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NEET ELECTROMAGNETIC INDUCTION — PYQS

Max. Marks: 156 **Questions:** 39

Section A (MCQ) — 39 questions

Q.1 A rectangular wire loop of sides 8 cm and 3 cm with a small cut, is moving out of a region of uniform magnetic field of magnitude 0.3 T directed normal to the plane of the loop. The emf developed across the cut, if the velocity of the loop is 2 cm s^{-1}, in a direction normal to the shorter side of the loop, will be : [NEET (UG) 2026]

(1) 1.8×10^{-4} volt (2) 1.3×10^{-4} volt
(3) 1.2×10^{-4} volt (4) 4.8×10^{-4} volt

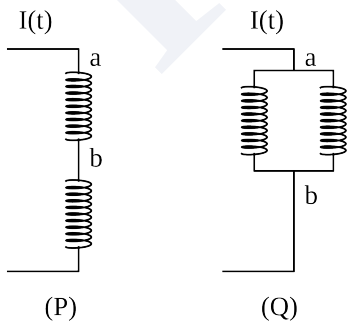
Scan or tap for the full solution

Q.2 Consider a long solenoid of length l and radius r. If n is the number of turns per unit length and μ_0 is the permeability of free space, the inductance of the solenoid is : [RE-NEET (UG) 2026]

(1) $2\mu_0\pi n^2r^2l$ (2) $\mu_0\pi n^2r^2l$
(3) $\mu_0 n^2r^2l$ (4) $(\mu_0/2\pi)n^2r^2l$

Scan or tap for the full solution

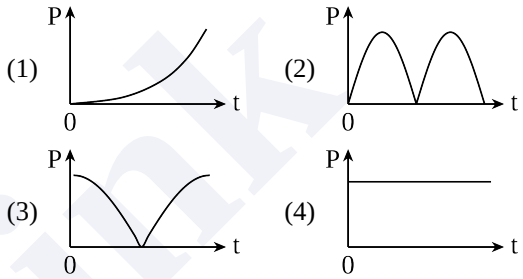
Q.3 Two identical inductors are connected in two different configurations P and Q, where a time varying current I(t) is flowing, as shown in the figure. The induced emf between points a and b for configuration P is E_P and that for configuration Q is E_Q. The ratio E_P/E_Q is:
[Neglect the effect of mutual inductance.]
[RE-NEET (UG) 2026]



(1) 2 (2) 1/4 (3) ½ (4) 1

Scan or tap for the full solution

Q.4 A conducting loop of finite resistance lies on the x − y plane. There is a constant magnetic field in the z direction. The area of the loop varies with time t, as $A = A_0(1 + \sin t)$ in appropriate units. The figure that correctly indicates the qualitative behaviour of the power P dissipated in the loop as a function of time is: [RE-NEET (UG) 2026]



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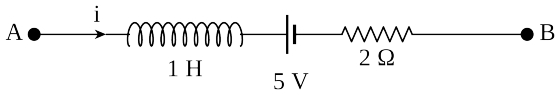
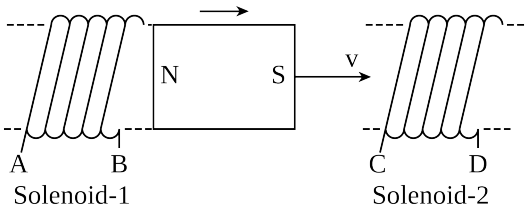
Q.5 AB is a part of an electrical circuit (see figure). The potential difference "$V_A - V_B$", at the instant when current i = 2 A and is increasing at a rate of 1 amp/second is: [NEET (UG) 2025]



(1) 9 volt (2) 10 volt (3) 5 volt (4) 6 volt

Scan or tap for the full solution

Q.6



In the above diagram, a strong bar magnet is moving towards solenoid-2 from solenoid-1. The direction of induced current in solenoid-1 and that in solenoid-2, respectively, are through the directions: [NEET (UG) 2024]

(1) AB and DC (2) BA and CD
(3) AB and CD (4) BA and DC

Scan or tap for the full solution

Q.7 A sheet is placed on a horizontal surface in front of a strong magnetic pole. A force is needed to:
A. hold the sheet there if it is magnetic.

B. hold the sheet there if it is non-magnetic.
C. move the sheet away from the pole with uniform velocity if it is conducting.
D. move the sheet away from the pole with uniform velocity if it is both, non-conducting and non-polar.

Choose the correct statement(s) from the options given below: [NEET (UG) 2024]

(1) B and D only (2) A and C only
(3) A, C and D only (4) C only

Scan or tap for the full solution

Q.8 Let us consider two solenoids A and B, made from same magnetic material of relative permeability μ_r and equal area of cross-section. Length of A is twice that of B and the number of turns per unit length in A is half that of B. The ratio of self inductances of the two solenoids, $L_A:L_B$ is

[RE-NEET (UG) 2024]

(1) 1:2 (2) 2:1 (3) 8:1 (4) 1:8

Scan or tap for the full solution

Q.9 The magnetic energy stored in an inductor of inductance 4 μH carrying a current of 2 A is :

[NEET (UG) 2023]

(1) 4 mJ (2) 8 mJ (3) 8 μJ (4) 4 μJ

Scan or tap for the full solution

Q.10 A square loop of side 1 m and resistance 1 Ω is placed in a magnetic field of 0.5 T. If the plane of loop is perpendicular to the direction of magnetic field, the magnetic flux through the loop is

[NEET (UG) 2022]

(1) 2 weber (2) 0.5 weber
(3) 1 weber (4) Zero weber

Scan or tap for the full solution

Q.11 A big circular coil of 1000 turns and average radius 10 m is rotating about its horizontal diameter at 2 rad s^{-1}. If the vertical component of earth's magnetic field at that place is 2×10^{-5} T and electrical resistance of the coil is 12.56 Ω, then the maximum induced current in the coil will be

[NEET (UG) 2022]

(1) 0.25 A (2) 1.5 A (3) 1 A (4) 2 A

Scan or tap for the full solution

Q.12 The magnetic flux linked to a circular coil of radius R is

$\varphi = 2t^3 + 4t^2 + 2t + 5$ Wb

The magnitude of induced emf in the coil at t = 5 s is [NEET (UG) 2022 (Phase 2)]

(1) 192 V (2) 108 V (3) 197 V (4) 150 V

Scan or tap for the full solution

Q.13 Two conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 >> R_2$, the mutual inductance M between them will be directly proportional to :

[NEET (UG) 2021]

(1) $\frac{R_2^2}{R_1}$ (2) $\frac{R_1}{R_2}$ (3) $\frac{R_2}{R_1}$ (4) $\frac{R_1^2}{R_2}$

Scan or tap for the full solution

Q.14 A 800 turn coil of effective area 0.05 m^2 is kept perpendicular to a magnetic field 5×10^{-5} T. When the plane of the coil is rotated by 90° around any of its coplanar axis in 0.1 s, the emf induced in the coil will be : [NEET (UG) 2019]

(1) 0.2 V (2) 0.02 V
(3) 2 V (4) 2×10^{-3} V

Scan or tap for the full solution

Q.15 In which of the following devices, the eddy current effect is **not** used? [NEET (UG) 2019]

(1) magnetic braking in train
(2) electromagnet
(3) electric heater
(4) induction furnace

Solution

Q.16 The magnetic potential energy stored in a certain inductor is 25 mJ, when the current in the inductor is 60 mA. This inductor is of inductance

[NEET 2018]

(1) 0.138 H (2) 138.88 H
(3) 1.389 H (4) 13.89 H

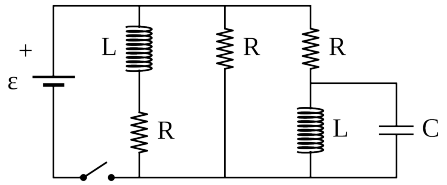
Scan or tap for the full solution

Q.17 A long solenoid of diameter 0.1 m has 2×10^4 turns per meter. At the centre of the solenoid, a coil of 100 turns and radius 0.01 m is placed with its axis coinciding with the solenoid axis. The current in the solenoid reduces at a constant rate to 0 A from 4 A in 0.05 s. If the resistance of the coil is $10\pi^2$ Ω, the total charge flowing through the coil during this time is [NEET 2017]

(1) 16 μC (2) 32 μC (3) 16π μC (4) 32π μC

Scan or tap for the full solution

Q.18 Figure shows a circuit that contains three identical resistors with resistance R = 9.0 Ω each, two identical inductors with inductance L = 2.0 mH each, and an ideal battery with emf ε = 18 V. The current i through the battery just after the switch is closed is [NEET 2017]



(1) 0.2 A (2) 4 A
(3) 0 ampere (4) 2 mA

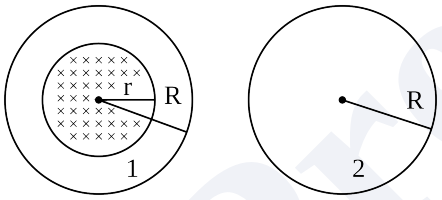
Solution

Q.19 A long solenoid has 1000 turns. When a current of 4 A flows through it, the magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb. The self-inductance of the solenoid is [NEET 2016 (Phase 1)]

(1) 2 H (2) 1 H (3) 4 H (4) 3 H

Scan or tap for the full solution

Q.20 A uniform magnetic field is restricted within a region of radius r. The magnetic field changes with time at a rate $\frac{d\vec{B}}{dt}$. Loop 1 of radius R > r encloses the region r and loop 2 of radius R is outside the region of magnetic field as shown in the figure. Then the e.m.f. generated is [NEET 2016 (Phase 2)]



(1) zero in loop 1 and zero in loop 2

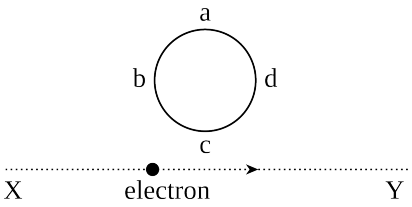
(2) $-\frac{d\vec{B}}{dt}\pi r^2$ in loop 1 and $-\frac{d\vec{B}}{dt}\pi r^2$ in loop 2

(3) $-\frac{d\vec{B}}{dt}\pi R^2$ in loop 1 and zero in loop 2

(4) $-\frac{d\vec{B}}{dt}\pi r^2$ in loop 1 and zero in loop 2

Scan or tap for the full solution

Q.21 An electron moves on a straight line path XY as shown. The abcd is a coil adjacent to the path of electron. What will be the direction of current, if any, induced in the coil ? [AIPMT 2015]



(1) The current will reverse its direction as the electron goes past the coil

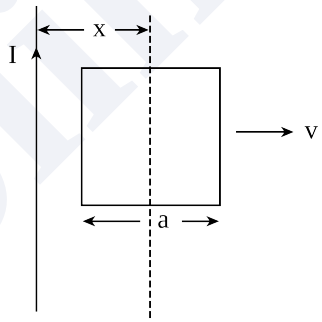
(2) No current induced

(3) abcd

(4) adcb

Solution

Q.22 A conducting square frame of side 'a' and a long straight wire carrying current I are located in the same plane as shown in the figure. The frame moves to the right with a constant velocity 'V'. The emf induced in the frame will be proportional to [AIPMT 2015 (Cancelled)]

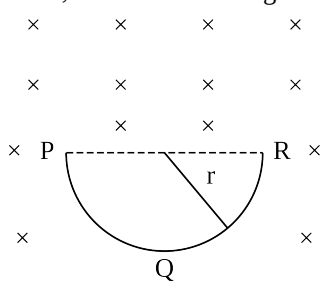


(1) $\frac{1}{(2x+a)^2}$ (2) $\frac{1}{(2x-a)(2x+a)}$

(3) $\frac{1}{x^2}$ (4) $\frac{1}{(2x-a)^2}$

Scan or tap for the full solution

Q.23 A thin semicircular conducting ring (PQR) of radius r is falling with its plane vertical in a horizontal magnetic field B, as shown in the figure.



The potential difference developed across the ring when its speed is v, is [AIPMT 2014]

(1) zero

(2) $\frac{Bv\pi r^2}{2}$ and P is at higher potential

(3) πrBv and R is at higher potential

(4) 2rBv and R is at higher potential

Scan or tap for the full solution

Q.24 A wire loop is rotated in a magnetic field. The frequency of change of direction of the induced e.m.f. is [NEET 2013]

(1) four times per revolution

(2) six times per revolution

(3) once per revolution

(4) twice per revolution

Solution

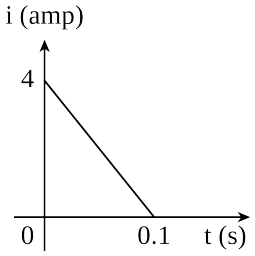
Q.25 A current of 2.5 A flows through a coil of inductance 5 H. The magnetic flux linked with the coil is [NEET 2013 (Karnataka)]

(1) 0.5 Wb (2) 12.5 Wb

(3) zero (4) 2 Wb

Scan or tap for the full solution

Q.26 In a coil of resistance 10 Ω, the induced current developed by changing magnetic flux through it, is shown in figure as a function of time. The magnitude of change in flux through the coil in weber is [AIPMT 2012 (Mains)]



(1) 8 (2) 2 (3) 6 (4) 4

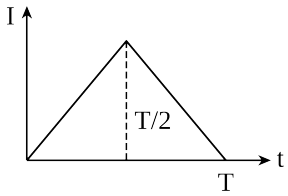
Scan or tap for the full solution

Q.27 A coil of resistance 400 Ω is placed in a magnetic field. If the magnetic flux φ (Wb) linked with the coil varies with time t (sec) as $\varphi = 50t^2 + 4$.
The current in the coil at t = 2 sec is [AIPMT 2012 (Prelims)]

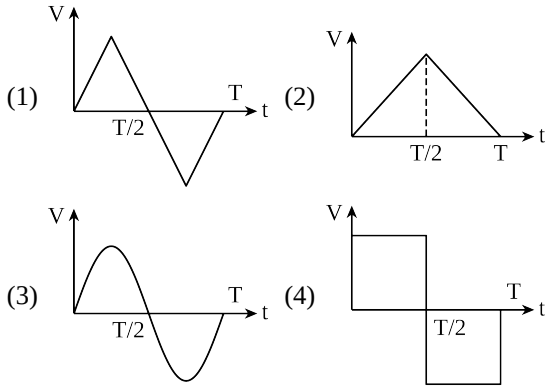
(1) 0.5 A (2) 0.1 A (3) 2 A (4) 1 A

Scan or tap for the full solution

Q.28 The current (I) in the inductance is varying with time according to the plot shown in figure.

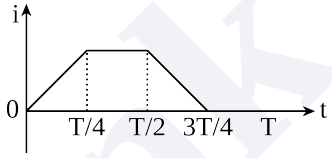


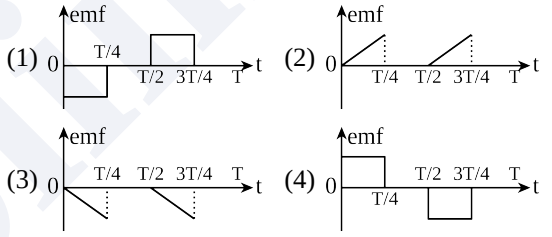
Which one of the following is the correct variation of voltage with time in the coil ? [AIPMT 2012 (Prelims)]



Scan or tap for the full solution

Q.29 The current i in a coil varies with time as shown in the figure. The variation of induced emf with time would be [AIPMT 2011 (Prelims)]





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Q.30 A conducting circular loop is placed in a uniform magnetic field, B = 0.025 T with its plane perpendicular to the field. The radius of the loop is made to shrink at a constant rate of 1 mm s^{-1}. The induced emf when the radius is 2 cm, is [AIPMT 2010 (Prelims)]

(1) 2π μV (2) π μV (3) $\frac{\pi}{2}$ μV (4) 2 μV

Scan or tap for the full solution

Q.31 A rectangular, a square, a circular and an elliptical loop, all in the (x-y) plane, are moving out of a uniform magnetic field with a constant velocity $\vec{V} = v\hat{i}$. The magnetic field is directed along the negative z axis direction. The induced emf, during the passage of these loops, out of the field region, will not remain constant for [AIPMT 2009]

(1) the circular and the elliptical loops

(2) only the elliptical loop

(3) any of the four loops

(4) the rectangular, circular and elliptical loops

Scan or tap for the full solution

Q.32 A conducting circular loop is placed in a uniform magnetic field 0.04 T with its plane perpendicular to the magnetic field. The radius of the loop starts shrinking at 2 mm/s. The induced emf in the loop when the radius is 2 cm is [AIPMT 2009]

(1) 4.8π μV (2) 0.8π μV
(3) 1.6π μV (4) 3.2π μV

Scan or tap for the full solution

Q.33 A long solenoid has 500 turns. When a current of 2 ampere is passed through it, the resulting magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb. The self-inductance of the solenoid is [AIPMT 2008]

(1) 1.0 henry (2) 4.0 henry
(3) 2.5 henry (4) 2.0 henry

Scan or tap for the full solution

Q.34 A circular disc of radius 0.2 meter is placed in a uniform magnetic field of induction $\frac{1}{\pi}\left(\frac{Wb}{m^2}\right)$ in such a way that its axis makes an angle of 60° with $\vec{B}$. The magnetic flux linked with the disc is [AIPMT 2008]

(1) 0.08 Wb (2) 0.01 Wb
(3) 0.02 Wb (4) 0.06 Wb

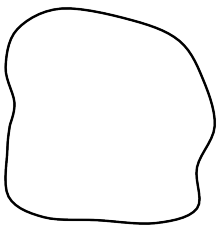
Scan or tap for the full solution

Q.35 Two coils of self inductance 2 mH and 8 mH are placed so close together that the effective flux in one coil is completely linked with the other. The mutual inductance between these coils is [AIPMT 2006]

(1) 16 mH (2) 10 mH (3) 6 mH (4) 4 mH

Scan or tap for the full solution

Q.36 As a result of change in the magnetic flux linked to the closed loop as shown in the figure, an e.m.f. V volt is induced in the loop. The work done (joule) in taking a charge Q coulomb once along the loop is [AIPMT 2005]



(1) QV (2) 2QV (3) QV/2 (4) zero

Scan or tap for the full solution

Q.37 A coil of 40 henry inductance is connected in series with a resistance of 8 ohm and the combination is joined to the terminals of a 2 volt battery. The time constant of the circuit is [AIPMT 2004]

(1) 5 seconds (2) 1/5 seconds
(3) 40 seconds (4) 20 seconds

Scan or tap for the full solution

Q.38 The magnetic flux through a circuit of resistance R changes by an amount Δφ in a time Δt. Then the total quantity of electric charge Q that passes any point in the circuit during the time Δt is represented by [AIPMT 2004]

(1) $Q = \frac{1}{R} \cdot \frac{\Delta\phi}{\Delta t}$ (2) $Q = \frac{\Delta\phi}{R}$
(3) $Q = \frac{\Delta\phi}{\Delta t}$ (4) $Q = R \cdot \frac{\Delta\phi}{\Delta t}$

Scan or tap for the full solution

Q.39 For a coil having L = 2 mH, current flow through it is $I = t^2e^{-t}$ then, the time at which emf becomes zero [AIPMT 2001]

(1) 2 sec (2) 1 sec (3) 4 sec (4) 3 sec

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	2	1	3	2	1	2	1	3	2	3
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	1	1	2	3	4	2	2	2	4	1	2
Ques.	23	24	25	26	27	28	29	30	31	32	33
Ans.	4	4	2	2	1	4	1	2	1	4	1
Ques.	34	35	36	37	38	39					
Ans.	3	4	1	1	2	1					