RK VISION ACADEMY

PHYSICS

XII – ELECTROMAGNETIC INDUCTION

SECTION A

1. In electromagnetic induction, the induced e.m.f. in a coil is independent of

(1) Change in the flux
(2) Time
(3) Resistance of the circuit
(4) None of the above

2. Lenz's law is consequence of the law of conservation of

(1) Charge
(2) Momentum
(3) Mass
(4) Energy

3. In electromagnetic induction, the induced charge in a coil is independent of

(1) Change in the flux
(2) Time
(3) Resistance in the circuit
(4) None of the above

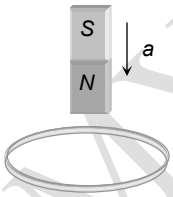
4. The magnetic flux through a circuit of resistance Rchanges by an amount $\Delta\varphi$ in time Δt, Then the total quantity of electric charge Q, which passing during this time through any point of the circuit is given by

(1) $Q = \frac{\Delta\varphi}{\Delta t}$
(2) $Q = \frac{\Delta\varphi}{\Delta t} \times R$
(3) $Q = -\frac{\Delta\varphi}{\Delta t} + R$
(4) $Q = \frac{\Delta\varphi}{R}$

5. A cylindrical bar magnet is kept along the axis of a circular coil. If the magnet is rotated about its axis, then

(1) A current will be induced in a coil
(2) No current will be induced in a coil
(3) Only an e.m.f. will be induced in the coil
(4) An e.m.f. and a current both will be induced in the coil

6. A metallic ring is attached with the wall of a room. When the north pole of a magnet is brought near to it, the induced current in the ring will be



(1) First clockwise then anticlockwise
(2) In clockwise direction
(3) In anticlockwise direction
(4) First anticlockwise then clockwise

7. A coil having an area A_0 is placed in a magnetic field which changes from $B_0$to $4B_0$ in a time interval t. The e.m.f. induced in the coil will be

(1) $\frac{3A_0B_0}{t}$
(2) $\frac{4A_0B_0}{t}$
(3) $\frac{3B_0}{A_0t}$
(4) $\frac{4B_0}{A_0t}$

8. The magnetic flux linked with a coil is given by an equation φ (in *webers*) = $8t^2 + 3t + 5$. The induced e.m.f. in the coil at the fourth second will b

(1) 16 *units*
(2) 39 *units*
(3) 67 *units*
(4) 145 *units*

9. The current flowing in two coaxial coils in the same direction. On increasing the distance between the two, the electric current will

(1) Increase
(2) Decrease

(3) Remain unchanged

(4) The information is incomplete

10. A copper ring is held horizontally and a bar magnet is dropped through the ring with its length along the axis of the ring. The acceleration of the falling magnet while it is passing through the ring is

(1) Equal to that due to gravity

(2) Less than that due to gravity

(3) More than that due to gravity

(4) Depends on the diameter of the ring and the length of the magnet

11. A player with 3 *m* long iron rod runs Towards east with a speed of 30 *km/hr*. Horizontal component of earth's magnetic field is $4 \times 10^{-5} Wb/m^2$. If he is running with rod in horizontal and vertical positions, then the potential difference induced between the two ends of the rod in two cases will be

(1) Zero in vertical position and $1 \times 10^{-3} V$ in horizontal position

(2) $1 \times 10^{-3} V$ in vertical position and zero Is horizontal position

(3) Zero in both cases

(4) $1 \times 10^{-3} V$ in both cases

12. A coil of area 80 *square cm* and 50 turns is rotating with 2000 *revolutions per minute* about an axis perpendicular to a magnetic field of 0.05 *Tesla*. The maximum value of the e.m.f. developed in it is

(1) $200\pi volt$

(2) $\frac{10\pi}{3} volt$

(3) $\frac{4\pi}{3} volt$

(4) $\frac{2}{3} volt$

13. A conducting rod of length *l* is falling with a velocity *v* perpendicular to a uniform horizontal magnetic field *B*. The potential difference between its two ends will be

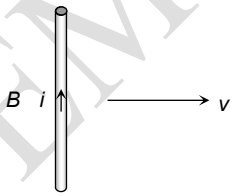
(1) $2Blv$

(2) Blv

(3) $\frac{1}{2} Blv$

(4) $B^2 l^2 v^2$

14. A conducting wire is moving towards right in a magnetic field *B*. The direction of induced current in the wire is shown in the figure. The direction of magnetic field will be



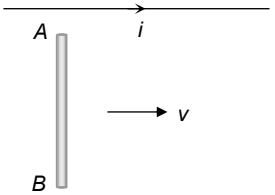
(1) In the plane of paper pointing towards right

(2) In the plane of paper pointing towards left

(3) Perpendicular to the plane of paper and down-wards

(4) Perpendicular to the plane of paper and upwards

15. The current carrying wire and the rod *AB* are in the same plane. The rod moves parallel to the wire with a velocity *v*. Which one of the following statements is true about induced emf in the rod



(1) End *A* will be at lower potential with respect to *B*

(2) *A* and *B* will be at the same potential

(3) There will be no induced e.m.f. in the rod

(4) Potential at *A* will be higher than that at *B*

16. A long horizontal metallic rod with length along the east-west direction is falling under gravity. The potential difference between its two ends will

(1) Be zero
(2) Be constant
(3) Increase with time
(4) Decrease with time

17. A two metre wire is moving with a velocity of 1 m/*sec* perpendicular to a magnetic field of 0.5 *weber*/m^2. The e.m.f. induced in it will be
(1) 0.5 *volt*
(2) 0.1 *volt*
(3) 1 *volt*
(4) 2 *volt*

18. A metal rod moves at a constant velocity in a direction perpendicular to its length. A constant uniform magnetic field exists in space in a direction perpendicular to the rod as well as its velocity. Select the correct statement(s) from the following
(1) The entire rod is at the same electric potential
(2) There is an electric field in the rod
(3) The electric potential is highest at the centre of the rod and decreases towards its ends
(4) The electric potential is lowest at the centre of the rod and increases towards its ends

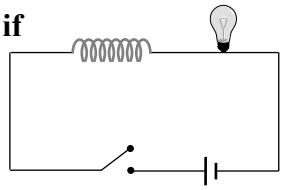
19. A conducting wire is dropped along east-west direction, then
(1) No emf is induced
(2) No induced current flows
(3) Induced current flows from west to east
(4) Induced current flows from east to west

20. The magnetic induction in the region between the pole faces of an electromagnet is 0.7 *weber/*m^2. The induced e.m.f. in a straight conductor 10 *cm* long, perpendicular to *B* and moving perpendicular both to magnetic induction and its own length with a velocity 2 *m/sec* is
(1) 0.08 V
(2) 0.14 V
(3) 0.35 V
(4) 0.07 V

21. A closely wound coil of 100 turns and area of cross-section 1 cm^2 has a coefficient of self-induction 1 *mH*. The magnetic induction in the centre of the core of the coil when a current of 2A flows in it, will be
(1) 0.022 Wbm^{-2}
(2) 0.4 $Wb\ m^{-2}$
(3) 0.8 $Wb\ m^{-2}$
(4) 1 $Wb\ m^{-2}$

22. Two circuits have coefficient of mutual induction of 0.09 *henry*. Average e.m.f. induced in the secondary by a change of current from 0 to 20 *ampere* in 0.006 *second* in the primary will be
(1) 120 V
(2) 80 V
(3) 200 V
(4) 300 V

23. In the following circuit, the bulb will become suddenly bright if



(1) Contact is made or broken
(2) Contact is made
(3) Contact is broken
(4) Won't become bright at all

24. Two pure inductors each of self inductance L are connected in parallel but are well separated from each other. The total inductance is
(1) $2L$
(2) L
(3) $\frac{L}{2}$
(4) $\frac{L}{4}$

25. **A coil and a bulb are connected in series with a dc source, a soft iron core is then inserted in the coil. Then**

(1) Intensity of the bulb remains the same

(2) Intensity of the bulb decreases

(3) Intensity of the bulb increases

(4) The bulb ceases to glow

26. **Self induction of a solenoid is**

(1) Directly proportional to current flowing through the coil

(2) Directly proportional to its length

(3) Directly proportional to area of cross-section

(4) Inversely proportional to area of cross-section

27. **Mutual inductance of two coils can be increased by**

(1) Decreasing the number of turns in the coils

(2) Increasing the number of turns in the coils

(3) Winding the coils on wooden core

(4) None of the above

28. **The self inductance of a coil is 5 *henry*, a current of 1 *amp* change to 2 *amp* within 5 *second* through the coil. The value of induced e.m.f. will be**

(1) 10 *volt*

(2) 0.10 *volt*

(3) 1.0 *volt*

(4) 100 *volt*

29. **The unit of inductance is**

(1) Volt/ampere

(2) Joule/ampere

(3) Volt-sec/ampere

(4) Volt-ampere/sec

30. **The current flowing in a coil of self inductance 0.4 *mH* is increased by 250 *mA* in 0.1 *sec*. The e.m.f. induced will be**

(1) + 1 *V*

(2) – 1 *V*

(3) + 1 *mV*

(4) – 1 *mV*

31. **Fan is based on**

(1) Electric Motor

(2) Electric dynamo

(3) Both

(4) None of these

32. **A transformer is employed to**

(1) Obtain a suitable dc voltage

(2) Convert dc into ac

(3) Obtain a suitable ac voltage

(4) Convert ac into dc

33. **What is increased in step-down transformer**

(1) Voltage

(2) Current

(3) Power

(4) Current density

34. **The core of a transformer is laminated so that**

(1) Ratio of voltage in the primary and secondary may be increased

(2) Rusting of the core may be stopped

(3) Energy losses due to eddy currents may be reduced

(4) Change in flux is increased

35. **In transformer, core is made of soft iron to reduce**

(1) Hysteresis losses

(2) Eddy current losses

(3) Force opposing electric current

(4) None of the above

SECTION B

36. **The transformation ratio in the step-up transformer is**

(1) 1

(2) Greater than one

(3) Less than one

(4) The ratio greater or less than one depends on the other factors

37. **In a transformer 220 ac voltage is increased to 2200 *volts*. If the number of turns in the secondary are 2000, then the number of turns in the primary will be**

(1) 200

(2) 100

(3) 50

(4) 20

38. **The ratio of secondary to the primary turns in a transformer is 3 : 2. If the power output be *P*, then the input power neglecting all loses must be equal to**

(1) 5 P

(2) 1.5 P

(3) P

(4) $\frac{2}{5}P$

39. **The primary winding of a transformer has 100 turns and its secondary winding has 200 turns. The primary is connected to an ac supply of 120 *V* and the current flowing in it is 10 A. The voltage and the current in the secondary are**

(1) 240 V, 5 A

(2) 240 V, 10 A

(3) 60 V, 20 A

(4) 120 V, 20 A

40. **A step-down transformer is connected to 2400 *volts* line and 80 amperes of current is found to flow in output load. The ratio of the turns in primary and secondary coil is 20 : 1. If transformer efficiency is 100%, then the current flowing in primary coil will be**

(1) 1600 A

(2) 20 A

(3) 4 A

(4) 1.5 A

41. **A loss free transformer has 500 turns on its primary winding and 2500 in secondary. The meters of the secondary indicate 200 *volts* at 8 *amperes* under these conditions. The voltage and current in the primary is**

(1) 100 V, 16 A

(2) 40 V, 40 A

(3) 160 V, 10 A

(4) 80 V, 20 A

42. **An ideal transformer has 100 turns in the primary and 250 turns in the secondary. The peak value of the ac is 28 *V*. The *r.m.s.* secondary voltage is nearest to**

(1) 50 V

(2) 70 V

(3) 100 V

(4) 40 V

43. **A transformer is employed to reduce 220 *V* to 11 *V*. The primary draws a current of 5 *A* and the secondary 90 *A*. The efficiency of the transformer is**

(1) 20%

(2) 40%

(3) 70%

(4) 90%

44. **In a step-up transformer, the turn ratio is 1 : 2. A Leclanche cell (e.m.f. 1.5V) is connected across the primary. The voltage developed in the secondary would be**

(1) 3.0 V

(2) 0.75 *V*

(3) 1.5 *V*

(4) Zero

45. The alternating voltage induced in the secondary coil of a transformer is mainly due to

(1) A varying electric field

(2) A varying magnetic field

(3) The vibrations of the primary coil

(4) The iron core of the transformer

46. We can reduce eddy currents in the core of transformer

(1) By increasing the number of turns in secondary coil

(2) By taking laminated core

(3) By making step-down transformer

(4) By using a weak ac at high potential

47. A 100% efficient transformer has 100 turns in the primary and 25 turns in its secondary coil. If the current in the secondary coil is 4 amp, then the current in the primary coil is

(1) 1 *amp*

(2) 4 *amp*

(3) 8 *amp*

(4) 16 *amp*

48. The efficiency of transformer is very high because

(1) There is no moving part in a transformer

(2) It produces very high voltage

(3) It produces very low voltage

(4) None of the above

49. In a lossless transformer an alternating current of 2 *amp* is flowing in the primary coil. The number of turns in the primary and secondary coils are 100 and 20 respectively. The value of the current in the secondary coil is

(1) 0.08 *A*

(2) 0.4 *A*

(3) 5 *A*

(4) 10 *A*

50. A transformer connected to 220 *volt* line shows an output of 2 *A* at 11000 *volt*. The efficiency is 100%. The current drawn from the line is

(1) 100 *A*

(2) 200 *A*

(3) 22 *A*

(4) 11 *A*

RK VISION ACADEMY

PHYSICS	
XII – ELECTROMAGNETIC INDUCTION	
SECTION A	
1.	3
2.	4
3.	2
4.	4
5.	2
6.	3
7.	1
8.	3
9.	1
10.	2
11.	2
12.	3
13.	2
14.	3
15.	4
16.	3
17.	3
18.	2
19.	3
20.	2
21.	1
22.	4
23.	3
24.	3
25.	2
26.	3
27.	2
28.	3
29.	3
30.	4
31.	1
32.	3
33.	2
34.	3
35.	1
SECTION B	
36.	2
37.	1
38.	3
39.	1
40.	3
41.	2
42.	1
43.	4
44.	4
45.	2
46.	2
47.	1
48.	1
49.	4
50.	1