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AMC/AFNS/NUMS Physics-6 Test Preparation

Magnetism and Modern Physics

1. Magnetism is mainly associated with:

- A. Stationary mass only
- B. Magnetic poles and moving charges
- C. Heat flow only
- D. Sound waves only

Correct Answer: B. Magnetic poles and moving charges

Explanation: Magnetism is a physical phenomenon associated with magnetic poles, magnetic fields, and moving electric charges. Magnets attract magnetic materials such as iron, nickel, and cobalt. Electric currents can also produce magnetic fields, which shows the close relationship between electricity and magnetism.

2. A magnet has:

- A. One pole only
- B. Two poles
- C. Three poles
- D. No poles

Correct Answer: B. Two poles

Explanation: Every magnet has two poles: north pole and south pole. These poles are the regions where magnetic force is strongest. Even if a magnet is broken into pieces, each piece still has both north and south poles.

3. Like magnetic poles:

- A. Attract each other
- B. Repel each other
- C. Become neutral
- D. Produce light only

Correct Answer: B. Repel each other

Explanation: Like magnetic poles repel each other. This means north repels north and south repels south. This property is similar to electric charges, where like charges also repel each other.

4. Unlike magnetic poles:

- A. Repel each other
- B. Attract each other
- C. Disappear completely
- D. Produce heat only

Correct Answer: B. Attract each other

Explanation: Unlike magnetic poles attract each other. A north pole attracts a south pole, and a south pole attracts a north pole. This attraction is due to magnetic force acting between the poles.



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5. The magnetic field lines outside a bar magnet move from:

- A. South pole to north pole
- B. North pole to south pole
- C. Center to both poles only
- D. East to west only

Correct Answer: B. North pole to south pole

Explanation: Outside a bar magnet, magnetic field lines emerge from the north pole and enter the south pole. Inside the magnet, they continue from south to north, forming closed loops. The closer the field lines, the stronger the magnetic field.

6. The region around a magnet where magnetic force can be felt is called:

- A. Electric field
- B. Magnetic field
- C. Gravitational field only
- D. Sound field

Correct Answer: B. Magnetic field

Explanation: A magnetic field is the region around a magnet or current-carrying conductor where magnetic force acts. It can be represented by magnetic field lines. The direction of the field is the direction in which a north pole would move.

7. The SI unit of magnetic field strength is:

- A. Tesla
- B. Volt
- C. Ohm
- D. Joule

Correct Answer: A. Tesla

Explanation: The SI unit of magnetic field strength or magnetic flux density is tesla, represented by T. A stronger magnetic field has a larger tesla value. Another smaller unit often used is gauss.

8. Magnetic field is strongest where field lines are:

- A. Far apart
- B. Close together
- C. Broken
- D. Absent

Correct Answer: B. Close together

Explanation: The strength of a magnetic field is represented by the spacing of magnetic field lines. Where the field lines are close together, the magnetic field is strong. Near the poles of a magnet, field lines are crowded, so the field is strongest there.

9. A freely suspended magnet always points approximately in:

- A. East-west direction
- B. North-south direction
- C. Up-down direction

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D. Circular direction

Correct Answer: B. North-south direction

Explanation: A freely suspended magnet aligns itself with Earth's magnetic field and points approximately in the north-south direction. This property is used in a magnetic compass to find direction.

10. A compass needle is actually a small:

- A. Electric bulb
- B. Magnet
- C. Battery
- D. Resistor

Correct Answer: B. Magnet

Explanation: A compass needle is a small magnet that can rotate freely. Its north-seeking pole points approximately toward the geographic north because Earth behaves like a giant magnet. This makes the compass useful for navigation.

11. The materials strongly attracted by magnets are called:

- A. Diamagnetic materials
- B. Ferromagnetic materials
- C. Non-metallic materials
- D. Insulators only

Correct Answer: B. Ferromagnetic materials

Explanation: Ferromagnetic materials are strongly attracted by magnets and can be magnetized. Common examples include iron, cobalt, and nickel. These materials contain magnetic domains that can align in the same direction.

12. Which of the following is a ferromagnetic material?

- A. Copper
- B. Glass
- C. Iron
- D. Wood

Correct Answer: C. Iron

Explanation: Iron is a ferromagnetic material and is strongly attracted by magnets. It can also be magnetized because its magnetic domains can align in one direction. Copper, glass, and wood are not ferromagnetic.

13. A current-carrying wire produces:

- A. Only heat
- B. Magnetic field around it
- C. Sound waves only
- D. Gravitational field only

Correct Answer: B. Magnetic field around it

Explanation: When electric current flows through a wire, a magnetic field is produced around

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the wire. This was first observed by Oersted. The direction of the magnetic field depends on the direction of current.

14. The direction of magnetic field around a current-carrying wire can be found by:

- A. Left hand grip rule
- B. Right hand grip rule
- C. Fleming's left hand rule only
- D. Newton's law

Correct Answer: B. Right hand grip rule

Explanation: The right hand grip rule is used to find the direction of magnetic field around a current-carrying straight conductor. If the thumb points in the direction of current, the curled fingers show the direction of magnetic field lines.

15. A coil of wire carrying current behaves like a:

- A. Resistor only
- B. Magnet
- C. Fuse
- D. Thermometer

Correct Answer: B. Magnet

Explanation: A current-carrying coil produces a magnetic field similar to that of a bar magnet. One end behaves as a north pole and the other as a south pole. This principle is used in electromagnets and electric motors.

16. An electromagnet consists of a coil wound around:

- A. Wood core
- B. Soft iron core
- C. Plastic core only
- D. Glass core only

Correct Answer: B. Soft iron core

Explanation: An electromagnet is made by winding insulated copper wire around a soft iron core. When current flows through the coil, the iron core becomes magnetized. Soft iron is used because it can be easily magnetized and demagnetized.

17. The strength of an electromagnet can be increased by:

- A. Decreasing number of turns
- B. Increasing current through coil
- C. Removing iron core
- D. Using plastic core

Correct Answer: B. Increasing current through coil

Explanation: The strength of an electromagnet increases when the current through the coil is increased. It can also be increased by increasing the number of turns of the coil and using a soft iron core. Electromagnets are useful because their magnetism can be switched on and off.

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18. The device that converts electrical energy into mechanical energy is:

- A. Electric motor
- B. Generator
- C. Transformer
- D. Battery

Correct Answer: A. Electric motor

Explanation: An electric motor converts electrical energy into mechanical energy. It works on the principle that a current-carrying conductor placed in a magnetic field experiences a force. Motors are used in fans, washing machines, pumps, and many appliances.

19. The device that converts mechanical energy into electrical energy is:

- A. Electric motor
- B. Generator
- C. Ammeter
- D. Fuse

Correct Answer: B. Generator

Explanation: A generator converts mechanical energy into electrical energy by electromagnetic induction. When a coil rotates in a magnetic field, an electric current is induced. Generators are used in power stations to produce electricity.

20. Electromagnetic induction was discovered by:

- A. Newton
- B. Faraday
- C. Dalton
- D. Mendel

Correct Answer: B. Faraday

Explanation: Michael Faraday discovered electromagnetic induction. He found that changing magnetic fields can induce electric current in a conductor. This principle is the basis of generators, transformers, and many electrical devices.

21. Modern physics mainly deals with:

- A. Only simple machines
- B. Atomic, nuclear, and quantum phenomena
- C. Heat engines only
- D. Motion of planets only

Correct Answer: B. Atomic, nuclear, and quantum phenomena

Explanation: Modern physics deals with phenomena that classical physics cannot fully explain, especially at atomic, subatomic, and very high-speed levels. It includes quantum physics, atomic structure, nuclear physics, relativity, semiconductors, and radiation.

22. The smallest particle of an element that retains its chemical properties is:

- A. Molecule
- B. Atom

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- C. Electron
- D. Proton only

Correct Answer: B. Atom

Explanation: An atom is the smallest unit of an element that retains the chemical properties of that element. Atoms are made up of protons, neutrons, and electrons. Chemical reactions involve rearrangement of atoms and electrons, not destruction of nuclei.

23. The nucleus of an atom contains:

- A. Electrons only
- B. Protons and neutrons
- C. Protons and electrons
- D. Neutrons and electrons

Correct Answer: B. Protons and neutrons

Explanation: The nucleus is the central part of an atom and contains protons and neutrons. Protons carry positive charge, while neutrons have no charge. Electrons move around the nucleus in energy levels or orbitals.

24. Electrons carry:

- A. Positive charge
- B. Negative charge
- C. No charge
- D. Variable nuclear charge

Correct Answer: B. Negative charge

Explanation: Electrons are negatively charged subatomic particles present outside the nucleus. Their movement and arrangement determine many chemical and electrical properties of matter. Electric current in metals is due to the flow of electrons.

25. Protons carry:

- A. Negative charge
- B. Positive charge
- C. No charge
- D. Both positive and negative charge

Correct Answer: B. Positive charge

Explanation: Protons are positively charged particles present in the nucleus of an atom. The number of protons determines the atomic number of an element. For example, hydrogen has one proton and carbon has six protons.

26. Neutrons carry:

- A. Positive charge
- B. Negative charge
- C. No charge
- D. Electric current

Correct Answer: C. No charge

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Explanation: Neutrons are neutral particles found in the nucleus along with protons. They contribute to atomic mass and help stabilize the nucleus. Different numbers of neutrons in atoms of the same element form isotopes.

27. Isotopes are atoms of the same element having:

- A. Same mass number but different atomic number
- B. Same atomic number but different mass number
- C. Different number of protons
- D. No neutrons

Correct Answer: B. Same atomic number but different mass number

Explanation: Isotopes are atoms of the same element that have the same number of protons but different numbers of neutrons. Therefore, they have the same atomic number but different mass numbers. Examples include carbon-12 and carbon-14.

28. Radioactivity is the spontaneous emission of radiation from:

- A. Stable nuclei
- B. Unstable nuclei
- C. Electrons only
- D. Molecules only

Correct Answer: B. Unstable nuclei

Explanation: Radioactivity is the spontaneous emission of particles or radiation from unstable atomic nuclei. The nucleus becomes more stable by releasing alpha particles, beta particles, or gamma rays. Radioactive decay is a nuclear process.

29. Alpha particles consist of:

- A. Electrons only
- B. Helium nuclei
- C. Neutrons only
- D. Gamma photons

Correct Answer: B. Helium nuclei

Explanation: Alpha particles are made up of two protons and two neutrons, the same as helium nuclei. They have a positive charge and relatively large mass. Alpha particles have low penetrating power but strong ionizing ability.

30. Gamma rays are:

- A. High-energy electromagnetic radiations
- B. Streams of electrons only
- C. Helium nuclei
- D. Slow-moving neutrons

Correct Answer: A. High-energy electromagnetic radiations

Explanation: Gamma rays are high-energy electromagnetic radiations emitted from unstable nuclei. They have no mass and no charge, but they have very high penetrating power. Thick lead or concrete is needed to reduce gamma radiation.



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