

# O P JINDAL SCHOOL , SAVITRINAGAR

## CLASS TEST & PRACTICE

CLASS X PHYSICS

TOPIC : MAGNETIC EFFECT  
OF CURRENT AND  
MAGNETISM

- 1 Rajiv and Rajat were once lost in a forest. As it was a cloudy and foggy day, they had no idea of direction in which they were leading. So, Rajiv took out the magnetic compass from his bag. On seeing it, he noticed that the pointer designed to point towards North was worn off and the needle became similar at both ends. This made him broke down. Rajat consoled him and came up with an idea on seeing the flashlight and a piece of wire hanging out from Rajiv's bag. He took out the battery of flashlight and connected it with the wire. Now they came to know about the true directions. 4
- (a) How are they identified the geographical north direction ?  
(b) What is magnetic compass ?  
(c) What according to you were the values displayed by Rajat to help Rajiv?

ANS: (a) Hold the magnetic compass needle directly above and closer to the current carrying wire in which current is flowing away from him. Using right hand thumb rule, the end of the compass needle directed towards right is north pole which is the direction of geographical north.

(b) Magnetic compass : A small bar magnet which is free to move in a horizontal plane on a pivot is called magnetic compass. The end of the needle pointing towards geographical north is called north seeking or north pole while the other end that points towards geographical south is called south seeking or south pole.

(c) Presence of mind, higher degree of general awareness, helping and caring nature, concern of friend.

- 2 Aishwarya once visited her uncle's house. Somehow she came to know about her uncle's illness and also about the neglect of MRI (Magnetic resonance imaging) due to its high cost. She then not only collected money from some of her family friends but also convinced her uncle for the test The reports came after the test helped the doctors to treat him well. After getting well, uncle arranged the money and returned to her saying thanks. Then her uncle did a brief research about the test and found that it was expensive because of its set-up, that needs a strong magnetic fields and pulses of radio wave energy. 4
- (a) What were the values shown by Aishwarya and her uncle ?  
(b) How the magnetic field produced due to a circular coil depends on its radius?  
(c) State the characteristics of magnetic field lines produce by current carrying circular coil. (any two)

ANS: (a) Ability to take prompt decisions, presence of mind, general awareness, sympathy, helping and caring nature, concern for each other. (Any two)

(b) Magnetic field produced due to circular coil at its centre is inversely dependent on the radius of the coil.

(c) Characteristics of magnetic field lines produced by current carrying circular coil are :

(i) Magnetic field lines are straight at the centre.

(ii) Field lines are perpendicular to the plane.

(iii) Field lines will enter the circular coil from the side with clockwise current and will leave from the other side.

(iv) Field lines are in the form of concentric circles near the wire whose radius increases as we move away from the wire. (any two)

3 Rahul once went to a construction site along with his father. There he saw large cranes lifting heavy iron loads. After sometimes, he noticed that all the cranes were lifting a bunch of iron rods and unloading it to other places. He was surprised and then enquired the crane man about it. The crane man then explained the use of electricity in lifting the load.

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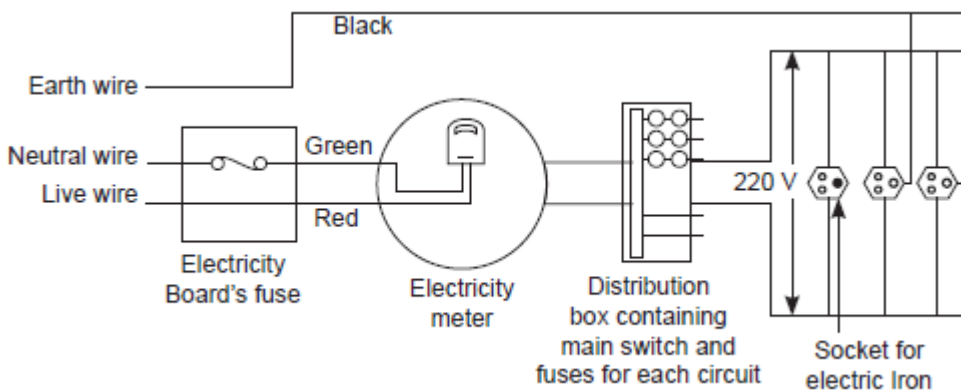
- According to you, which effect of electricity is used in cranes ?
- How electromagnet is formed ?
- Which qualities were shown by the crane man?

ANS: (a) Magnetic effect of electric current i.e., electromagnetism

(b) When a soft iron is placed inside a current carrying solenoid, the strong magnetic field inside the solenoid magnetise the soft iron. The magnet so formed is called an electromagnet.

(c) Practical knowledge, Knowledge sharing, helping nature.

4 A novice electrician designed the following circuit for the electric wiring in a certain household. His senior, however, told him to make five important changes/corrections in this circuit.



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(a) Identify five faults in the

above circuit.

- Suggest and write the five corrections needed, in brief, that you think the senior electrician must have suggested to this novice.
- What qualities were shown by his senior?

ANS: (a) Faults in the given circuits

- Black insulation wire is used for earth wire.
- Main fuse is connected with the neutral wire.
- Insulation of neutral wire is green.
- In distribution box, neutral wire is distributed for various circuits and fuses are also connected with neutral wire.
- Earth wire is connected with live and neutral wire.

(b) Correction needed for given circuit

- Earth wire should be of green insulation instead of black colour.
- Main fuse must be connected with live wire.
- Neutral wire should be of black insulation instead of a green colour.
- In distribution box, live wire should be distributed for various circuits and all the fuses in distribution box must be connected with live wire.
- Earth wire must not be connected with the live wire or neutral wire.

(c) Presence of mind, alertness, helping nature, scientific temper and knowledge sharing with his subordinates.

- 5 One day Suresh connected many household high power appliances having a current rating more than 6A to a multiplug of 6A rating. When he was about to switch them on, his elder sister shouted and asked him to remove the appliances from a single socket.
- (a) According to you, why she would not advice to connect multi-high power appliances on a single socket 4 ?
- (b) What would have happened, if he switched them on ?
- (c) What was the value shown by his sister?

ANS: (a) Connecting too many appliances to a single socket can cause overloading.

(b) A large amount of current would have flown through the circuit beyond permissible value i.e. 6A. Due to overloading, the wires of the circuit get heated which may also cause fire.

(c) Knowledge application, concern for her brother, presence of mind.