SUMMER VACATION- 2020

VACATION ENGAGEMENT WORK FOR CLASS – XII

Subject	Chapters	Assignment
ENGLISH	Vistas – Ch. 1 The Third Level Vistas – Ch. 2 The Tiger King Vistas – Ch. 4 The Enemy Flamingo – Ch. 1 – The Last Lesson Flamingo – Ch. 2 – The Lost Spring Poem – My Mother at Sixty Six	1. How did Charley reach the third level of Grand Central? How was it different from the other levels? (120-150 words) 2. Do you think that the third level was a medium of escape for Charley? Why? (120-150 words) 3. The story 'The Tiger King' is a satire on the conceit of those in power. Discuss. (120-150 words) 4. Write a character sketch of The Tiger King or his Diwan. (120-150 words) 5. Dr. Sadao did justice to his profession and his country both. Discuss. (120-150 words) 6. Write a character sketch of Hana. (120-150 words) 7. Write a charcter sketch of Little Franz. (120-150 words) 8. Write a character sketch of M.Hamel. 9. Describe the life of squatters in Seemapuri. 10. Describe the difficulties the bangle makers of Firazabad have to face in their lives? 11. Write a critical analysis of the poem 'My Mother at Sixty Six'.

HINDI **हिन्दी**		1 मेरा आदर्श / रोल मॉडल ' पर एक फीचर लिखिए। 2 'कोरोना महामारी सब पर भारी' विषय पर आलेख लिखिए। इससे बचने के लिए अपने सुझाव भी लिखिए। 3 'जूझ' कहानी को पढ़कर अपने शब्दों में पाठ का सारांश लिखिए। क्या यह कहानी किशोर छात्रों के लिए एक आदर्श प्रेरणा स्रोत है ? 4 विद्यालय के वेबसाईट पर उपलब्ध कराई गई पाठ्य सामग्री की सहायता से पढाए गए पाठ के प्रश्नों के उत्तर को नोटबुक में सुंदर अक्षरों में लिखें।
INFORMATICS PRACTICES	5 - Introduction to Software Engineering. 6 – Agile Methods and Practical Aspects of Software Engineering.	I. Write notes on the following topics: a) Need of Software Engineering. b) Software Process Activity c) The Waterfall Model d) Evolutionary Model e) Component-based Model f) Spiral Model g) Working of Scrum h) Version Control System i) Types of Version Control System j) Use-case Diagrams k) Purpose of Use-case Diagrams II. From the uploaded assignments / worksheets (In School Website / WhatsApp), write the given assignment questions and solutions in Your IP Notebook.
COMPUTER SCIENCE (083)	MYSQL SQL Using Python Libraries	Write notes on the following topics: • Data base concepts • Relational Data Model:relation, attribute, degree, tuple, keys. • Advantages of SQL,data definition and data manipulation languages. • Datatypes and SQL commands. • SQL functions & joins. Write short notes & programs on following topics. • Python module, packages & library. • All chapter programs. Write the given Python Programs and solutions in Your PracticalNotebook.

PHYSICS **+ 10 Annexure Files of Physics Worksheets**	1. ELECTROSTATIC CHARGE AND FIELG 2. ELECTRIC POTENTIAL AND CAPACITANCE 3. CURRENT ELECTRICITY	1. All exercises questions of the chapters to be solved from NCERT. 2. Solve the Practice Paper 1 to 10 *Note : Practice paper is attached at the end of this page.*
CHEMISTRY	1. SOLUTION 2. ELECTROCHEMISTRY 3. CHEMICAL KINETICS	All exercises questions of the chapters to be solved from NCERT. Solve the numerical questions of the chapters from NCERT.
BIOLOGY	1. Reproduction in organisms 2.Sexual reproduction in flowering plants 3.Human reproduction 4.Reproductive Health	III. Solve NCERT Questions(Chapter-1) IV. Draw and practice all diagram of chapter-1 III.Complete notes (Chapter-2 content uploaded in our school website) IV.Solve NCERT Questions(Chapter-2) V. Draw and practice all diagram of chapter-3 VI. Solve NCERT Questions(Chapter-3) VII. Complete notes (Chapter-4content uploaded in our school website) VIII.Solve NCERT Questions.(Chapter-4) Complete your project and practical work.

CLASS XII

MATHEMATICS

S.N	DATE	DAY	ASSIGNMENT SUBJECT
1	18/5/2020	Monday	Maths: NCERT textbook Ex- 1.1 and 1.2 in CW notebook and related exercises from R.S. AGRAWAL in practice notebook.
2	20/5/2020	Wednesday	Maths: NCERT textbook Ex- 1.3 and Miscellaneous Ex-1in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
3	23/5/2020	Saturday	Maths: NCERT textbook Ex- 3.1 and 3.2in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
4	27/5/2020	Wednesday	Maths: NCERT textbook Ex- 3.3 and 3.4in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
5	30/5/2020	Saturday	Maths: NCERT textbook Miscellaneous Ex-3 in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
6	04/6/2020	Thursday	Maths: NCERT textbook Ex- 4.1 and 4.2 in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
7	06/6/2020	Saturday	Maths: NCERT textbook Ex- 4.3 and 4.4in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
8	10/6/2020	Wednesday	Maths: NCERT textbook Ex- 4.5 and 4.6in CW notebook and related exercises from R.S. AGRAWALin practice notebook.
9	13/6/2020	Saturday	Maths: NCERT textbook Miscellaneous Ex-4 in CW notebook and related exercises from R.S. AGRAWALin practice notebook.

Class XII – Com.

ECONOMICS:

1. Solve Part A- (Introductory Macroeconomics) of
   Last five years question paper.

2. Learn and prepare notes of Government Budget.

3. Complete Project File.

Class XII – Com.

O P JINDAL SCHOOL SAVITRI NAGAR

VACATION HOME WORK (CLASS XII)

SUBJECT	CHAPTERS	ASSIGNMENTS
ACCOUNTANCY	ACCOUNTING FOR PARTNERSHIP (FUNDAMENTALS) FINANCIAL STATEMENT OF A COMPANY ANALYSIS OF FINANCIAL STATEMENT ACCOUNTING RATIO (LIQUIDITY AND SOLVENCY)	Solve MCQs of all the chapters given in assignment. Solve the numerical of given chapters. Complete project file
BUSINESS STUDIES	NATURE AND SIGNIFICANCE OF MANAGEMENT PRINCIPLES OF MANAGEMENT BUSINESS ENVIRONMENT	Solve one mark questions and case studies of the chapters mentioned in the assignment Complete the notes of these chapters Complete project file

Physics

PRACTICE PAPER - 01

TOPIS : ELECTROSTATICS

In general, metallic ropes are suspended on the carriers taking inflammable materials. The reason is
(a) to control the speed of the carrier.
(b) to keep the centre of gravity of the carrier nearer to the earth.
(c) to keep the body of the carrier in contact with the earth.
(d) none of these.

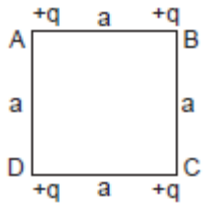
Two charges q_1 and q_2 are placed in vacuum at a distance d and the force acting between them is F. If a medium of dielectric constant 4 is introduced around them, the force now will be _____.

When 10^{14} electrons are removed from a neutral metal sphere, the charge on the sphere becomes _____.

Two similar spheres having +Q and –Q charges are kept at a certain distance. F force acts between the two. If at the middle of two spheres, another similar sphere having +Q charge is kept, then it experiences a force in magnitude and direction as
(a) zero having no direction.
(b) 8F towards +Q charge.
(c) 8F towards –Q charge.
(d) 4F towards +Q charge.

A charge Q is divided into two parts of q and Q – q. If the coulomb repulsion between them when they are separated is to be maximum, the ratio of Q/q should be
(a) 2 : 1 (b) 1/2
(c) 4 : 1 (d) 1/4

Four equal charges q are placed at the four corners A, B, C, D of a square of length a. The magnitude of the force on the charge at B will be



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

(c) $\frac{(1+2\sqrt{2})q^2}{2\times 4\pi\varepsilon_0 a^2}$ (d) $\frac{\left(\frac{2+1}{\sqrt{2}}\right)q^2}{4\pi\varepsilon_0 a^2}$

Dielectric constant for metal _____.

Two charges of equal magnitudes kept at a distance r exert a force F on each other. If the charges are halved and distance between them is doubled, then the new force acting on each charge is

(a) $\frac{F}{8}$ (b) $\frac{F}{4}$

(c) $4F$ (d) $\frac{F}{16}$

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 these

A cylinder of radius R and length L is placed in a uniform electric field E parallel to the cylinder axis. The total flux for the surface of the cylinder is given by

(a) $2\pi R^2 E$ (b) πr^2

(c) $\frac{\pi R^2 - \pi R}{E}$ (d) Zero

Electric field at a point varies as r^0 for
(a) an electric dipole
(b) a point charge
(c) a plane infinite sheet of charge

(d) a line charge of infinite length

An electric charge q is placed at the centre of a cube of side a. The electric flux on one of its faces will be

(a) $\frac{q}{6\varepsilon_0}$ (b) $\frac{q}{\varepsilon_0 a^2}$

(c) $\frac{q}{4\pi\varepsilon_0 a^2}$ (d) $\frac{q}{\varepsilon_0}$

Total electric flux coming out of a unit positive charge kept in air is

(a) ε_0 (b) ε_0^{-1}

(c) $(4\pi\varepsilon_0)^{-1}$ (d) $4\pi\varepsilon_0$

The electric field 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.

A point charge q is placed at a distance a/2 directly above the centre of a square of side a. The electric flux through the square is

(a) q/ε_0 (b) $q/\pi\varepsilon_0$

(c) $q/4\varepsilon_0$ (d) $q/6\varepsilon_0$

PRACTICE PAPER - 02

TOPIS : ELECTROSTATICS

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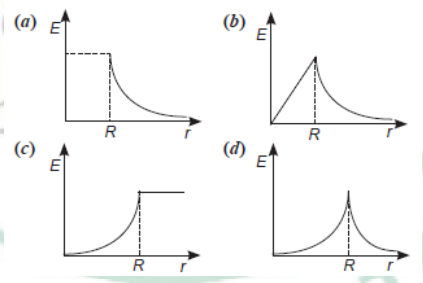
1 Which of the following graphs shows the variation of electric field E due to a hollow spherical conductor of radius R as a function of distance from the centre of the sphere?

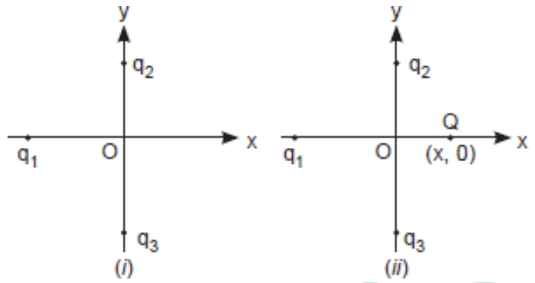


2 The magnitude of electric field intensity E is such that, an electron placed in it would experience an electrical force equal to its weight is given by

(a) mge (b) mg/e

(c) e/mg (d) e^2g/m^2

3 In Fig. (i) 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) in figure(ii), the force on q_1 is



(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_3.

4 Which of the following statement is correct? The electric field at a point is
(a) always continuous.
(b) continuous if there is a charge at that point.
(c) discontinuous only if there is a negative charge at that point.
(d) discontinuous if there is a charge at that point.

5 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.

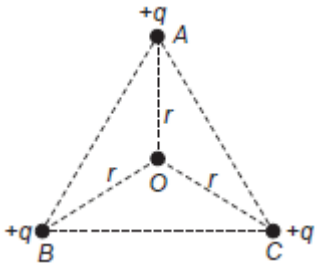
6 Gauss's law will be invalid if
(a) there is magnetic monopoles.
(b) the inverse square law is not exactly true.
(c) the velocity of light is not a universal constant.

(d) none of these.

7 An electric dipole of moment p is placed in the position of stable equilibrium in uniform electric field of intensity E. It is rotated through an angle θ from the initial position. The potential energy of electric dipole in the final position is
(a) pE cos θ (b) pE sin θ
(c) pE(1 – cos θ) (d) –pE cos θ

8 An electric dipole is kept in a non-uniform electric field. It experiences
(a) a force and a torque.
(b) a force but not a torque.
(c) a torque but not a force.
(d) neither a force nor a torque.

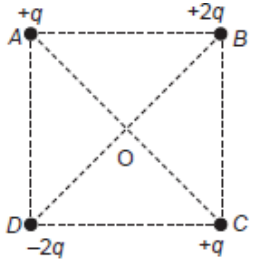
9 ABC is an equilateral triangle. Three charges +q are placed at each corner. The electric intensity at O will be



(a) 1. $q/4\pi\varepsilon_0 . r^2$ (b) 1. $q/4\pi\varepsilon_0 r$
(c) Zero (d) 1. $3q/4\pi\varepsilon_0 r^2$

10 There are two charges +1 μC and +5 μC. The ratio of the forces acting on them will be
(a) 1 : 5 (b) 1 : 1
(c) 5 : 1 (d) 1 : 25

11 Four charges are arranged at the corners of a square ABCD, as shown. The force on the charge kept at the centre O is



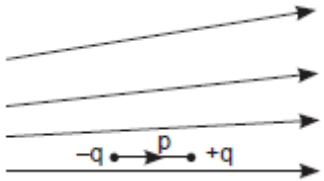
(a) zero
(b) along the diagonal AC
(c) along the diagonal BD
(d) perpendicular to side AB

12 Which of the following statement is correct?

If $\int E \cdot ds$ = 0 over a surface, then
(a) the electric field inside the surface and on it is zero.
(b) the electric field inside the surface is necessarily uniform.
(c) the number of flux lines entering the surface must be equal to the number of flux lines leaving it.
(d) all charges must not necessarily be outside the surface.

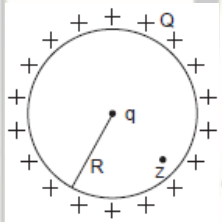
13 A hemisphere is uniformly charged positively. The electric field at a point on a diameter away from the centre is directed [NCERT Exemplar]
(a) perpendicular to the diameter
(b) parallel to the diameter
(c) at an angle tilted towards the diameter
(d) at an angle tilted away from the diameter.

14 Figure shows electric field lines in which an electric dipole p is placed as shown. Which of the following statements is correct?



(a) The dipole will not experience any force.
(b) The dipole will experience a force towards right.
(c) The dipole will experience a force towards left.
(d) The dipole will experience a force upwards.

15 A positive charge Q is uniformly distributed along a circular ring of radius R. A small test charge q is placed at the centre of the ring.



Which of the following statement is not correct?
(a) If $q > 0$ and is displaced away from the centre in the plane of the ring, it will be pushed back towards the centre.
(b) If $q < 0$ and is displaced away from the centre in the plane of the ring, it will never return to the centre and will continue moving till it hits the ring.
(c) If $q < 0$, it will perform SHM for small displacement along the axis.
(d) q at the centre of the ring is in an unstable equilibrium within the plane of the ring for $q > 0$.

PRACTICE PAPER - 03

TOPIS : ELECTROSTATICS

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1 Two metallic spheres having same shape and size, but one of Cu and other of Al, are both placed in an identical electric field. In which metallic sphere will more charge be induced?

2 If a body contains n_1 electrons and n_2 protons, then what will be the total amount of charge on the body?

3 Is the force acting between two point electric charges q_1 and q_2 kept at some distance apart in air, attractive or repulsive when (i) $q_1q_2 > 0$ (ii) $q_1q_2 < 0$?

4 Name the physical quantity whose SI unit is V.m. Is it a vector or a scalar quantity?

5 Two insulated charged copper spheres A and B of identical size have charges q_A and q_B respectively. A third sphere C of the same size but uncharged is brought in contact with the first and then in contact with the second and finally removed from both. What are the new charges on A and B?

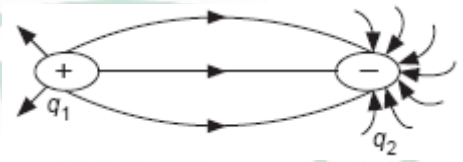
6 Two equal balls having equal positive charge q coulombs are suspended by two insulating strings of equal length. What would be the effect on the force when a plastic sheet is inserted between the two?

7 Draw electric field lines for a system of two charges q_1 and q_2 such that
(*i*) $q_1q_2 > 0$; $q_1 > q_2 > 0$ (*ii*) $q_1\, q_2 < 0$; $q_1 > |-q_2| < 0$, $|q_1| > |-q_2|$

8 What is the value of $\left|\frac{E_{ax}}{E_{eq}}\right|$ for a short electric dipole?

9 Why can a Gaussian surface not pass through any discrete charge?

10

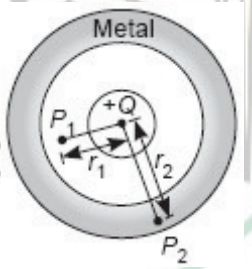


Determine the ratio of magnitudes of two charges q_1 and q_2.

11 Two fixed point charges + 4 e and + e units are separated by a distance 'a'. Where should the third point charge be placed for it to be in equilibrium?

12 Two point electric charges of unknown magnitude and sign are placed at a distance d apart. The electric field intensity is zero at a point, not between the charges but on the line joining them. Write two essential conditions for this to happen.

13 A small metal sphere carrying the charge +Q is located at the centre of a spherical cavity in a large uncharged metal sphere as shown in the figure.

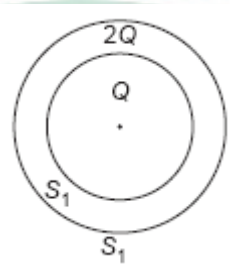


Use the Gauss's theorem to find the electric flux at points P_1 and P_2.

14 S_1 and S_2 are two hollow concentric spheres enclosing charge Q and $2Q$ respectively as shown in figure.

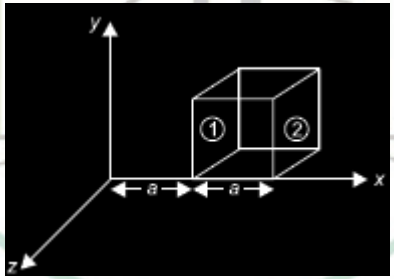
(i) What is the ratio of the electric flux through S_1 and S_2?

(ii) How will the electric flux through the sphere S_1 change, if a medium of dielectric constant 5 is introduced in the space inside S_1 in place



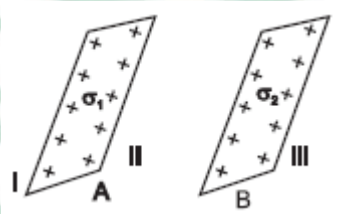
of air?

15 State Gauss's law in electrostatics. A cube with each side a is kept in an electric field given by $\vec{E} = Cx\hat{i}$, (as is shown in the figure) where C is a positive dimensional constant. Find out
(i) the electric flux through the cube, and
(ii) the net charge inside the cube

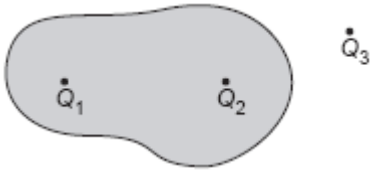


16 Using Gauss's theorem, deduce an expression for the electric field intensity at any point due to a thin, infinitely long wire of charge/length λ C/m.

17 (a) A point charge (+Q) is kept in the vicinity of uncharged conducting plate. Sketch electric field lines between the charge and the plate.
(b) Two infinitely large plane thin parallel sheets having surface charge densities σ_1 and σ_2 ($\sigma_1 > \sigma_2$) are shown in the figure. Write the magnitudes and directions of net fields in the regions marked II and III.



18 Three charges Q_1, Q_2 and Q_3 are placed inside and outside a closed Gaussian surface as shown in the figure.



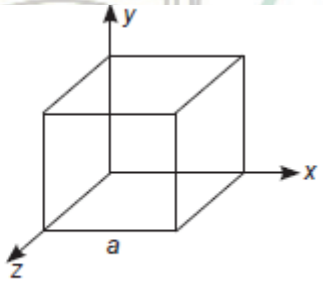
Answer the following:

(a) Which charges contribute to the electric field at any point on the Gaussian surface?

(b) Which charges contribute to the net flux through this surface?

(c) If $Q_1 = -Q_2$, will electric field on the surface be zero?

19 **(a) An electric dipole of dipole moment $\vec{p}$ consists of point charges $+q$ and $-q$ separated by a distance $2a$ apart. Deduce the expression for the electric field $\vec{E}$ due to the dipole at a distance x from the centre of the dipole on its axial line in terms of the dipole moment $\vec{p}$. Hence show that in the limit $x >> a$, $\vec{E} \to 2\vec{p}/(4\pi\varepsilon_0 x^3)$.**



5

(b) Given the electric field in the region $\vec{E} = 2x\hat{i}$, find the net electric flux through the cube and the charge enclosed by it.

20 An electric dipole of dipole moment p is held in a uniform electric fieldE . 5

(i) Prove that no translatory force acts on the dipole.

(ii) Hence prove that the torque acting on the dipole is given by pE sin θ, indicating the direction along which it acts.
(iii) How much work is required in turning the electric dipole, from the position of most stable equilibrium to the position of most unstable equilibrium?

PRACTICE PAPER-04

TOPIS : Electric Potential and Capacitance

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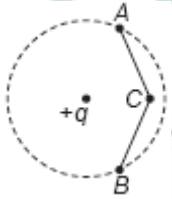
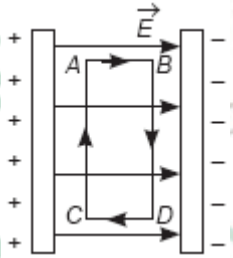
1 What is the work done in moving a test charge q through a distance of 1 cm along the equatorial axis of an electric dipole?

2 If a point charge $+q$ is taken first from A to C and then from C to B of a circle drawn with another point charge $+q$ at centre, then along which path more work will be done?



3 A uniform electric field E exists between two charged plates as shown in figure. What would be the work done in moving a charge q along the closed rectangular path $ABCDA$?



4 What is the geometrical shape of equipotential surfaces due to a single isolated charge?

5 Why is there no work done in moving a charge from one point to another on an equipotential surface?

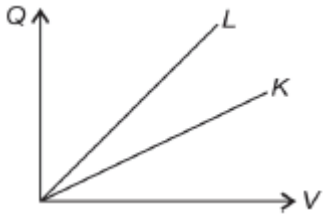
6 Can two equipotential surfaces intersect each other? Justify your answer.

7 In the expression $W = pE(\cos \theta_0 - \cos \theta_1)$, why is θ_0 is taken as $\pi/2$ for obtaining expression for the potential energy of electric

dipole?

8 A hollow metal sphere of radius 5 cm is charged such that the potential on its surface is 10 V. What is the potential at the centre of the sphere?

9 The following graph shows the variation of charge Q, with voltage V, for two capacitors K and L. In which capacitor is more electrostatic energy stored?



10 A 500 μC charge is at the centre of a square of side 10 cm. Find the work done in moving a charge of 10 μC between two diagonally opposite points on the square.

PRACTICE PAPER-05

TOPIS : Electric Potential and Capacitance

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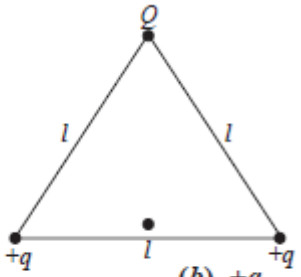
1 Equipotentials at a great distance from a collection of charges whose total sum is not zero are approximately.
(a) spheres (b) planes
(c) paraboloids (d) ellipsoids

2 If a unit positive charge is taken from one point to another over an equipotential surface, then
(a) work is done on the charge.
(b) work is done by the charge.
(c) work done is constant.
(d) no work is done.

3 A conductor with a positive charge
(a) is always at +ve potential.
(b) is always at zero potential.
(c) is always at negative potential.
(d) may be at +ve, zero or –ve potential.

4 A parallel plate condenser is connected with the terminals of a battery. The distance between the plates is 6mm. If a glass plate (dielectric constant K = 9) of 4.5 mm is introduced between them, then the capacity will become
(a) 2 times. (b) the same.
(c) 3 times. (d) 4 times.

5 Three charges Q, +q and +q are placed at the vertices of an equilateral triangle of side l as shown in the figure. If the net electrostatic energy

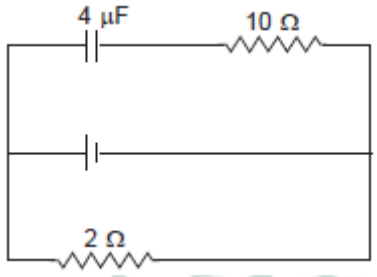


(a) $-q$ (b) $+q$

(c) zero (d) $-\frac{q}{2}$

of the system is zero, then Q is equal to

6 A capacitor of 4 μF is connected as shown in the circuit. The internal resistance of the battery is 0.5 Ω. The amount of charge on the capacitor plates will be



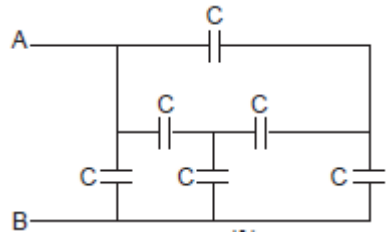
(a) 0 (b) 4 μC (c) 16 μC (d) 8 μC

7 If E is the electric field intensity of an electrostatic field, then the electrostatic energy density is proportional to

(a) E (b) E^2

(c) $1/E^2$ (d) E^3

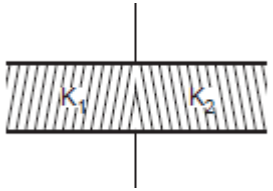
8 Find the equivalent capacitance of the system across the terminals A and B. All the capacitors have equal capacitances.



(a) 2 C (b) 4 C
(c) 3 C (d) 5 C

9 The capacitors of capacitance 4 F, 6 F and 12 F are connected first in series and then in parallel. What is the ratio of equivalent capacitance in the two cases?
(a) 2 : 3 (b) 11 : 1
(c) 1 : 11 (d) 1 : 3

10 A parallel plate capacitor with air as medium between the plates has a capacitance of 10 μF. The area of capacitor is divided into two equal halves and filled with two media having dielectric constant $k_1 = 2$ and $k_2 = 4$ as shown in the figure. The capacitance of the system will now



be (a) 10 μF (b) 20 μF
(c) 30 μF (d) 40 μF

PRACTICE PAPER -06

TOPIS : Electric potential and Capacitance

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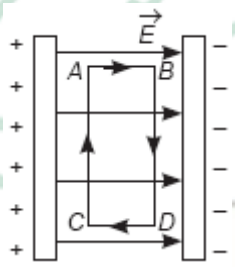
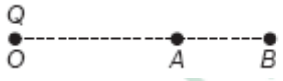
1 A uniform electric field E exists between two charged plates as shown in figure. What would be the work done in moving a charge q along the closed rectangular path $ABCDA$?



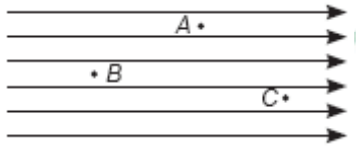
2 In the expression $W = pE(\cos \theta_0 - \cos \theta_1)$, why is θ_0 is taken as $\pi/2$ for obtaining expression for the potential energy of electric dipole?

3 For what position of an electric dipole in a uniform electric field its potential energy is (*i*) minimum and (*ii*) maximum?

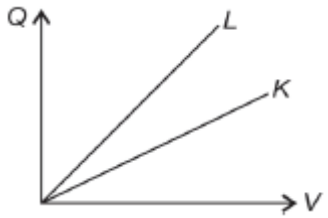
4 A point charge Q is placed at point O as shown in the figure. Is the potential difference $V_A - V_B$ positive, negative or zero, if Q is (*i*) positive (*ii*) negative?



5 Figure given below shows three points A, B and C in a uniform electrostatic field. At which of the points will the electric potential be maximum ?



6 The following graph shows the variation of charge Q, with voltage V, for two capacitors K and L. In which capacitor is more electrostatic



energy stored?

7 A charge Q is given to three capacitors C_1, C_2 and C_3 connected in parallel. Determine the charge on each.

8 Draw a plot showing the variation of (*i*) electric field (E and (*ii*) electric potential (V) with distance r due to a point charge Q.

9 What is an electrostatic shielding? What is its practical importance?

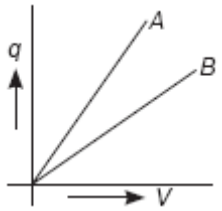
10 (*a*) Draw equipotential surfaces due to a point $Q > 0$. (*b*) Are these surfaces equidistant from each other? If not, explain why.

PRACTICE PAPER -07

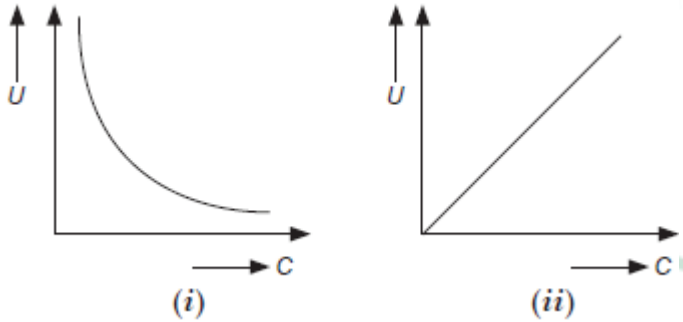
TOPIS : Electric potential and Capacitance

1 Draw equipotential surfaces and corresponding electric field lines for the: (*i*) single point charge $q < 0$ and (*ii*) uniform electric field.

2 The given graph shows that variation of charge q versus potential difference V for two capacitors C_1 and C_2. The two capacitors have same plate separation but the plate area of C_2 is double than that of C_1. Which of the lines in the graph correspond to C_1 and C_2 and why?



3 The energy of a capacitor varying with its capacitance is shown by two graphs (i) and (ii). Find in which of the graphs: (a) charge is constant, and (b) potential difference is constant.

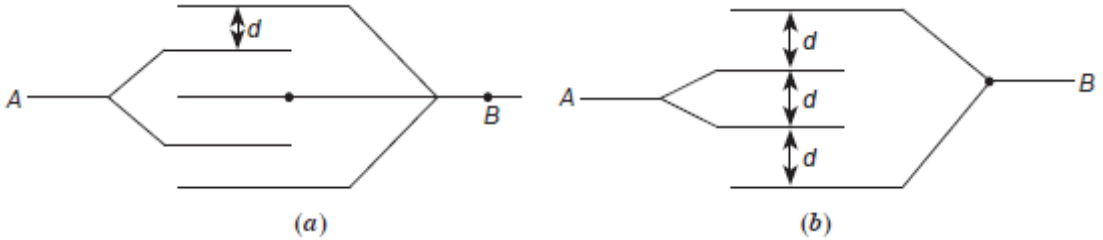


4 Deduce an expression for the electric potential due to an electric dipole at any point on its axis. Mention one contrasting feature of electric

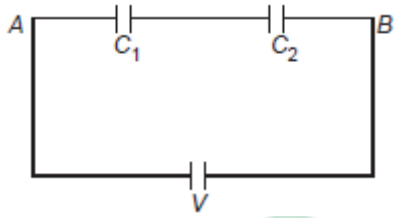
potential of a dipole at a point as compared to that due to a single charge.

5 Four charges $+q$, $-q$, $+q$ and $-q$ are to be arranged respectively at the four corners of a square $ABCD$ of side a. (a) Find the work required to put together this arrangement. (b) A charge q_0 is bought to the centre of the square, the four charges being held fixed. How much extra work is needed to do this?

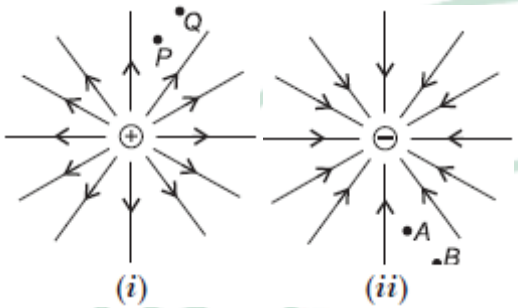
6 Five identical horizontal square metal plates each of area A are placed at a distance d apart in air and connected to the terminals A and B as shown in the figures (a) and (b). Find the effective capacitance between the two terminals A and B.



7 Two air-filled capacitors C_1 and C_2 of capacitances $2C$ and C are connected in series to a battery as shown below. (a) Find across which capacitor, the potential difference is high. (b) Draw the graph for variation of potential with distance from A to B. (c) If a dielectric of constant 2 is filled completely in the air gap of second capacitor, then what will be the final ratio of charge, potential difference and energy stored by each capacitor.



8 Figures (i) and (ii) show the field lines of the positive and negative point charges respectively. (a) Give the signs of the potential difference $V_p - V_Q$, $V_B - V_A$. (b) Give the sign of the potential energy difference of a small negative charge between the points Q and P, A and B. (c) Give the sign of the work done by the field in moving a small positive charge from Q to P. (d) Give the sign of the work done by the external agency in moving a small negative charge from B to A. (e) Does the kinetic energy of a small negative charge increase or decrease



in going from B to A?

10 Show by graph how q given to a capacitor varies with its potential difference.
Using the graph or otherwise, prove that the energy of a capacitor is $1/2\ CV^2$. Calculate the energy density of the electrostatic field in a parallel plate capacitor.

PRACTICE PAPER -08

TOPIS : CURRENT ELECTRICITY

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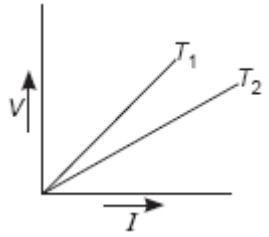
1 Plot a graph showing the variation of resistance of a conducting wire as a function of its radius, keeping the length of the wire and its temperature as constant.

2 *V–I* graph for a metallic wire at two different temperatures T_1 and T_2 is as shown in the figure. Which of the two temperatures is higher and why?



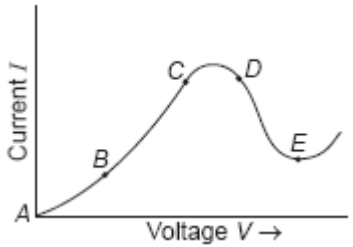
3 The emf of a cell is always greater than its terminal voltage. Why? Give reason.

4 You are given three constantan wires *P*, *Q* and *R* of length and area of cross-section (*L*, *A*), $\left(2L, \frac{A}{2}\right), \left(\frac{L}{2}, 2A\right)$ respectively. Which has highest resistance?

5 Two wires of equal length, one of copper and the other of manganin have the same resistance. Which wire is thicker?

6 State the condition for maximum current to be drawn from a cell.

7 Graph showing the variation of current versus voltage for a material GaAs is shown in the figure. Identify the region of
(i) negative resistance,
(ii) where Ohm's law is obeyed.

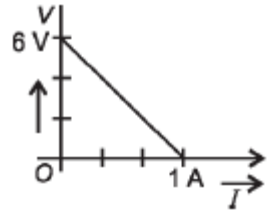


8 Define the term ‘electrical conductivity’ of a metallic wire. Write its SI unit.

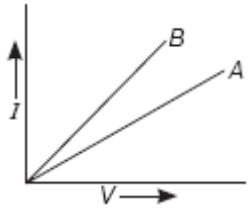
9 When electrons drift in a metal from lower to higher potential, does it mean that all the free electrons of the metal are moving in the same direction?

10 Show variation of resistivity of copper as a function of temperature in a graph.

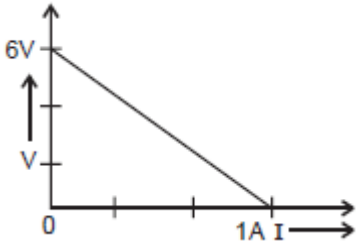
11 The plot of the variation of potential difference across a combination of three identical cells in series, versus current is as shown here. What is the emf of each cell?



12 Out of V – I graph for parallel and series combination of two metallic resistors, which one represents parallel combination of resistors? Justify your answer.



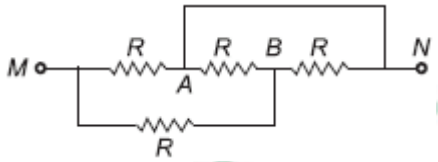
13 The plot of the variation of potential difference across a combination of three identical cells in series, versus current is shown below. What is the emf and internal resistance of each cell?



14 Plot a graph showing temperature dependence of resistivity for a typical semiconductor. How is this behaviour explained?

15 Nichrome and copper wires of same length and area of cross section are connected in series, current is passed through them why does the nichrome wire get heated first?

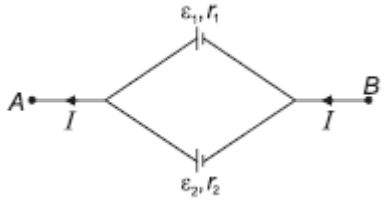
16 Calculate the resistance across the points *M* and *N* in the given figure.



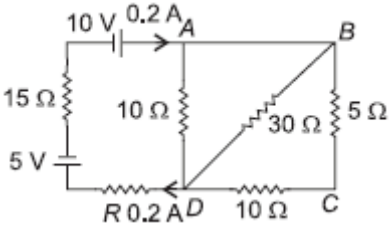
17 A uniform wire of resistance *R* ohm is bent into a circular loop as shown in the figure. Compute effective resistance between diametrically opposite points *A* and *B*.

18 Name two factors on which the resistivity of a given material depends. A carbon resistor has a value of 62 kΩ with a tolerance of 5%. Give the colour code for the resistor.

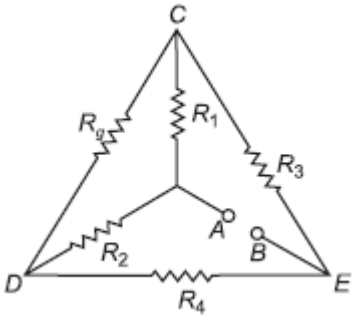
19 Two cells of emfs ε_1, ε_2 and internal resistances r_1 and r_2 respectively are connected in parallel as shown in the figure. Deduce the expression for
(i) the equivalent emf of the combination,
(ii) the equivalent resistance of the combination, and
(iii) the potential difference between the points *A* and *B*.



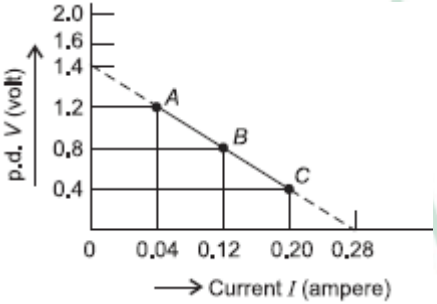
20 Calculate the value of the resistance *R* in the circuit shown in the figure so that the current in the circuit is 0.2 A. What would be the potential difference between points *A* and *D*?



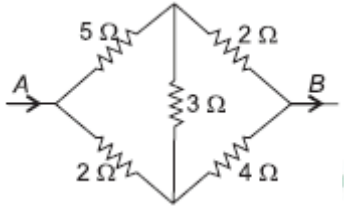
21 (i) Calculate the equivalent resistance of the given electrical network between points *A* and *B*.
(ii) Also calculate the current through *CD* and *ACB*, if a 10 V dc source is connected between *A* and *B*, and the value of *R* is assumed as 2 Ω.



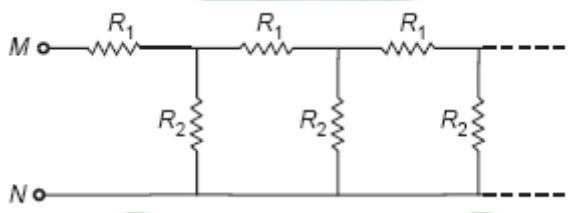
22 A straight line plot showing the terminal potential difference (V) of a cell as a function of current (I) drawn from it is shown in the figure.
Using this plot, determine (i) the emf, and (ii) internal resistance of the cell.



23 In the arrangement of conductors, find the equivalent resistance between A and B.



24 The figure shows an infinite circuit which is formed by the repetition of same chain consisting R1 and R2. If R1 = 4W and R2 = 3W, then calculate the resistance between the points M and N.

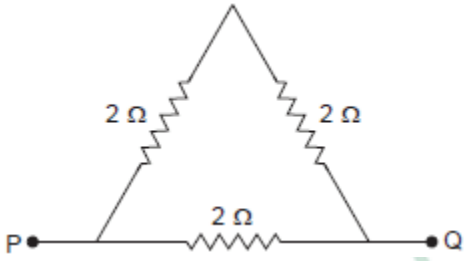


25 A Daniel cell is balanced on 125 cm length of a potentiometer wire. Now the cell is short-circuited by a resistance 2 ohm and the balance is obtained at 100 cm. The internal resistance of the Daniel cell is

(a) 0.5 ohm (b) 1.5 ohm

(c) 1.25 ohm (d) 4/5 ohm

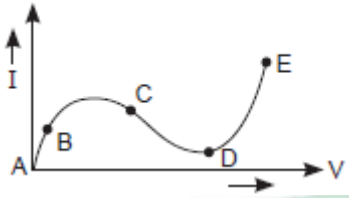
26 Three resistors each of 2 ohm are connected together in a triangular shape. The resistance between any two vertices will be



(a) 4/3 ohm (b) 3/4 ohm

(c) 3 ohm (d) 6 ohm

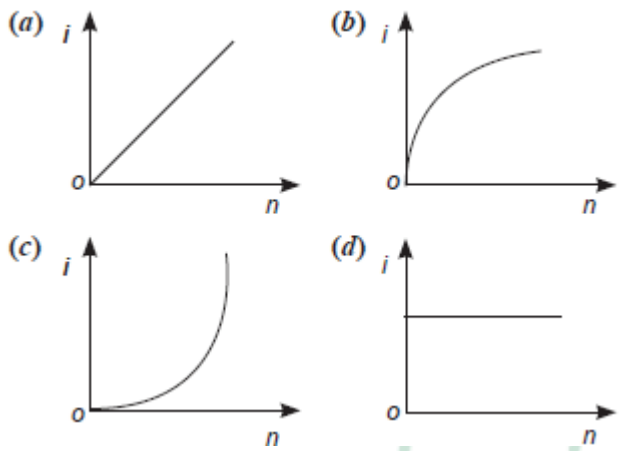
27 From the graph between current I and voltage V shown below, identify the portion corresponding to negative resistance



(a) AB (b) BC

(c) CD (d) DE

28 A battery consists of a variable number 'n' of identical cells having internal resistances connected in series. The terminals of battery are short circuited and the current i is measured. Which of the graph below shows the relationship between i and n?



29 A cell of e.m.f. 1.5V having a finite internal resistance is connected to a load resistance of 2Ω. For maximum power transfer the internal resistance of the cell should be _____.

PRACTICE PAPER -09

TOPIC : CURRENT ELECTRICITY

1 Why is the potentiometer preferred to a voltmeter for measuring emf of a cell?

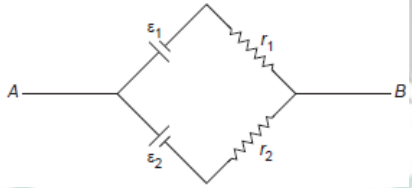
2 Why copper is not used for making potentiometer wires?

3 The emf of a cell is always greater than its terminal voltage. Why? Give reason.

4 How can we increase the sensitivity of a potentiometer?

5 Why do bends in a wire not affect its resistance?

6 Two batteries of ε_1 and ε_2 ($\varepsilon_2 > \varepsilon_1$) and internal resistance r_1 and r_2 respectively are connected in parallel as shown in figure.



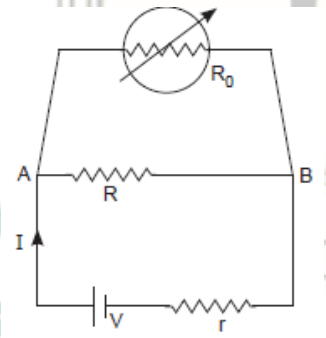
(a) The equivalent emf ε_{eq} of the two cells is between ε_1 and ε_2, i.e. $\varepsilon_1 < \varepsilon_{eq} < \varepsilon_2$.
(b) The equivalent emf ε_{eq} is smaller than ε_1.
(c) The ε_{eq} is given by $\varepsilon_{eq} = \varepsilon_1 + \varepsilon_2$ always.
(a) ε_{eq} is independent of internal resistances r_1 and r_2.

7 A resistance R is to be measured using a meter bridge. Student chooses the standard resistance S to be 100 Ω He finds the null point at l_1 = 2.9 cm. He is told to attempt to improve the accuracy. Which of the following is a useful way?
(a) He should measure l1 more accurately.
(b) He should change S to 1000 Ω and repeat the experiment.
(c) He should change S to 3 Ω and repeat the experiment.

(d) He should give up hope of a more accurate measurement with a meter bridge.

8 Two cells of emf's approximately 5 V and 10 V are to be accurately compared using a potentiometer of length 400 cm. [NCERT Exemplar]
(a) The battery that runs the potentiometer should have voltage of 8 V.
(b) The battery of potentiometer can have a voltage of 15 V and R adjusted so that the potential drop across the wire slightly exceeds 10 V.
(c) The first portion of 50 cm of wire itself should have a potential drop of 10 V.
(d) Potentiometer is usually used for comparing resistances and not voltages.

9 Consider a simple circuit shown in figure stands for a variable resistance R′. R′ can vary from R_0 to infinity. r is internal

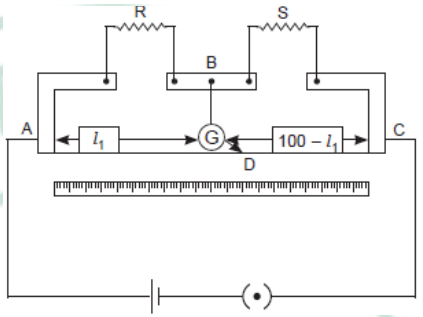


resistance of the battery ($r << R << R_0$).

(a) Potential drop across AB is not constant as R0 is varied.
(b) Current through R0 is nearly a constant as R0 is varied.
(c) Current I depends sensitively on R0.

(d) $I \geq \frac{V}{r+R}$ always.

10

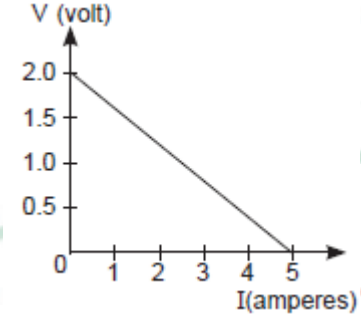


In a meter bridge, the point D is a neutral point (figure).

(a) The meter bridge can have other neutral point for this set of resistances.
(b) When the jockey contacts a point on meter wire left of D, current flows to B from the wire.
(c) When the jockey contacts a point on the meter wire to the right of D, current flows from B to the wire through galvanometer.
(d) When R is increased, the neutral point shifts to left.

11 For measurement of potential difference, a potentiometer is preferred over voltmeter because
(a) potentiometer is more sensitive than voltmeter.
(b) the resistance of potentiometer is less than voltmeter.
(c) potentiometer is cheaper than voltmeter.
(d) potentiometer does not take current from the circuit.

12 For a cell, the graph between the potential difference (V) across the terminals of the cell and the current (I) drawn from the cell



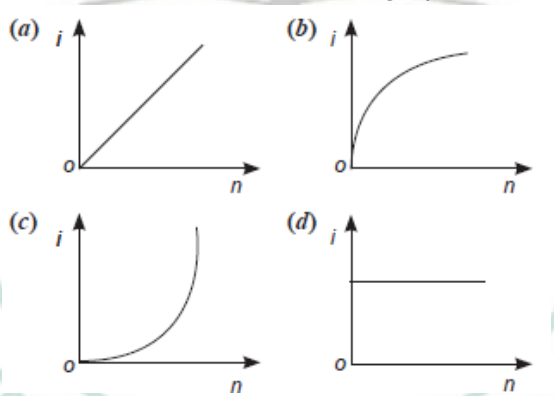
is shown in the figure.

The e.m.f. and the internal resistance of the cell are

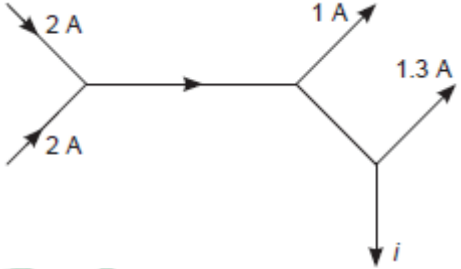
(a) 2V, 0.5 Ω (b) 2V, 0.4 Ω
(c) > 2V, 0.5 Ω (d) > 2V, 0.4 Ω

13 A Daniel cell is balanced on 125 cm length of a potentiometer wire. Now the cell is short-circuited by a resistance 2 ohm and the balance is obtained at 100 cm. The internal resistance of the Daniel cell is
(a) 0.5 ohm (b) 1.5 ohm
(c) 1.25 ohm (d) 4/5 ohm

14 A battery consists of a variable number 'n' of identical cells having internal resistances connected in series. The terminals of battery are short circuited and the current i is measured. Which of the graph below shows the relationship between i and n?



15



The figure below shows currents in a part of electric circuit. The current i is _____.

16 Kirchhoff's junction rule is a reflection of
(a) conservation of current density vector.
(b) conservation of potential.
(c) the fact that the momentum with which a charged particle approaches a junction is unchanged (as a vector) as the charged particle leaves the junction.
(d) the fact that there is no accumulation of charges at a junction.

17 Ohm's law is true.
(a) For metallic conductors at low temperature.
(b) For metallic conductors at high temperature.
(c) For electrolytes when current passes through them.
(d) For diode when current flows.

18 A cell of internal resistance 1.5 Ω and e.m.f. 1.5 volt balances on 500 cm length of a potentiometer wire. If a wire of 15 Ω is connected between the balance point and the cell, then the balance point will shift
(a) to zero (b) by 500 cm
(c) by 750 cm (d) no change

19 The terminal potential difference of a cell is greater than its e.m.f. when it is
(a) being discharged.
(b) in open circuit.
(c) being charged.

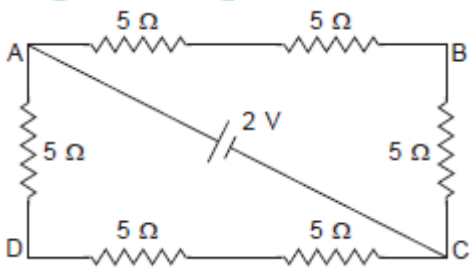
(d) being either charged or discharged.

20 If the length of potentiometer wire is increased, then the length of the previously obtained balance point will
(a) increase.
(b) decrease.
(c) remain unchanged.
(d) become two times.

21 Kirchhoff's first law, i.e. $\Sigma i = 0$ at a junction is based on the law of conservation of _____.

22 Kirchhoff 's second law is based on the law of conservation of _____.

23



The potential difference between points A and B of given figure is _____.

24 A cell of e.m.f. 1.5V having a finite internal resistance is connected to a load resistance of 2Ω. For maximum power transfer the internal resistance of the cell should be _____.

25 When the current i is flowing through a conductor, the drift velocity is v. If 2i current flows through the same metal but having the double area of cross-section, then the drift velocity will be _____.

PRACTICE PAPER 10

TOPIC : CURRENT ELECTRICITY

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1 (a) You are required to select a carbon resistor of resistance 47 kW ± 10% from a large collection. What should be the sequence of colour bands used to code it ?

(b) Write two characteristics of manganin which make it suitable for making standard resistances.

2 A cell of emf E and internal resistance r is connected to two external resistances R_1 and R_2 and a perfect ammeter. The current in the circuit is measured in four different situations :

(i) without any external resistance in the circuit,

(ii) with resistance R_1 only,

(iii) with R_1 and R_2 in series combination, and

(iv) with R_1 and R_2 in parallel combination.

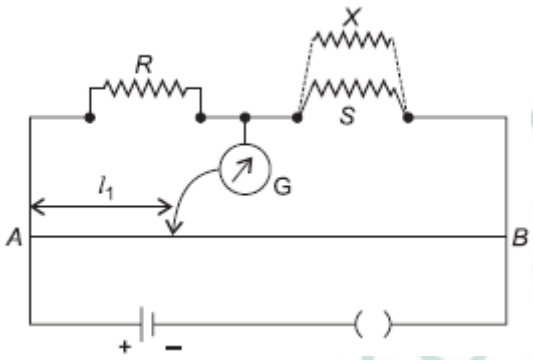
The currents measured in the four cases are 4.2 A, 1.05 A, 0.42 A, 1.4 A but not necessarily in that order. Identify the currents corresponding to the four cases mentioned above.

3 State the two Kirchhoff 's rules used in electric networks. How are these rules justified?

4 (i) State the principle of working of a meter bridge.

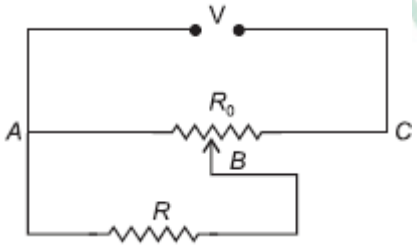
(ii) In a meter bridge balance point is found at a distance l_1 with resistances R and S as shown in the figure.

When an unknown resistance X is connected in parallel with the resistance S, the balance point shifts to a distance l_2. Find the expression for X in terms of l_1, l_2 and S.



5 State the underlying principle of a potentiometer.
Describe briefly, giving the necessary circuit diagram, how a potentiometer is used to measure the internal resistance of a given cell.

6 A resistance of $R\,\Omega$ draws current from a potentiometer as shown in the figure.
The potentiometer has a total resistance $R_0\,\Omega$.
A voltage V is supplied to the potentiometer.
Derive an expression for the voltage across R when the sliding contact is in the middle of the potentiometer.



7 (a) State, with the help of circuit diagram, the working principle of a meter bridge. Obtain the expression used for determining the unknown resistance.
(b) What happens if the galvanometer and cell are interchanged at the balance point of the bridge ?

(c) Why is it considered important to obtain the balance point near the midpoint of the wire?

8 (a) State Kirchhoff 's rules for a network. Using Kirchhoff 's rules, obtain the balance condition in terms of the resistances of four arms of wheatstone bridge.

(b) In the meter bridge exprimental set up, shown in the figure, the null point D is obtained at a distance of 40 cm from end A of the meter bridge wire. If a resistance of 10 Ω is connected in series with R_1, null point is obtained at AD = 60 cm. Calculate the values of R_1 and R_2.