

Sample Question Paper - 17
Science (086)
Class- X, Session: 2021-22
TERM II

Time: 2 Hours

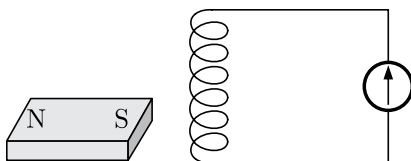
Max. Marks: 40

General Instructions:

1. All questions are compulsory.
 2. The question paper has three sections and 15 questions. All questions are compulsory.
 3. Section–A has 7 questions of 2 marks each; Section–B has 6 questions of 3 marks each; and Section–C has 2 case based questions of 4 marks each.
 4. Internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
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Section A

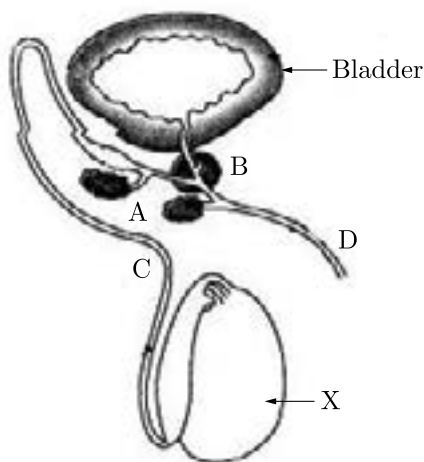
1. Answer the following question :
 - (a) Why are certain compounds called hydrocarbons? Write the general formula for homologous series of alkanes, alkenes and allkeynes.
 - (b) Write the name of the reaction that converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur.
2.
 - (a) State Modern Periodic Law.
 - (b) Why is position assigned to hydrogen in Periodic Table considered anomalous ?
3.
 - (a) Trace the path of sperms from where they are produced in human body to the exterior.
 - (b) Write the functions of secretions of prostate gland and seminal vesicles in humans.
4. In the diagram of human male reproductive system given below :
 - (a) Label parts A and B.
 - (b) Name the hormone produced by organ 'X'. What is the role of this hormone in the human male?
5. A coil of insulated wire is connected to a galvanometer as show in figure. What would be seen if a bar magnet with its south pole towards one face of the coil is :



- (a) moved quickly towards it ?
- (b) moved quickly away from it ?

or

- (i) A compass needle gets deflected when brought near a current carrying conductor why ?
- (ii) What happens to the deflection of needle when current in the conductor is increased?



6. Leaves of Bryophyllum fallen on the ground produce new plants, whereas the leaves of Jasmine do not. Why ?

or

What are the disadvantages of natural vegetative propagation?

7. Government of India is imposing ban on the use of polythene bags for shopping. List for advantages of using cloth or jute bags over polythene bags.

or

Pesticides like DDT which are sprayed to kill pests on crops are found to be present in the soil, ground water, water bodies etc. Explain how do they reach these places.

Section B

8. Study the data of the following three categories A, B and C.

| Category | Name of the element | Atomic Mass |
|----------|---------------------|-------------|
| A | Li | 7 |
| | Na | 23 |
| | K | 39 |
| B | N | 14 |
| | P | 31 |
| | As | 74 |
| C | B | 10.8 |
| | Al | 27 |
| | Ga | 69.7 |

- (a) From the given three categories A, B and C, pick the one which forms Dobereinefs Triads.
- (b) Why did Mendeleev placed elements of category A, B and C in three different groups?
- (c) Is Newland law of octaves applicable to all the three categories? Give reason to justify your answer.

9. An element X has mass number 35 and number of neutrons 18.

- (a) Write the atomic number of X .
- (b) Give electronic configuration of X .
- (c) To which group and period does it belong?

or

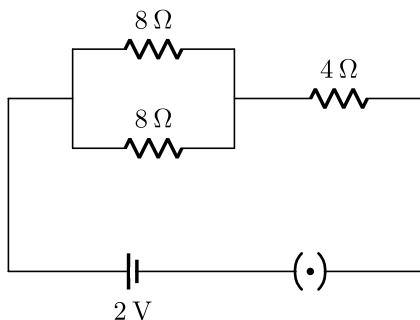
- (a) State the Modern Periodic Law.
- (b) Name the element which has twice as many electrons in its second shell as in its first shell. Write its electronic configuration also.

10. How do Mendel's experiments show that traits may be dominant or recessive?

11. (a) In a given ammeter, a student saw that needle indicates 12th division in ammeter while performing an experiment to verify Ohm's law. If ammeter has 10 divisions between 0 to 0.5 A, then what is the ammeter reading corresponding to 12th division ?
- (b) How do you connect an ammeter and a voltmeter in an electric circuit ?

12. Study the given electric circuit and calculate :

- (i) the current flowing through the $4\ \Omega$ resistor and
- (ii) potential difference across the combination of two resistor of $8\ \Omega$ each.



or

Demonstrate that due to motion of a magnet near a solenoid coil an induced current is set up in the coil.

13. (a) "Improvements in our lifestyle have resulted in greater amounts of waste generation." Give two examples to support the given statement. Suggest one change that we can incorporate in our lifestyle in order to reduce non-biodegradable waste.

- (b) The following organisms form a food chain.

Insect, Hawk, Grass, Snake, Frog

Which of these will have highest concentration of non-biodegradable chemicals? Name the phenomenon.

Section C

This section has 02 case-based questions (14 and 15). Each case is followed by 03 sub-questions (a, b and c). Parts a and b are compulsory. However, an internal choice has been provided in part c.

14. Study the following table and answer the following questions.

| | Contraceptive method | Duration of efficiency | Hormonal exposure |
|----|----------------------|------------------------|-------------------|
| 1. | Copper IUD | 10 years | No |
| 2. | Pills | Use days | Yes |
| 3. | Diaphragm | Reusable | No |

- Name the contraceptive device that is commonly used by the males.
- What is the part of the male reproduction organ that is cut in the process of vasectomy?
- What are STDs?

or

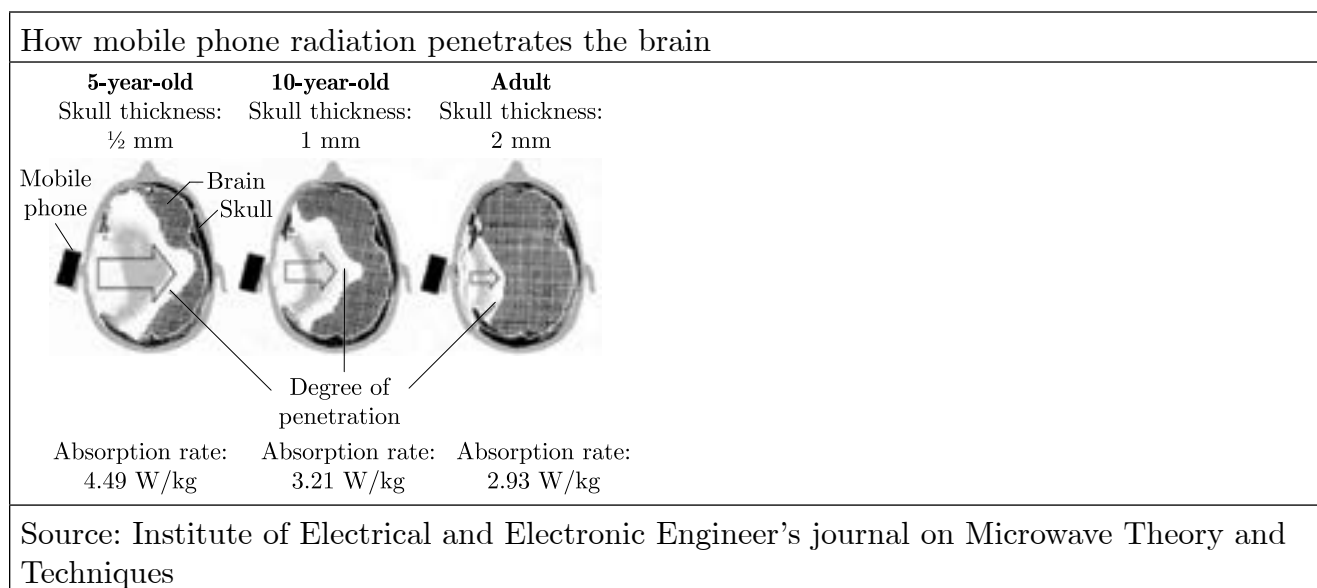
Syphilis is caused by any microbe. Name it.

15. Read the following case based passage and answer the questions given after passage.

The mobile phone is an excellent communication device. Mobile phones uses electromagnetic radiation in the microwave range. Part of the radio wave emitted by the mobile phone handset will be absorbed by the head.

Head is in the 'near field' of radiation, so that most of the heating effect occurs in the head.

Temperature in the internal ear, brain increases by 1 degree or more. This adversely affect the functioning of these organs since these have fluid filled cavities. But prolonged heating effect can alter brain functions and hearing ability also. Other harmful effects such as Premature Cataract, Confusion and loss of memory may also be possible. Following figure shows that how mobile phone radiation penetrates the brain.



- Which radiations are used in mobile phones?
- How does prolonged heating effect due to mobile radiations can effect adversely?

(iii) What precautions should be taken while using mobile phones?

or

In which part of our body, most of the heating effect occurs due to use of mobiles?

Solution
SCIENCE - 086
Class 10 - Science

Time: 2 Hours

Max. Marks: 40

General Instructions:

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Section A

1. Answer the following question :

- (a) Why are certain compounds called hydrocarbons? Write the general formula for homologous series of alkanes, alkenes and alkynes.
- (b) Write the name of the reaction that converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur.

Ans :

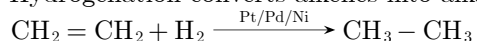
- (a) Certain compounds are called as hydrocarbons because they are formed mainly from carbon and hydrogen.

Formula for homologous series of alkanes : C_nH_{2n+2}

Formula for homologous series of alkenes : C_nH_{2n}

Formula for homologous series of alkynes : C_nH_{2n-2}

- (b) Hydrogenation converts alkenes into alkane.



Dihydrogen gas adds to alkene in the presence of finely divided catalysts like platinum, palladium or nickel to form alkanes.

2. (a) State Modern Periodic Law.
(b) Why is position assigned to hydrogen in Periodic Table considered anomalous ?

Ans :

- (a) Modern periodic law states that the physical and chemical properties of an element are the periodic function of the atomic number of that element.
- (b) Hydrogen resembles both alkali metals and

halogens. In one hand, it can lose one electron like alkali metals, in the other, like halogens it forms diatomic molecule and combines with metals and non-metals to form covalent compounds and also gains one electron like halogens. So, no fixed position can be given to hydrogen.

3. (a) Trace the path of sperms from where they are produced in human body to the exterior.
(b) Write the functions of secretions of prostate gland and seminal vesicles in humans.

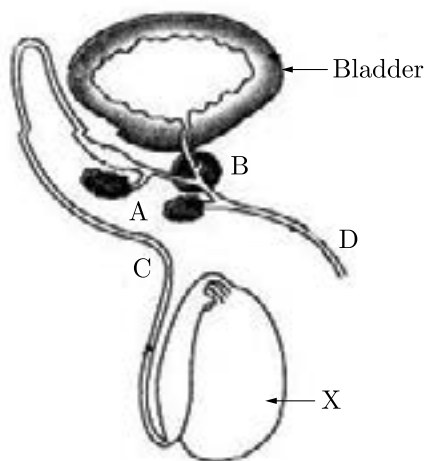
Ans :

- (a) The sperms produced in testes are delivered through the vas deferens which unites with another tube urethra emerging from urinary bladder. Urethra carries the sperms to an organ called penis. The penis passes the sperms from the man's body into vagina in the woman's body during mating.

- (b)
 - (i) **Seminal vesicles** : It secretes alkaline secretions which lower the pH of the semen and provide nourishment to sperms.
 - (ii) **Prostate glands** : The secretions of these glands keeps the sperms active and mobile. It secretes fluid comprising up to a third of semen volume and assists sperm motility.

4. In the diagram of human male reproductive system given below :

- (a) Label parts A and B.
- (b) Name the hormone produced by organ 'X'. What is the role of this hormone in the human male?



Ans :

- (a) A : Seminal vesicle, B : Prostate gland.
- (b) The organ 'X' testis produces testosterone hormone.

Role :

- (i) It controls sperm formation.
- (ii) It is responsible for secondary sexual characters.

5. Leaves of Bryophyllum fallen on the ground produce new plants, whereas the leaves of Jasmine do not. Why ?

Ans :

In case of Bryophyllum. It bears adventitious buds produced in the notches along the leaf margin, when these leaves fall on the soil they develop into a new plant. But in case of Jasmine, no such buds are produced in the notches of leaves.

or

What are the disadvantages of natural vegetative propagation?

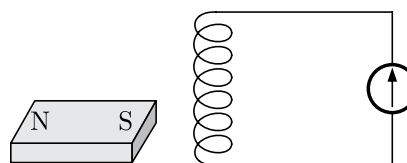
Ans :

The disadvantages of natural vegetative propagation are :

- (i) There is less adaptability to the environment since there is no genetic variation.
- (ii) The disease of the parent plant gets transferred to the offspring.
- (iii) Undesirable characters cannot be eliminated.
- (iv) New characters cannot be introduced.

6. A coil of insulated wire is connected to a galvanometer as show in figure. What would be seen if a bar magnet with its south pole towards

one face of the coil is :



- (a) moved quickly towards it ?
- (b) moved quickly away from it ?

Ans :

- (a) We get a momentary deflection in galvanometer.
- (b) We again get a momentary deflection in galvanometer but in the reverse direction.

or

- (i) A compass needle gets deflected when brought near a current carrying conductor why ?
- (ii) What happens to the deflection of needle when current in the conductor is increased?

Ans :

- (i) Current carrying conductor produces a magnetic field around it.
- (ii) Deflection increases with increase in current.

7. Government of India is imposing ban on the use of polythene bags for stopping. List for advantages of using cloth or jute bags over polythene bags.

Ans :

Advantages of jute and cloth bags are :

- (i) They are re-usable.
- (ii) They are biodegradable.
- (iii) They are stronger than polythene bags and can carry more load.
- (iv) They can be repaired at home if torn.

or

Pesticides like DDT which are sprayed to kill pests on crops are found to be present in the soil, ground water, water bodies etc. Explain how do they reach these places.

Ans :

Soil : Pesticides like DDT are used to protect crops plants from insects and pests. They, in the end, get settled into the soil particles, when used on plants and cause soil pollution.

Ground water : Through irrigation these pesticides present in the soil pass into lower layers of soil and reaches ground water and ground water pollution.

Water bodies : When the waste water or other agricultural waste is thrown or rain off with rain water in water bodies like rivers, canals, ponds etc the pesticides affect water bodies and polluted it.

Section B

8. Study the data of the following three categories A, B and C.

| Category | Name of the element | Atomic Mass |
|----------|---------------------|-------------|
| A | Li | 7 |
| | Na | 23 |
| | K | 39 |
| B | N | 14 |
| | P | 31 |
| | As | 74 |
| C | B | 10.8 |
| | Al | 27 |
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- From the given three categories A, B and C, pick the one which forms Dobereinefs Triads.
- Why did Mendeleev placed elements of category A, B and C in three different groups?
- Is Newland law of octaves applicable to all the three categories? Give reason to justify your answer.

Ans :

- Category A forms Dobereiner's triads.
- Mendeleev placed the elements of category A, B and C in different groups because they all have different atomic masses.
- The law of octaves states that every eighth element has similar properties when the elements are arranged in the increasing order of their atomic masses. Therefore, it is applicable to all three categories.

- 9.** An element X has mass number 35 and number of neutrons 18.

- Write the atomic number of X .
- Give electronic configuration of X .
- To which group and period does it belong?

Ans :

- Atomic number of the element $X = \text{Mass number} - \text{Number of neutrons} = 35 - 18 = 17$
- Electronic configuration of $X = 2, 8, 7$.
- The element X belongs to 17th group and 3rd period.

or

- State the Modern Periodic Law.
- Name the element which has twice as many electrons in its second shell as in its first shell.

Write its electronic configuration also.

Ans :

- Modern periodic law states that the physical and chemical properties of an element are the periodic function of the atomic number of that element.
- Carbon.

| | | |
|----------------------------|---|---|
| Electronic configuration : | K | L |
| | 2 | 4 |

- 10.** How do Mendel's experiments show that traits may be dominant or recessive?

Ans :

Traits may be dominant or recessive. When Mendel cross-bred plants of two different traits of character, a tall pea plant (TT) and a dwarf pea plant (tt) to get a progeny, in F_1 generation, all plants were tall. Thus, only the dominant trait was visible in this generation. But when plants of F_1 generation were self-crossed, then the two traits of character got separated in the plants of F_2 generation. All plants obtained in the F_2 generation were not tall. One-fourth of the F_2 plants were short.

Appearance of tall characters in both the F_1 and F_2 generations shows that it is a dominant character. Whereas, the absence of dwarf character in F_1 generation and its reappearance in F_2 generation shows dwarfness is the recessive character.

11. (a) In a given ammeter, a student saw that needle indicates 12th division in ammeter while performing an experiment to verify Ohm's law. If ammeter has 10 divisions between 0 to 0.5 A, then what is the ammeter reading corresponding to 12th division ?
- (b) How do you connect an ammeter and a voltmeter in an electric circuit ?

Ans :

- (a) The ammeter is having 10 division in between $0 - 0.5 \text{ A}$.

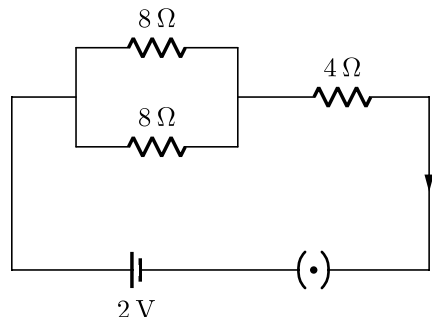
$$\begin{aligned}\text{Least count of ammeter} &= \frac{0.5 - 0}{10} \\ &= 0.05 \text{ A}\end{aligned}$$

Hence, the reading of 17 division will be

$$= 17 \times 0.05$$
$$= 0.85 \text{ A}$$

- (b) Ammeter is connected in series combination and voltmeter is connected in the parallel combination.

12. Study the given electric circuit and calculate :
- the current flowing through the $4\ \Omega$ resistor and
 - potential difference across the combination of two resistors of $8\ \Omega$ each.



Ans :

- (i) As we know that,

$$V = IR$$

$$2 = I \times 4$$

$$I = 0.5\text{ A}$$

- (ii) Two $8\ \Omega$ resistors are in parallel, so then equivalent resistance.

$$\frac{1}{R_{\text{eq}}} = \frac{1}{8} + \frac{1}{8} = \frac{2}{8}\ \Omega = \frac{1}{4}\ \Omega$$

$$R_{\text{eq}} = 4\ \Omega$$

Now, two $4\ \Omega$ resistors are in series.

So, total resistance,

$$R_{\text{Total}} = 4\ \Omega + 4\ \Omega = 8\ \Omega$$

Total current,

$$I_{\text{Total}} = \frac{V}{R} = \frac{2}{8} = \frac{1}{4}\text{ A}$$

Voltage across equivalent resistance of two $8\ \Omega$ resistors

$$V = \frac{I_{\text{Total}}}{R_{\text{eq}}} = \frac{1}{4} \times 4 = 1\text{ V}$$

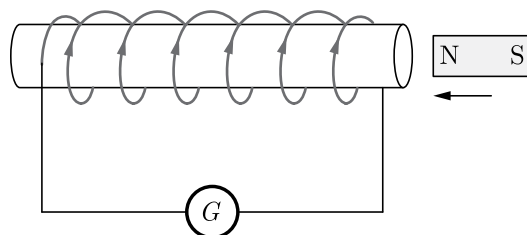
or

Demonstrate that due to motion of a magnet near a solenoid coil an induced current is set up in the coil.

Ans :

Take a solenoid coil of insulated copper wire AB having a number of turns (about 20 or more). Connect the ends of coil to a sensitive galvanometer. Now take a bar magnet NS and rapidly bring the magnet towards the end B of coil as shown in Figure. The galvanometer suddenly gives momentary deflection in one direction. Now take the magnet away from the coil, the galvanometer again gives momentary deflection but in the opposite direction. It clearly shows that motion of magnet induces,

a current in the coil and it is the phenomenon of electro-magnetic induction.



Now fix the magnet in any one position so that it is stationary with respect to the coil. We find that there is no deflection in galvanometer.

Again keep the magnet fixed and gently move the coil AB either towards the magnet or away from the magnet. We get deflection in galvanometer even now. Thus, it is proved that induced current due to electromagnetic induction is produced whenever there is relative motion between the coil and the magnet.

13. (a) "Improvements in our lifestyle have resulted in greater amounts of waste generation." Give two examples to support the given statement. Suggest one change that we can incorporate in our lifestyle in order to reduce non-biodegradable waste.
- (b) The following organisms form a food chain.
Insect, Hawk, Grass, Snake, Frog
Which of these will have highest concentration of non-biodegradable chemicals? Name the phenomenon.

Ans :

- (a) Now-a-days, changes and improvement in our lifestyle has resulted in more and more use of disposable items like polythene bags, plastic items and paper plates etc. These materials are increasing the generation of wastes.
Suggestion : We can reduce non-biodegradable wastes by adopting techniques like recycling and reuse. We must encourage the reuse of plastic and glass containers to store the household items. Packaging materials should be made out of recyclable materials like cloth and paper.
- (b) The proper sequence of this food chain is:
Grass \rightarrow Insect \rightarrow Frog \rightarrow Snake \rightarrow Hawk
The last trophic level 'Hawk' will have highest concentration of non-biodegradable chemicals. This phenomenon is called Biomagnification.

Section C

This section has 02 case-based questions (14 and 15). Each case is followed by 03 sub-questions (a, b and c). Parts a and b are compulsory. However, an internal choice has been provided in part c.

14. Study the following table and answer the following questions.

Table-A

| | Contraceptive method | Duration of efficiency | Hormonal exposure |
|----|----------------------|------------------------|-------------------|
| 1. | Copper IUD | 10 years | No |
| 2. | Pills | Use days | Yes |
| 3. | Diaphragm | Reusable | No |

- Name the contraceptive device that is commonly used by the males.
- What is the part of the male reproduction organ that is cut in the process of vasectomy?
- What are STDs?

or

Syphilis is caused by any microbe. Name it.

Ans :

- The contraceptive device that is commonly used by the males is the condom.
- Male vas deferens are cut down and tied to prevent sperm from entering into urethra.
- There are a number of diseases that are caused by sexual intercourses. These diseases are called STDs "Sexually Transmitted Disease".

or

Treponema pallidum is the bacterium that causes a disease called syphilis in humans.

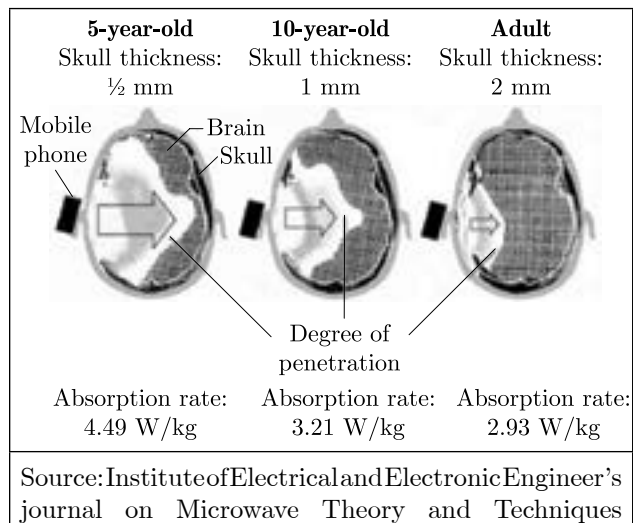
15. Read the following case based passage and answer the questions given after passage.

The mobile phone is an excellent communication device. Mobile phones use electromagnetic radiation in the microwave range. Part of the radio wave emitted by the mobile phone handset will be absorbed by the head.

Head is in the 'near field' of radiation, so that most of the heating effect occurs in the head.

Temperature in the internal ear, brain increases by 1 degree or more. This adversely affects the functioning of these organs since these have fluid filled cavities. But prolonged heating effect can alter brain functions and hearing ability also. Other harmful effects such as Premature Cataract, Confusion and loss of memory may also be possible. Following figure shows that how mobile phone radiation penetrates the brain.

How mobile phone radiation penetrates the brain



- Which radiations are used in mobile phones?
- How does prolonged heating effect due to mobile radiations can effect adversely?
- What precautions should be taken while using mobile phones?

or

In which part of our body, most of the heating effect occurs due to use of mobiles?

Ans :

- Electromagnetic radiations of microwave range are used in mobile phones.
- Heating effect can alter brain functions and hearing ability also. Other harmful effects such as premature cataract, confusion and loss of memory may also be possible.
- Try to consider mobile phone as a communication device and not an entertainment device. Even if you are not talking, the cell phone is emitting strong signals to keep a link with the base station.

or

Head.