Physics 12
Chapter 15 – ELECTROMAGNETIC INDUCTION
Solved MCQ's
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MCQs Related to the Article "15.1 INDUCED EMF AND INDUCED CURRENT"

1. The SI units of induced emf is
(a) Ohm (b) Volt (c) Henry (d) Tesla

2. The induced current is a circuit can be increased by:
(a) Using strong magnetic field (b) Moving loop faster
(c) Replacing the loop by the coil of many turns (d) All a, b & c

3. Identify the phenominon by which an induced emf can be generated:
(a) By moving magnet (b) By rotating a coil in it
(c) By moving a coil towards stationary magnet (d) All a, b & c

4. When a loop of wire is moved across a magnetic field, the current is produced in it is called
(a) Induced current (b) Photo electric current (c) Alternating current (d) Direct current

5. emf is induced due to change in:
a) Charge (b) Current (c) Magnetic Flux (d) Electric Flux

MCQ # 1: (b)	MCQ # 2: (d)	MCQ # 3: (d)	MCQ # 4: (a)	MCQ # 5: (c)

MCQs Related to the Article "15.2 MOTIONAL EMF"

1. The emf induced by motion of conductor across magnetic field is called
(a) Potential Difference (b) Electric potential (c) Variable emf (d) Motional emf

2. The relation of motional emf , when a conductor is move in perpendicular magnetic field, is:
(a) $\varepsilon = vBL$ (b) $\varepsilon = qBl$ (c) $\varepsilon = Blq$ (d) $\varepsilon = qvB$

3. If velocity of a conductor moving through a magnetic field B is made zero, then motional emf is:
(a) $-vBL$ (b) $-\frac{v}{BL}$ (c) Zero (d) $-\frac{BL}{v}$

4. Motional emf is directly proportional to:
(a) Velocity of conductor (b) Magnetic field strength
(c) Length of conductor (d) All a, b & c

5. The rod of unit length is moving at 30° through a magnetic field of 1 T. If velocity of the rod is 1 ms^{-1}, then induced emf in the rod will be given by:
(a) 1 V (b) 0.2 V (c) 0.5 V (d) 0.6 V

MCQ # 1: (d)	MCQ # 2: (a)	MCQ # 3: (c)	MCQ # 4: (d)	MCQ # 5: (c)

MCQs Related to the Article "15.3 FARADAY'S LAW OF INDUCED EMF"

1. The relation $\varepsilon = -N\frac{\Delta\phi}{\Delta t}$ is known as:
(a) Kirchoff's Rule (b) Ampere's Law (c) Faraday's Law (d) Coulomb's Law

2. The negative sign with induced emf is due to
(a) Faraday's law (b) Lenz's law (c) Ampere law (d) None

3. According to Faraday's law of electromagnetic induction, the induced emf is directly proportional to:
(a) Magnetic Flux (b) Induced Current
(c) Resistance of coil (d) Rate of change of magnetic flux

4. If we increase the resistance of the circuit containing a coil, the induced emf will be
(a) Increase (b) Decrease (c) Remain same (d) None

5. The product of induced current and resistance of the wire through which current is passing is equal to:
(a) Mutual Inductance (b) Induced emf (c) Self Inductance (d) Eddy Currents

6. The term $\frac{\Delta\phi}{\Delta t}$ has the same dimension as:
(a) Time (b) Current (c) Magnetic Flux (d) Resistance

MCQ # 1: (c)	MCQ # 2: (b)	MCQ # 3: (d)	MCQ # 4: (c)	MCQ # 5: (b)	MCQ # 6: (c)

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MCQs Related to the Article "15.4 LENZ'S LAW AND DIRECTION OF INDUCED CURRENT"

1. **The direction of induced current is always so as to oppose the change which causes the current is called:**

(a) Faraday's law (b) Lenz's law (c) Ohm's law (d) Kirchhoff's rule

2. **Lenz's law is consistent with the law of conservation of:**

(a)Angular Momentum (b) Momentum (c) Energy (d) Charge

3. **Lenz's law deals with:**

(a) Magnitude of emf (b) Direction of emf
(c) Resistance (d) Direction of induced current

4. **If the magnetic flux through the circuit through the circuit is increasing, then induced emf acts to _____ the magnetic flux**

(a) Increase (b) Decrease (c) Zero (d) None of these

5. **If the magnetic flux through the circuit through the circuit is decreasing, then induced emf acts to _____ the magnetic flux.**

(a) Increase (b) Decrease (c) Zero (d) None of these

MCQ # 1: (b)	MCQ # 2: (c)	MCQ # 3: (d)	MCQ # 4: (b)	MCQ # 5: (a)

MCQs Related to the Article "15.5 MUTUAL INDUCTION"

1. **The phenominon in which changing current in one coil induces emf in other coil is called:**

(a) Self Induction (b) Mutual Induction (c) Motional emf (d) Magnetic Flux

2. **The mutual inductance b/w two coil is**

(a) $M = -\frac{\varepsilon_S}{\Delta I_P}$ (b) $M = -\frac{\varepsilon_S}{\left(\frac{\Delta I_P}{\Delta t}\right)}$ (c) $M = -\frac{\varepsilon_S}{\left(\frac{\Delta \phi}{\Delta t}\right)}$ (d) $M = -\frac{\left(\frac{\Delta I_P}{\Delta t}\right)}{\varepsilon_S}$

3. **Inductance is measure in:**

(a) Volt (b) Ampere (c) Ohms (d) Henry

4. **1 henry is equal to:**

(a) $1\ V\ A\ s^{-1}$ (b) $1\ V\ s\ A^{-1}$ (c) $1\ V\ m\ A^{-1}$ (d) $1\ V\ A\ m^{-1}$

5. **The application of mutual induction is a**

(a) Television (b) Radio (c) Transformer (d) D.C. motor

6. **The mutual induction between two coils depends upon:**

(a) area of the coils (b) distance b/w the coils (c) number of turns (d) all of these

MCQ # 1: (b)	MCQ # 2: (b)	MCQ # 3: (d)	MCQ # 4: (b)	MCQ # 5: (c)	MCQ # 6: (d)

MCQs Related to the Article "15.6 SELF INDUCTION"

1. **The phenomenon in which changing current in a coil induces an emf in itself is called:**

(a) Self Induction (b) Mutual Induction (c) Motional emf (d) Magnetic Flux

2. **The self-inductance may be defined by**

(a) $L = -\frac{\left(\frac{\Delta I}{\Delta t}\right)}{\varepsilon}$ (b) $L = -\frac{\varepsilon}{\left(\frac{\Delta I}{\Delta t}\right)}$ (c) $L = -\frac{\varepsilon}{\Delta I}$ (d) $L = -\frac{\Delta I}{\varepsilon}$

3. **The ratio of average induced emf to the rate of change of current in the coil is called:**

(a) Self inductance (b) Mutual inductance (c) Electric Flux (d) Current

4. **The notation for henry is:**

(a) $Vs^{-1}A^{-1}$ (b) $Vs^{-1}A$ (c) AsV^{-1} (d) VsA^{-1}

5. **The inductance is more in self induction in:**

(a) Air cored coil (b) Iron cored coil (c) Plastic cored coil (d) None of these

6. **Inductance of the coil can be increased by using _____ core:**

(a) Diamagnetic (b) Paramagnetic (c) Ferromagnetic (d) None of these

7. **Self-inductance of a coil depends upon:**

(a) Number of turns of coil (b) Area of coil (c) Core material (d) All a, b & c

MCQ # 1: (a)	MCQ # 2: (b)	MCQ # 3: (a)	MCQ # 4: (d)	MCQ # 5: (b)	MCQ # 6: (c)	MCQ # 7: (d)

MCQs Related to the Article "15.7 ENERGY STORED IN AN INDUCTOR"

1. **An inductor is a circuit element that can store energy in**

(a) Magnetic field (b) Electric flux (c) Electric field (d) None

2. **Magnetic potential energy stored in an inductor depends upon:**

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(a) Square root of the value of current (b) Cube root of the value of current
(c) Square of the value of current (d) None of these

3. Energy stored in an inductor is:

(a) $\frac{1}{2}LI^2$ (b) $\frac{1}{2}LI$ (c) $\frac{1}{2}L^2I^2$ (d) $\frac{1}{2}LI$

4. The energy stored per unit volume inside a solenoid is calculated by:

(a) $\frac{B^2}{2\mu_0}(Al)$ (b) $\frac{B^2}{2\mu_0}$ (c) $\frac{\mu_0}{2B^2}(Al)$ (d) $\frac{\mu_0}{2B^2}$

5. If an inductor has N turns and ϕ is magnetic flux through its each turn when current I is flowing, then self-inductance L is given by formula:

(a) $\frac{I}{N\phi}$ (b) $N\phi$ (c) $\frac{N\phi}{I}$ (d) $N\phi I$

6. Self inductance of solenoid is:

(a) $L = \mu_0 nAl$ (b) $L = \mu_0 N^2 Al$ (c) $L = \mu_0 n^2 Al$ (d) $L = \mu_0 NAl$

MCQ # 1: (a)	MCQ # 2: (c)	MCQ # 3: (a)	MCQ # 4: (b)	MCQ # 5: (c)	MCQ # 6: (c)

MCQs Related to the Article "15.8 ALTERNATING CURRENT GENERATOR"

1. A generator converts mechanical energy into

(a) Chemical energy (b) Light energy (c) Heat energy (d) Electrical energy

2. The principle of an alternating current generator is based on:

(a) Coulomb's law (b) Ampere's law (c) Faraday's law (d) Lenz's law

3. Alternating current changes

(a) Its magnitude as well as direction (b) Only direction but not magnitude
(c) Only magnitude but not direction (d) None

4. The induced emf in A.C. generator is

(a) $vBL\sin\theta$ (b) $NAB\sin\theta$ (c) $N\omega AB\sin\theta$ (d) $NIAB\sin\theta$

5. Maximum emf generated in a generator is:

(a) $\varepsilon_0\sin\theta$ (b) $N\omega AB\sin\theta$ (c) $N\omega AB$ (d) None of these

6. Which one is not present in AC generator?

(a) Armature (b) Magnet (c) Slip Ring (d) Commutator

7. If the speed of rotation of a generator is doubled, the output voltage will be:

(a) Remains same (b) Double (c) Four times (d) One Half

MCQ # 1: (d)	MCQ # 2: (c)	MCQ # 3: (a)	MCQ # 4: (c)	MCQ # 5: (c)	MCQ # 6: (d)	MCQ # 7: (b)

MCQs Related to the Article "15.9 D.C. GENERATOR"

1. Which of the following is not present in AC generator:

(a) Armature (b) Magnet (c) Slip rings (d) Commutator

2. Who invented commutator?

(a) William Sturgeon (b) William Smith (c) Michael Faraday (d) Coulomb

3. The coil used in the generators is called

(a) Commutator (b) Slip rings (c) Armature (d) None

4. Commutator was invented in:

(a) 1820 (b) 1830 (c) 1834 (d) 1840

5. Which part of DC generator prevent the direction of current from changing:

(a) Carbon Brushes (b) Armature (c) Commutator (d) Poles of magnet

MCQ # 1: (d)	MCQ # 2: (a)	MCQ # 3: (c)	MCQ # 4: (c)	MCQ # 5: (c)

MCQs Related to the Article "15.10 BACK MOTOR EFFECT IN GENERATORS"

1. The back motor effect exist in the

(a) Generator (b) Motor (c) A.C. Motor (d) None

2. A device in a circuit that consumes electrical energy is known as:

(a) Resistance (b) Capacitance (c) Inductance (d) Load

3. The torque produced due to induced current in coil of generator that opposes coil's rotation is called:

(a) Back generator effect (b) Back motor effect (c) Mutual Inductance (d) Self Inductance

MCQ # 1: (a)	MCQ # 2: (d)	MCQ # 3: (b)

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MCQs Related to the Article "15.11 D.C. MOTOR"

1. A device which converts electrical energy into mechanical energy is called:
(a) Transformer (b) AC generator (c) DC motor (d) DC generator

2. The back ward generator is called
(a) Electric motor (b) A.C. generator (c) Reverse generator (d) None

3. The working principle of D.C. motor is similar to
(a) Galvanometer (b) Rectifier (c) DC generator (d) Transformer

4. The jerks in DC motors are created by the use of:
(a) Commutator (b) Armature (c) Torque (d) Source

5. The winding of electromagnet in motor are usually called:
(a) Magnetic coils (b) Field coils (c) Electric coils (d) Induction coils

MCQ # 1: (c)	MCQ # 2: (a)	MCQ # 3: (a)	MCQ # 4: (a)	MCQ # 5: (b)

MCQs Related to the Article "15.12 BACK EMF EFFECT IN MOTORS"

1. Self-induced emf is sometimes called:
(a) Motional emf (b) Constant emf (c) Back emf (d) Variable emf

2. When a motor is just started, back emf is almost _____
(a) Maximum (b) Minimum (c) Infinite (d) Zero

3. An over loaded motor draws
(a) Max. current (b) Min. current (c) Half (d) None

4. When motor is at its Max. speed the back emf will be
(a) Maximum (b) Zero (c) Cannot tell (d) None of these

5. When back emf is zero, an electric motor draws:
(a) Zero current (b) Steady current (c) Minimum Current (d) Maximum Current

6. When back emf in the motor is maximum, it draws
(a) Zero current (b) Steady current (c) Minimum Current (d) Maximum Current

MCQ # 1: (c)	MCQ # 2: (d)	MCQ # 3: (a)	MCQ # 4: (a)	MCQ # 5: (d)	MCQ # 6: (c)

MCQs Related to the Article "15.13 TRANSFORMER"

1. The principle of transformer is
(a) Amperes law (b) Mutual induction (c) Motional emf (d) None

2. When constant current flows in primary of transformer, then the emf induced across secondary of transformer is:
(a) Zero (b) Constant (c) Alternating (d) Irregular

3. A transformer is a device which step up or stop down
(a) Energy (b) Power (c) Voltage (d) All of above

4. To construct a step down transformer:
(a) $N_S > N_P$ (b) $N_S < N_P$ (c) $N_S = N_P$ (d) $N_S \times N_P = 1$

5. To construct a step up transformer:
(a) $N_S > N_P$ (b) $N_S < N_P$ (c) $N_S = N_P$ (d) $N_S \times N_P = 1$

6. An ideal transformer obeys the law of conservation of:
(a) Flux (b) Momentum (c) Emf (d) Energy

7. The coil which is connected to input of a transformer is called:
(a) Primary (b) Secondary (c) Middle (d) None

8. In the actual transformer, the output is always
(a) Equal to input (b) Less then input (c) More than input (d) None

9. In ideal transformer when applied potential difference is double, the output current is:
(a) Doubled (b) Tripled (c) Halved (d) Same

10. Why is the core of a transformer made of iron?
(a) Iron is good conductor (b) Iron is cheaper than copper
(c) Iron can be magnetized or demagnetized easily (d) Iron makes good permanent magnet

11. For a good transformer the hysterics loop are _____ in size.
(a) Small (b) Large (c) Zero (d) None

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12. To minimize the heating effect in the transmission lines

(a) High current, low voltage in used (b) High voltage, low current in used

(c) Same voltage and current in used (d) None

13. A step up transformer has primary voltage of 50 V D.C. the secondary voltage is:

(a) 20 V (b) 40 V (c) 220 V (d) 0 V

14. For an ideal transformer:

(a) $Output\ Power > Input\ Power$ (b) $Output\ Power < Input\ Power$

(c) $Output\ Power = Input\ Power$ (d) $Output\ Power = (Input\ Power)^2$

15. A laminated iron core is used in transformer and choke to

(a) Increase magnetic flux (b) Minimize eddy current losses

(c) To conduct current (d) All a, b & c

16. The power loss in transformer takes place due to:

(a) Eddy currents (b) Magnetic field (c) Hysteresis (d) Both a & c

17. The efficiency of transformer is given by:

(a) $\eta = \frac{Output\ Power}{Input\ Power} \times 100$ (b) $\eta = \frac{Input\ Power}{Output\ Power} \times 100$ (c) $Output\ Power \times 100$

18. The loss of power in transformer can be reduced by

(a) Using laminated sheets of core material (b) Decreasing the resistance of coil

(c) Proper coupling of primary and secondary coil (d) All a, b & c

19. In a transformer, which of the following quantities has same value in primary and secondary?

(a) Voltage (b) Current (c) Resistance (d) Rate of change of magnetic flux

20. The core of transformers is laminated to reduce:

(a) Magnetic Loss (b) Hysteresis Loss (c) Eddy current loss (d) Electric loss

MCQ # 1: (b)	**MCQ # 2: (a)**	**MCQ # 3: (c)**	**MCQ # 4: (b)**	**MCQ # 5: (a)**	**MCQ # 6: (d)**	**MCQ # 7: (a)**
MCQ # 8: (b)	**MCQ # 9: (c)**	**MCQ # 10: (c)**	**MCQ # 11: (a)**	**MCQ # 12: (b)**	**MCQ # 13: (d)**	**MCQ # 14: (c)**
MCQ # 15: b()	**MCQ # 16: (d)**	**MCQ # 17: (a)**	**MCQ # 18: (d)**	**MCQ # 19 d)**	**MCQ # 20: (c)**	

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