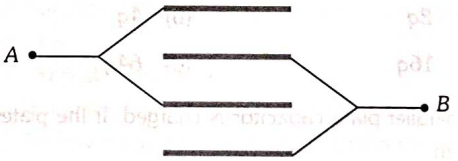
3. Four condensers are joined as shown in the adjoining f The capacity of each is $8\mu F$. The equivalent capacity be the points A and B will be



(a) $32\mu F$ (b) $2\mu F$

(c) $8\mu F$ (d) $16\mu F$

4. Four plates of the same area of cross-section are joi shown in the figure. The distance between each plat The equivalent capacity across A and B will be



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

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

5. Four metallic plates each of surface area (of one side) placed at a distance d apart from each other. The two are connected to a point P and the two inner plates to a point Q as shown in figure:

Then the capacitance of the system is

(a) $\varepsilon_0\frac{A}{2d}$ (b) $\varepsilon_0\frac{A}{d}$

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

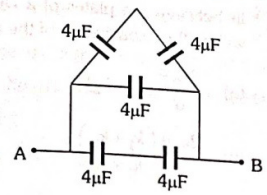
6. Equivalent capacitance between A and B is

(a) $8\mu F$

(b) $6\mu F$

(c) $26\mu F$

(d) $10/3\mu F$



7. Three capacitors of capacitance $3\mu F$ are connected in a circuit. Then their maximum and minimum capacitances will be

(a) $9\mu F$, $1\mu F$ (b) $8\mu F$, $2\mu F$

(c) $9\mu F$, $0\mu F$ (d) $3\mu F$, $2\mu F$

8. Three capacitors of capacitances $3\mu F, 9\mu F$ and $18\mu F$ are connected once in series and another time in parallel. The ratio of equivalent capacitance in the two cases $\left(\frac{C_s}{C_p}\right)$ will be

(a) 1 : 15 (b) 15 : 1

(c) 1 : 1 (d) 1 : 3

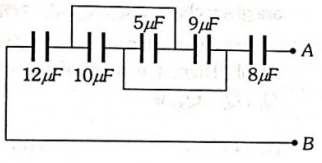
9. The capacities and connection of five capacitors are shown in the adjoining figure. The potential difference between the points A and B is 60 *volts*. Then the equivalent capacity between A & B and the charge on $5\mu F$ capacitance will be respectively

(a) $44\mu F; 300\mu C$

(b) $16\mu F; 150\mu C$

(c) $15\mu F; 200\mu C$

(d) $4\mu F; 50\mu C$



10. n identical capacitors each of capacitance C when connected in parallel give the effective capacitance 90 μF and when connected in series give 2.5 μF. Then the values of n and C respectively are

(a) 6 and 15 μF (b) 5 and 18 μF

(c) 15 and 6 μF (d) 18 and 5 μF

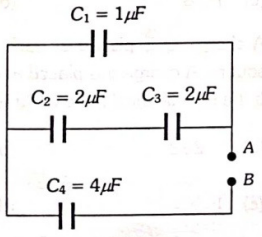
11. Four capacitors are connected in a circuit as shown in the following figure. Calculate the effective capacitance between the points A and B

(a) $\frac{4}{3}\mu F$

(b) $\frac{24}{5}\mu F$

(c) $9\mu F$

(d) $5\mu F$



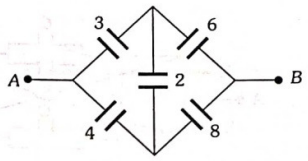
12. Effective capacitance between A and B in the figure shown is (all capacitance is in μF)

(a) $21\ \mu F$

(b) $23\ \mu F$

(c) $\frac{3}{14}\mu F$

(d) $\frac{14}{3}\mu F$



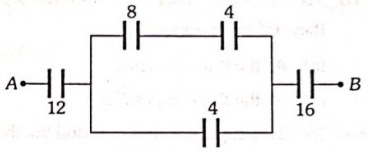
13. What is the equivalent capacitance between A and B in the given figure (all are in farad)

(a) $\frac{13}{18}F$

(b) $\frac{48}{13}F$

(c) $\frac{1}{31}F$

(d) $\frac{240}{71}F$



14. 0.2F capacitor is charged to 600V by a battery. On removing the battery, it is connected with another parallel plate condenser of 1F. The potential decreases to

(a) 100 *volts* (b) 120 *volts*

(c) 300 *volts* (d) 600 *volts*

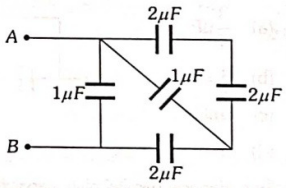
15. The total capacity of the system of capacitors shown in the adjoining figure between the points A and B is

(a) $1\mu F$

(b) $2\mu F$

(c) $3\mu F$

(d) $4\mu F$



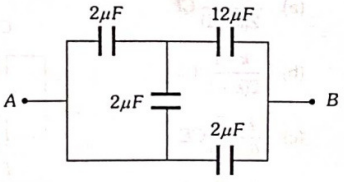
16. Four capacitors are connected in a circuit as shown in the figure. The effective capacitance in μF between points A and B will be

(a) $\frac{28}{9}$

(b) 4

(c) 5

(d) 18



Chemistry

1. Solve the following questions in the notebook:-

Chapter No.	Chapter Name	NCERT Exercise Questions
1	Solution	4, 5, 8, 9, 12, 15, 16, 17, 18, 20, 22, 32, 40, 41
10	Biomolecules	2, 3, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 20, 21, 22, 23 Intext Questions: 2, 3, 7, 8
3	Chemical Kinetics	2, 3, 6, 7, 8, 9, 12, 14, 17, 18, 19, 20, 23, 24, 26, 27 Intext Questions: 1, 8. 9

Note: Learn the chapters Solutions, Biomolecules and Chemical Kinetics..

Practical Work

Determination of concentration/ Molarity and strength of given Potassium permanganate solution ($KMNO_4$) by titrating it against a standard solution of:

1. Ferrous Ammonium Sulphate (Mohr's salt).
2. Oxalic acid.

Project

Prepare a project on any of the following topics:

1. Study of the presence of oxalate ions in guava fruit at different stages of ripening
2. Study of quantity of Casein present in different samples of milk
3. Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder, pepper
4. Corrosion and its prevention
5. Colligative properties
6. Vitamins and their deficiency diseases
7. Osmosis
8. Biomolecules
9. Study of the effect of Potassium bisulphate as food preservative under various conditions (temperature, concentration, time etc)

Biology

Assignment-A

SECTION-A

Q-1. Give one example of non-endospermic dicot seed.
Q-2. Give one example of bird pollinated plant.
Q.3. Give the term for pollination by bats.
Q-.4. Name accessory reproductive. glands.
Q-5. Name the primary and secondary sexorgans offemale.
Q-6. Which primary germ layer forms muscles and skeleton?
Q.7. Give the full form of MTP.
Q-8. Name two sexually transmitted diseases.
Q-9. What is Point Mutation? Give one example.
Q.10. State one difference between a gene and an allele.

SECTION-B

Q-11. What is amniocentesis? Give its significance.
Q-12. Differentiate between Graafian follicles and corpus luteum.
Q.13.What is spermatogenesis ? write down its steps.
Q.14. What is colostrum ? How is milk production hormonally regulated?
Q-15. What are false fruits ? Give two examples.
Q.16. What is the need and significance of pollination in plants?
Q-17. Give special characters of flowers which are pollinated by wind.
Q-18. Give an example of an autosomal recessive trail in humans. Explain its pattern of inheritance with the help of inheritance a cross.
Q-19. Which chromosome carries the mutant genes causing thalassaemia in human? What are the problems caused by these mutant genes?
Q-.20 Explain the sex-determination mechanism in humans. How is itdifferent in birds?

SECTION-C

Q-21. Human blood group is a good example of multiple allelism and co-dominance. Justify.
Q.2.2. Expand IUD, why is hormone releasing IUD-consideredas a goodcontraceptive to space children?
023. Explain the different phases of menstrual cycle and correlate the phases with the different levels. of ovarian a human female.
Q-24. (a) How is "oogenesis markedly different from 'spermatogenesis' with respect to the growth till puberty in the humans?
(b) Draw a sectional view of human ovary and label the different follicular stages, ovum and corpus luteum.
Q-25. Differentiate between autogamy, Geitonomy and xenogamy.

Assignment-B

A. Draw the diagramsfrom chapter- 2 to 5.
B. Make a project on a given topic.
i. Pollination and it's types.
ii. Embryogenesis.
iii. Fertilization and post-fertilization events.
iv. Human Reproductive systems.
v. Fertilization and Implantation in humans.
vi. Foetus development.
vii. MTP
viii. Mendelian disorders etc.

MATHEMATICS

1. Do following exercise of **NCERT TEXT BOOK** in your fair notebook
   1.1, 1.2, 2.1, 2.2, 3.2, 3.3, 4.2, 4.6, 12.1, 5.1 and complete Miscellaneous exercises of Chapter-1, 2, 3 & 4
2. Solve following Problems from NCERT EXEMPLAR
   Page No. 3: Example 1, 2, 3, Page No. 5: Example 13, Page No. 9 : Example 24, 25, 20.
   Exercise 1.3 : Question No. 14, 15, 16, 20, 21, 23, 28, 30, 31, 35, 36, 49
   Page No. : 26: Example 18, Page No. 29: Example 24
   Page No. 31 : Example 31, Page No. 32 : Example 32, 33, 34
   Page No. 33 : Example 37
   Exercise 2.3 : Question No. 2,3,9,11,13,18,22,23,24, 25, 30, 33, 35.
   Page No. : 48 : Example 43, Page No. 51: Example 10, 11, 12
   Exercise 3.3: Question No. 5, 13, 21, 42, 53, 54, 55, 57, 60, 61, 62, 63, 64, 65
   Page No. 69 : Example 1 , Page No. 71: Example 5
   Exercise 4.3: Q. No. 11, 18, 19, 20, 24, 31, 33, 35, 37, 58
   Exercise 5.3 : Q. No. 3, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 20, 24
3. Prepare a Model for functions.
4. Prepare a well labeled chart on Inverse Trigonometric functions (i.e. graph, Domains & Range)
5. Complete following activities in your Lab Manual.
   i) Activity 1 (Page No. 1)
   ii) Activity 8 (Page No. 24)
   iii) Activity 10 (Page No. 30)

Physical Education

1. Read ,Learn and Prepare the notes of the following units:-

   Unit 1- 'Management of Sporting Events'
   Unit 2-'Children and Women in Sports'
   Unit 3- Yoga as Preventive Measures for 'Lifestyle Disease'

2. Make the following corrective asanas with procedure, benefits, and stick diagram:- Tadasana,Pavanmuktasana, katichakrasana, Halasana, paschimottanasana, Dhanurasana, Bhujangasana, Gomukhasana, vajrasana, Shavasana ,Vakrasana
3. Make the following Pranayama with stick diagram and write down procedure, benefits, contraindications also:-
   *Nadi- Shodhan Pranayama
   * Sitali Pranayama
   *Anulom- vilom Pranayama
   *Kapalbhati Pranayama
4. Make a record file on the topic- "Yoga and Lifestyle Diseases". Your record file must include the following:-
   - Introduction
   - Index
   - Acknowledgement
   - Bibliography
   - Passport size photograph

I.P

1. Revise Python PandasI,II.
2. Write attributes of Series and DataFrame with examples on A4 size sheet.
3. Create DataFrame on "Movies" and write all commands related to DataFrame in fair notebook.
4. Create a Series of 'Student Detail' and write all commands related to Series in fair notebook.
5. READ unit-3 'Introduction to Computer Network".
6. Do five examples of Series and DataFrame in fair notebook.
7. Make a chart on
   - Uses of Internet (Roll No. 1-25)
   - Network Devices(Roll No. 26-50)