

**HOLIDAYS HOMEWORK**  
**CLASS XII Science Session 2018 - 19**

**ENGLISH**

1. Read novel 'The Invisible Man' by H.G. Wells.
2. Write the character sketch of:
  - a. Griffin
  - b. Dr. Kemp
  - c. Thomas Marvel
  - d. Mrs. Hall
  - e. Mr. Hall
  - f. Colonel Adye
  - g. Dr. Cuss
  - h. J.A. Joffers
  - i. Rev. Bunting
  - j. Mr. Heelas
  - k. Mr. Wicksteed
  - l. Teddy Henfrey
3. Assignment of the novel.
4. Assignment of Deep Water.
5. Assignment of Keeping Quiet

**PHYSICS**

1. Prepare a project of physics which should be research or experiment based (working project), where every aspect of the topic selected should be discussed. The project should have the following key aspects:

- Certificate
- Acknowledgement
- Why this was selected? (Related to daily life)
- Introduction
- Details of the project
- Experiment
- Observations
- Analysis
- Result
- Bibliography (mention the links)

Project should be aesthetically prepared. Print out of the content is not allowed, only data or pictures can be printed and the same has to be approved first.

2. Complete the worksheet in the notebook that will be uploaded on website

**Assignments**

1. Prepare a project of physics which should be research or experiment based (working project), where every aspect of the topic selected should be discussed. The project should have the following key aspects:

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### ASSIGNMENT-1 Electric Charges and Fields

Q-1 What do you mean by static electricity or electrostatics?

Q-2 What kinds of charges are produced on each, when (i) a glass rod is rubbed with silk and (ii) an ebonite rod is rubbed with wool.

Q-3 A glass rod, when rubbed with silk cloth, acquires a charge of  $1.6 \times 10^{-13}$  coulomb. What is the charge on the silk cloth?

Q-4 Vehicles carrying inflammable materials usually have metallic ropes touching the ground during motion. Why?

Q-5 Five Charges of equal amount ( $q$ ) are placed at five corners of a regular hexagon of side 10 cm. What will be the value of sixth charge placed at sixth corner of the hexagon so that the electric field at the centre of hexagon is zero ?

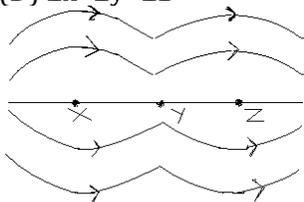
Q-6 Which of the following statement is true & why?

(A)  $E_x = E_y = E_z$

(B)  $E_x > E_y > E_z$

(C)  $E_x = E_z < E_y$

(D)  $E_x < E_y < E_z$



Q-7 Suppose a gaussian surface does not include any net charge. Does it necessarily mean that  $E$  is equal to zero for all points on the surface?

Q-8 What is the angle between the electric dipole moment and electric field strength due to it on the equilateral line?

Q-9 Distinguish between the field lines of a point charge and that of an electric dipole.

Q-10 If  $N$  drops of same size, each having the same charge, coalesce to form a bigger drop. How will the following vary with respect to single small drop?

(i) Total charge on bigger drop

(ii) Potential on the bigger drop

(iii) The capacitance on the bigger drop

Q-11 A charge  $Q$  is divided in two parts  $q$  and  $Q - q$  separated by a distance  $R$ . If force between the two charges is maximum, find the relationship between  $q$  &  $Q$ .

Q-12 If  $V (=q/4\pi\epsilon_0 r)$  is the potential at a distance  $r$  due to a point charge  $q$ , then determine the electric field due to a point charge  $q$ , at a distance  $r$ .

Q-13 Can electric potential at any point in space be zero while intensity of electric field at that point is not zero?

Q-14  $S_1$  and  $S_2$  are two hollow concentric spheres enclosing charges  $Q$  and  $2Q$  respectively. What is the ratio of electric flux through  $S_1$  and  $S_2$ ? How will the electric flux through the sphere  $S_1$  change if a medium of dielectric constant  $\epsilon$  is introduced in the space inside  $S_1$  in place of air.

### ASSIGNMENT-2 Electric Potential and Capacitance

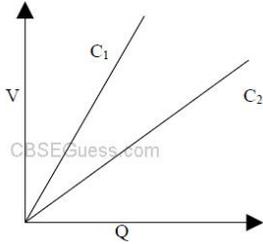
1. Define electric potential at a point in an electric field. Give its unit.

2. Define electric potential difference between two points. Is it a scalar or vector?

3. Give the dependence of electrostatic potential due to small electric dipole at a far off point lying on (i) axial line and (ii) the equatorial line.

4. Where the energy of capacitor does resides?

5. The given graph shows that the variation of charge versus potential difference  $V$  for the two capacitors  $C_1$  &  $C_2$ . The two capacitors have same plate separation but the plate area of  $C_2$  is doubled than that of  $C_1$ . Which of the line in the graph corresponds to  $C_1$  &  $C_2$  and why?



6. A parallel plate capacitor with air between the plates has a capacitance of  $8 \text{ pF}$ . The separation between the plates is now reduced by half and the space between them is filled with a medium of dielectric constant 5. Calculate the value of capacitance of parallel plate capacitor in second case.

7. Five identical capacitors, each of capacitance  $C$  are connected between points  $X$  and  $Y$  as shown in the figure. If the equivalent capacitance of the combination between  $X$  and  $Y$  is  $5 \text{ mF}$ . Calculate the capacitance of each capacitor.

8. An uncharged capacitor is connected to a battery. Show that half of the energy supplied by the battery is lost as heat while charging the capacitor.

9. Is the capacitance  $C$  of a capacitor proportional to the charge  $Q$ ?

10. When a capacitor is charged and then discharged repeatedly, its dielectric gets heated. Why?

11.  $n$  small drops of same size are charged to  $V$  volt each. They coalesce to form a bigger drop. Calculate the potential of the bigger drop.

12. Two capacitors of capacitance  $6 \text{ mF}$  and  $12 \text{ mF}$  are connected in series with the battery. The voltage across the  $6 \text{ mF}$  capacitor is  $2 \text{ volt}$ . Compute the total battery voltage.

### ASSIGNMENT-3 Electric current, resistance and EMF

1. What is conventional current? What is the direction of conventional current? Define SI unit of current.

2. Define drift velocity of an electron.

3. How does the drift velocity of electrons in a metallic conductor vary with increase in temperature.

4. State Ohm's law.

5. Does the value of resistance of a conductor depend upon the potential difference applied across it or the current passed through it?

6. What are ohmic device and non-ohmic device? Give one example.

7. You are given  $8 \Omega$  resistor. What length of wire of resistance  $120 \Omega \text{ m}^{-1}$  should be joined in parallel with it to get a value of  $6 \Omega$ ?

8. Three resistance  $3 \Omega$ ,  $6 \Omega$  and  $9 \Omega$  are connected to a battery. In which of them will the power dissipation be maximum if

a) They are all connected in parallel

b) They are all connected in series. Give reason.

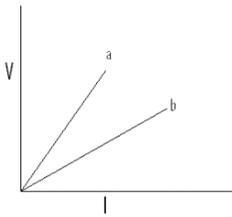
9. A silver wire has a resistance of  $2.1 \Omega$  at  $27.5^\circ \text{C}$  and a resistance of  $2.7 \Omega$  at  $100^\circ \text{C}$ . determine the temperature coeff. of resistivity of silver.

10.  $N$  number of identical resistors each of resistance  $R$  is combined to get the maximum and minimum resistances, what is the ratio of the maximum to minimum resistance.

11. Two wires of equal length one of copper and other of manganin have same resistance. Which of the two wires will be thicker? Justify your answer with the help of suitable formula.

12. A resistor of  $24 \text{ ohm}$  resistance is bent in the form of a loop as shown in the figure. Calculate effective resistance between points  $A$  and  $B$ ?

13.  $V$ - $I$  graph for metallic wire at two different temperature 'a' and 'b' is shown in fig. Which of the two temperatures is higher and why?



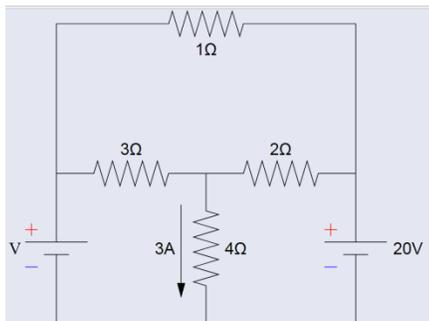
13. Two resistances are in the ratio 1:4 if these are connected in parallel their total resistance becomes 20 ohm. Find the value of each resistance.

14. 4 cells of identical EMF  $E$ , internal resistance  $r$  are connected in series to a variable resistor. The following graph shows the variation of terminal voltage of the combination with the current output:

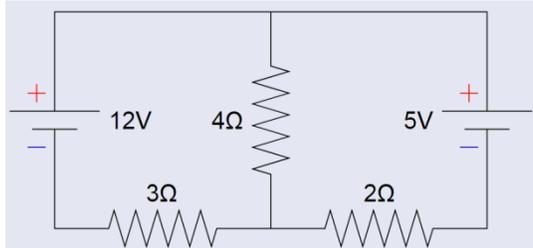
1. What is the EMF of each cell?
2. Calculate the internal resistance of each cell.

15. Given the circuit below with 3 A of current running through the 4  $\Omega$  resistor as indicated in the diagram to the right. Determine...

- a. the current through each of the other resistors,
- b. the voltage of the battery on the left, and
- c. the power delivered to the circuit by the battery on the right.



16. Determine the current through each resistor in the circuit shown below.



## CHEMISTRY

### I. Investigatory Project

Prepare an investigatory project of chemistry which should be experiment based. It should be a research based project where every aspect of the topic selected should be discussed in terms of chemistry. The project should have the following key aspects:

- Certificate
- Acknowledgement
- Why this was selected? (related to daily life)
- Introduction
- Details of the project (research related to the topic)
- Experiment (detailed manner including procedure)
- Observations
- Analysis
- Result
- Bibliography (mention the links)

Project should be aesthetically prepared. No print out of content is allowed, only data or pictures can be printed. It has to be first approved.

- II. Complete the assignment and back exercise questions of the chapters 10-14. Assignments are already provided to you .
- III. Practice for the following topics in chemistry notebook:
- Nomenclature (minimum 20 organic compounds)
  - Mechanisms done in organic
  - Minimum 15 pairs of compounds for distinguishing between covering all the chemical tests done( Heisenberg, lucas, carbylamine, iodoform, 2,4-DNP , neutral  $\text{FeCl}_3$  test, bromine water test etc)
  - Complete the reactions(minimum 20)
  - Word problems(minimum 10)
- IV. Attempt all the given CBSE board questions given below .  
Other details are mailed.

### **MATHEMATICS**

Complete the assignments already shared with you in class before announcement of holidays

### **COMPUTER SCIENCE**

Assignments mailed on your ids @kiitworld.in

### **BIOLOGY**

1. Prepare an investigatory project on topic related to biology where every aspect of the topic selected should be discussed. The project should have the following key aspects:
  - Certificate
  - Acknowledgement
  - Why this was selected? (Related to daily life)

Content

  - Introduction
  - Details of the project
  - Observations
  - Analysis
  - Result
  - Bibliography

(mention the links)  
Project should be hand written, and printout of pictures if required could be used .
2. Prepare for pre-mid term exam

Note: All assignments will be sent through Edupage and your official ids @kiitworld.in