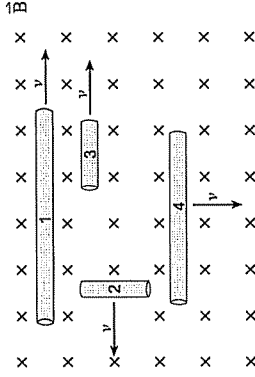


Magnetism & Induction Review

4. Four conductors of different lengths are moved through a uniform magnetic field at the same speed.



Which conductor will induce the greatest emf?

- A. 1
B. 2
C. 3
D. 4

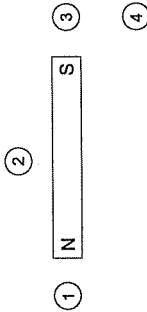
5. A motor has an armature resistance of 3.5Ω and is connected to a 12.0 V source. At full speed the current through the armature is 0.18 A . What is the back emf at full speed?

- A. 0 V
B. 0.63 V
C. 11.4 V
D. 12.0 V

6. A step-down transformer has a 500 turn primary that operates at 120 V ac . Which of the following sets of conditions best describes the number of secondary turns and secondary voltage of this transformer?

	SECONDARY TURNS	SECONDARY VOLTAGE
A.	40	9.6 V ac
B.	40	1500 V ac
C.	2000	30 V ac
D.	2000	480 V ac

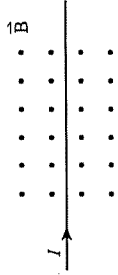
1. A compass is positioned at each of the following locations near a bar magnet.



In which location will the compass needle point to the right-hand side of the page?

- A. 1
B. 2
C. 3
D. 4

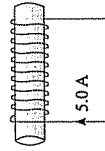
2. A current-carrying conductor is placed in a uniform magnetic field as shown.



What is the direction of the magnetic force on this conductor?

- A. Into the page
B. Out of the page
C. Towards the top of the page
D. Towards the bottom of the page

3. A 5.0 A current flows through a 0.20 m long solenoid that contains 1500 loops.

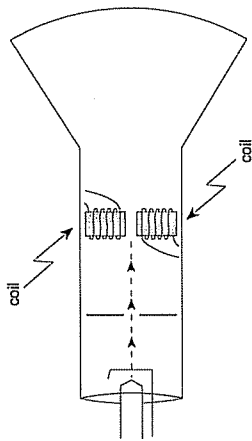


What are the magnitude and direction of the magnetic field at the centre of the solenoid?

MAGNITUDE	DIRECTION
$9.4 \times 10^{-3} \text{ T}$	left
$9.4 \times 10^{-3} \text{ T}$	right
$4.7 \times 10^{-2} \text{ T}$	left
$4.7 \times 10^{-2} \text{ T}$	right

- A.
B.
C.
D.

9. The diagram below represents a cross-sectional view from the side of a cathode ray tube. What is the purpose of the coils in a functional cathode ray tube?



- A. They increase the speed of the electrons.
 B. They focus the electrons into a fine beam.
 C. They deflect the electrons into or out of the page.
 D. They deflect the electrons toward the top or bottom of the page.

7. A flexible loop of wire of area $4.5 \times 10^{-2} \text{ m}^2$ is positioned in a 0.17 T magnetic field as shown in Figure A. The loop is then stretched until its area is zero in a time of 0.35 s (Figure B). What is the average induced emf in the circuit and the direction of the current through resistor R?

Figure A

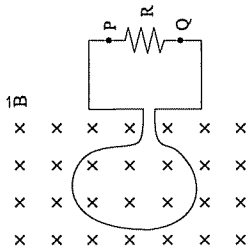
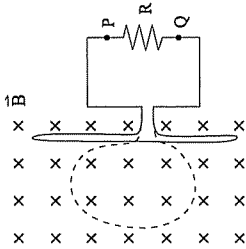
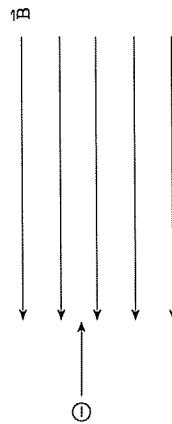


Figure B



	AVERAGE EMF	DIRECTION OF CURRENT THROUGH R
A.	$2.2 \times 10^{-2} \text{ V}$	P to Q
B.	$2.2 \times 10^{-2} \text{ V}$	Q to P
C.	$4.9 \times 10^{-1} \text{ V}$	P to Q
D.	$4.9 \times 10^{-1} \text{ V}$	Q to P

8. An electron enters a uniform magnetic field as shown below.



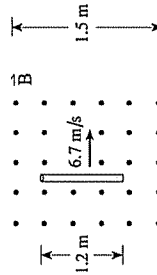
The path of the electron upon entering the field would be

- A. linear.
 B. circular.
 C. parabolic.
 D. hyperbolic.

10. A solenoid of length 0.35 m and diameter 0.040 m carries a current of 5.0 A through its windings. If the magnetic field in the centre of the solenoid is $2.8 \times 10^{-2} \text{ T}$, what is the number of turns per metre for this solenoid?

- A. 1.8×10^2 turns/m
 B. 7.8×10^2 turns/m
 C. 1.6×10^3 turns/m
 D. 4.5×10^3 turns/m

11. A 1.2 m length of wire is pulled through a uniform 0.045 T magnetic field at 6.7 m/s as shown. What emf is generated between the ends of the wire?

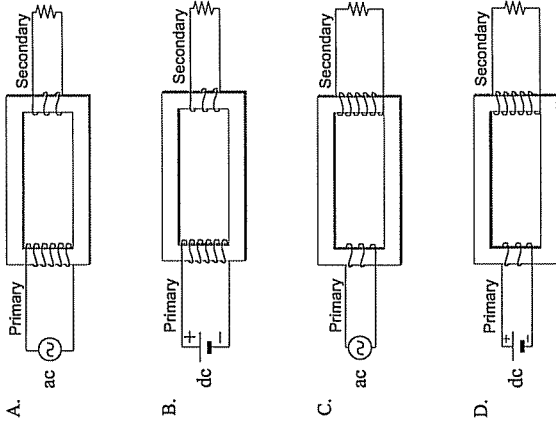


- A. 0 V
 B. 0.090 V
 C. 0.36 V
 D. 0.45 V

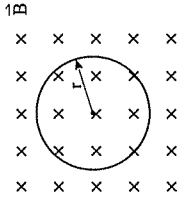
12. A dc motor is connected to a 12.0 V power supply. When the armature is rotating, the current through it is 0.78 A and the back emf is 10.6 V. What is the resistance of the armature?

- A. 1.4 Ω
- B. 1.8 Ω
- C. 14 Ω
- D. 15 Ω

13. In which of the following diagrams is the secondary current greater than the primary current?

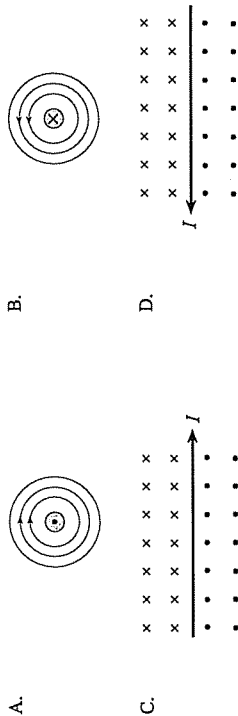


14. An electron circulates in a uniform 5.0×10^{-4} T magnetic field as shown. If the electron has 3.2×10^{-18} J of kinetic energy, what is its radius of orbit, r ?



- A. 2.3×10^{-7} m
- B. 4.6×10^{-4} m
- C. 2.5×10^{-3} m
- D. 3.0×10^{-2} m

15. Which of the following diagrams shows the magnetic field produced by a long current-carrying wire?



16. Which of the following devices commonly uses a solenoid?

- A. kettle
- B. television
- C. battery
- D. incandescent bulb

17. An electric motor is connected to a constant source of potential. Considering back emf, which of the following observations is correct?
- A. At full speed the applied voltage increases.
 - B. At full speed the armature resistance increases.
 - C. If the motor is kept from rotating at full speed, the armature heats up.
 - D. If the motor is kept from rotating at full speed, the armature temperature decreases.

1) B

2) D

3) C

4) D

5) C

18. Which of the following are correct units for magnetic flux?
- A. T
 - B. Wb
 - C. V/m
 - D. $N \cdot m^2$

6) A

7) A

8) A

9) D

10) D

19. In a step-up transformer, how does the secondary voltage V_s compare with the primary voltage V_p , and the number of turns in the secondary N_s compare with the number of turns in the primary N_p ?

11) C

12) B

13) A

14) D

15) D

	VOLTAGE	NUMBER OF TURNS
A.	$V_s < V_p$	$N_s > N_p$
B.	$V_s > V_p$	$N_s > N_p$
C.	$V_s < V_p$	$N_s < N_p$
D.	$V_s > V_p$	$N_s < N_p$

20. An ideal transformer has a potential difference of 130 V ac across the primary windings and a potential difference of 780 V ac across the secondary windings. There are 390 turns in the secondary. The secondary current is
- A. twice the primary current.
 - B. one half the primary current.
 - C. six times the primary current.
 - D. one-sixth the primary current.

16) B

17) C

18) B

19) B

20) D