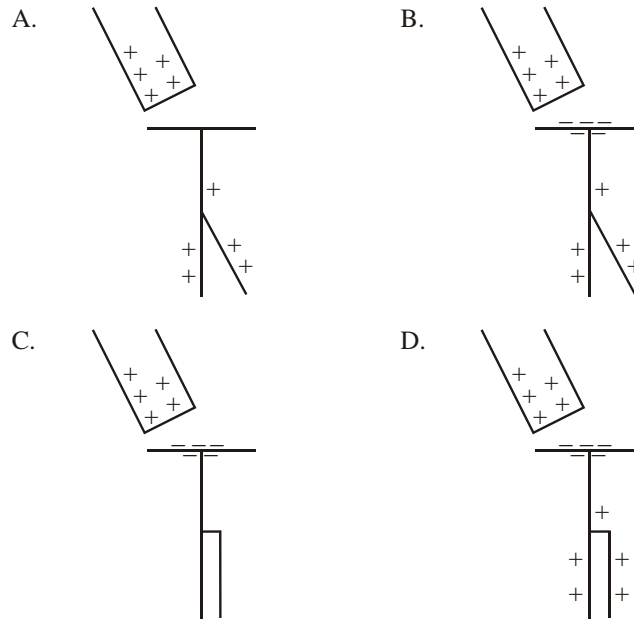


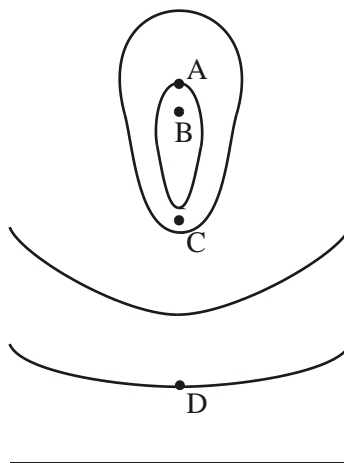
1. A positively charged rod is placed near the cap of an uncharged gold leaf electroscope. Which **one** of the following diagrams correctly shows the distribution of charges on the electroscopes as well as the deflection of the gold leaf?



2. Which **one** of the following is a correct definition of electric potential difference between two points?

- A. The power to move a small positive charge between the two points.
- B. The work done to move a small positive charge between the two points.
- C. The power per unit charge to move a small positive charge between the two points.
- D. The work done per unit charge to move a small positive charge between the two points.

3. The diagram below shows lines of electric equipotential. The change in potential on moving from one line to the next is always the same. At which point does the electric field strength have its greatest magnitude?



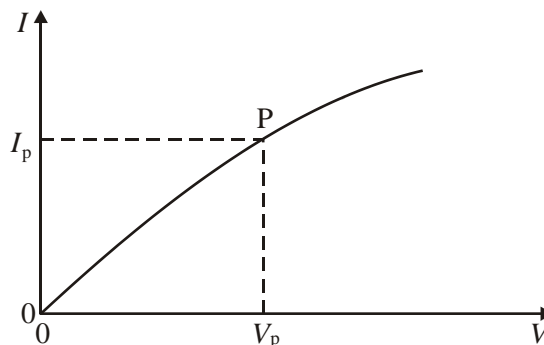
(1)

4. The electron volt is **defined** as

- A. a unit of energy exactly equal to 1.6×10^{-19} J.
- B. a fraction $\frac{1}{13.6}$ of the ionization energy of atomic hydrogen.
- C. the energy gained by an electron when it moves through a potential difference of 1.0 V.
- D. the energy transfer when 1.0 C of charge moves through a potential difference of 1.0 V.

(1)

5. The variation with potential difference V of the current I in an electric lamp is shown below.



At point P, the current is I_p , the potential difference is V_p and the gradient of the tangent to the curve is G . What is the resistance of the lamp at point P?

- A. $\frac{1}{G}$
- B. G
- C. $\frac{I_p}{V_p}$
- D. $\frac{V_p}{I_p}$

(1)

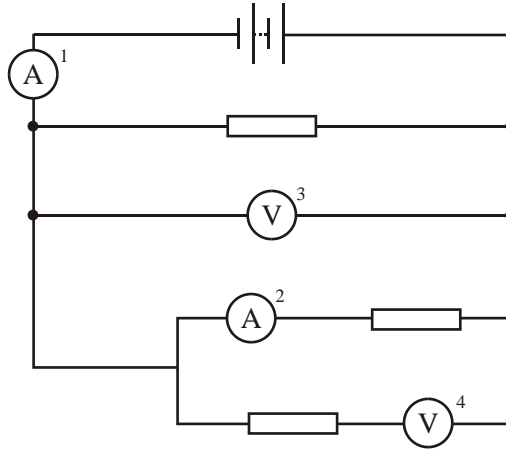
6. A battery is connected in series with a resistor R . The battery transfers 2 000 C of charge completely round the circuit. During this process, 2 500 J of energy is dissipated in the resistor R and 1 500 J is expended in the battery.

The e.m.f. of the battery is

- A. 2.00 V.
- B. 1.25 V.
- C. 0.75 V.
- D. 0.50 V.

(1)

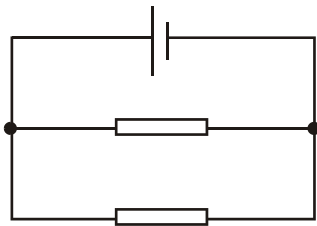
7. In the circuit below, which meter is **not** correctly connected?



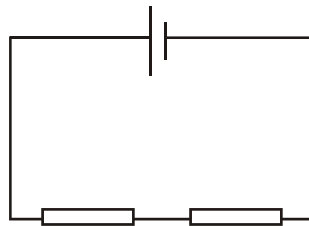
- A. 1
- B. 2
- C. 3
- D. 4

(1)

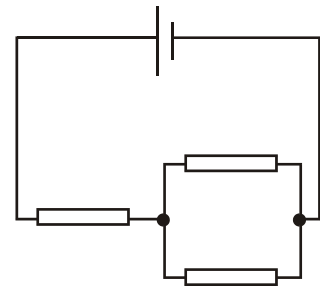
8. In the circuits below, the cells each have the same e.m.f. and zero internal resistance. All the resistors have the same resistance.



Circuit X



Circuit Y



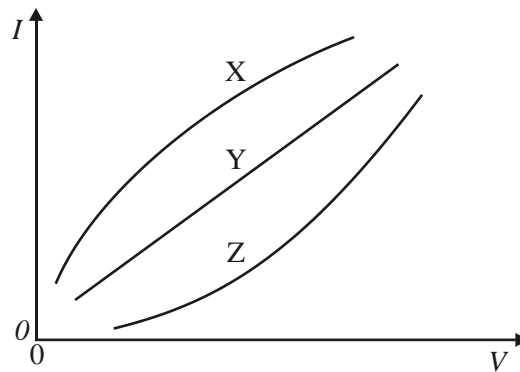
Circuit Z

Which of the following gives the current through the cells in order of increasing magnitude?

	Lowest current	→	Highest current
A.	X	Y	Z
B.	Z	X	Y
C.	Y	Z	X
D.	Y	X	Z

(1)

9. The graph below shows the variation with voltage V of the current I in three resistors X, Y and Z.

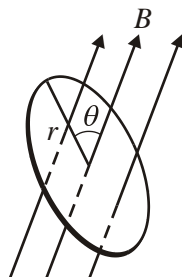


Which of the following corresponds to resistors for which the resistance increases with increasing current?

- A. X only
- B. Z only
- C. X and Z
- D. Y and Z

(1)

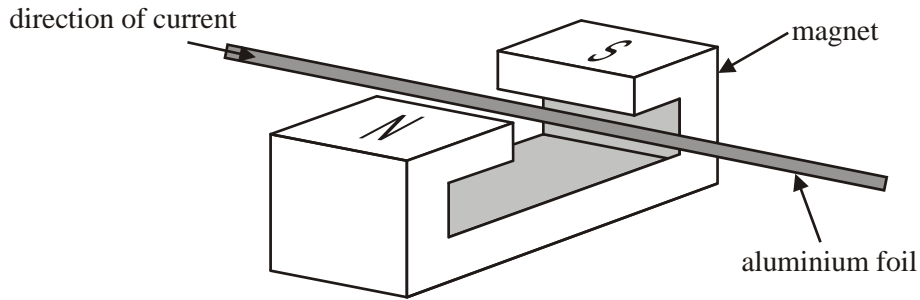
10. A circular coil of wire of radius r is placed in a uniform magnetic field of flux density B . The angle between the plane of the coil and the magnetic field is θ .



The magnetic flux linking the coil is

- A. $\pi r^2 B$.
- B. $\pi r^2 B \sin \theta$.
- C. $\pi r^2 B \cos \theta$.
- D. $\pi r^2 B$.

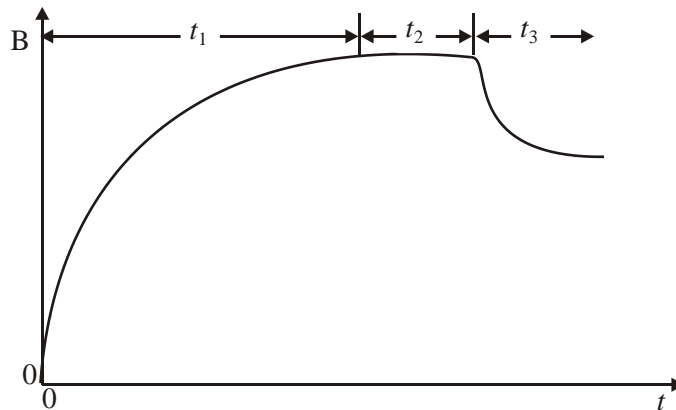
11. A strip of aluminium foil is held between the poles of a strong magnet, as shown below.



When a current is passed through the aluminium foil in the direction shown, the foil is deflected. In which direction is this deflection?

- A. Vertically downwards
 B. Vertically upwards
 C. Towards the North pole of the magnet
 D. Towards the South pole of the magnet
12. The definition of the unit of current, the ampere, is based on
- A. the force per unit length on a conductor in a uniform magnetic field.
 B. the force per unit length on parallel current-carrying conductors.
 C. the charge per unit time delivered by a cell of e.m.f. 1.0 V.
 D. the charge passing a point per unit time in an electrical circuit.

13. A magnetic field links a closed loop of metal wire. The magnetic field strength B varies with time t as shown.



A current is induced in the loop during the time period

- A. t_1 only.
 B. t_2 only.
 C. t_2 and t_3 only.
 D. t_1 and t_3 only.

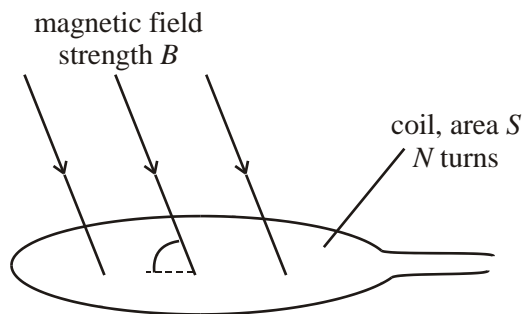
14. The rms voltages across the primary and secondary coils in an ideal transformer are V_p and V_s respectively. The currents in the primary and secondary coils are I_p and I_s respectively.

Which **one** of the following statements is always true?

- A. $V_s = V_p$
- B. $I_s = I_p$
- C. $V_s I_s = V_p I_p$
- D. $\frac{V_s}{V_p} = \frac{I_s}{I_p}$.

(1)

15. A coil of area S has N turns of wire. It is placed in a uniform magnetic field of strength B so that its plane makes an angle θ with the direction of the magnetic field as shown.

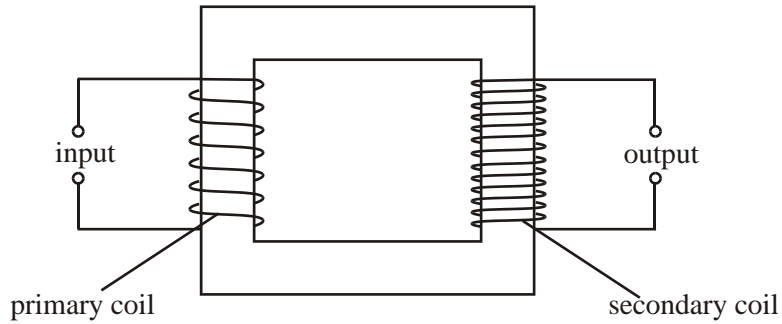


The magnetic flux linkage is

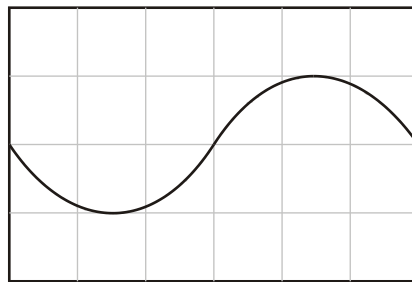
- A. $BSN \sin\theta$.
- B. $BSN \cos\theta$.
- C. $BSN \tan\theta$.
- D. BSN .

(1)

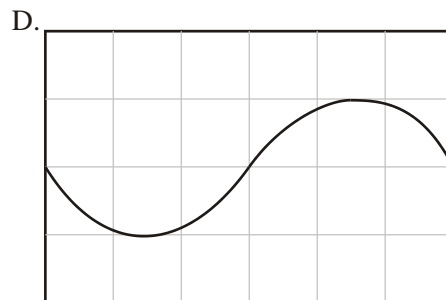
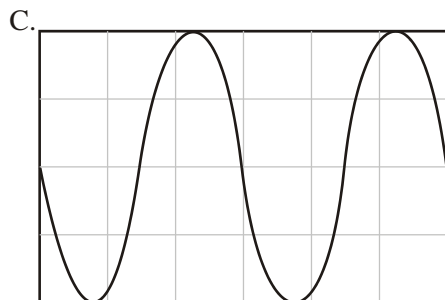
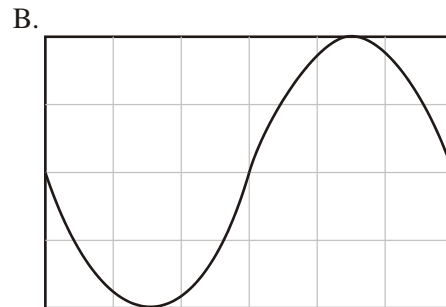
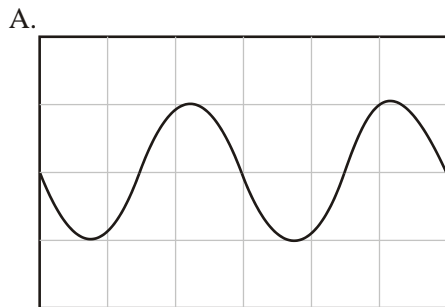
16. The diagram below shows an ideal transformer.



The transformer has n turns on the primary coil and $2n$ turns on the secondary coil. The waveform produced on the screen of a cathode-ray oscilloscope (c.r.o.), when the c.r.o. is connected to the primary coil, is shown below.

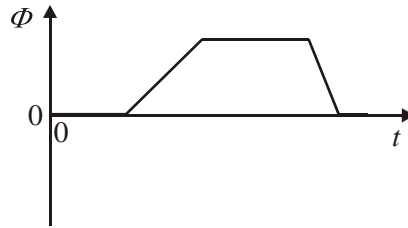


Which of the following diagrams shows the waveform displayed on the c.r.o. when it is connected to the secondary coil? The settings of the c.r.o. remain unchanged.

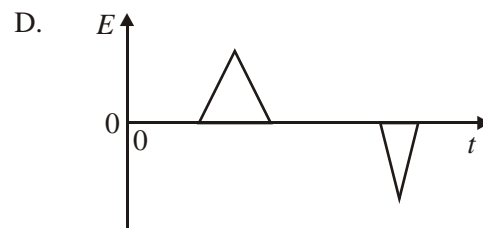
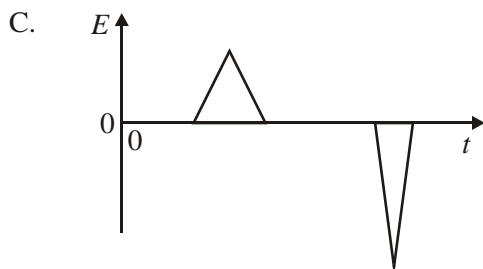
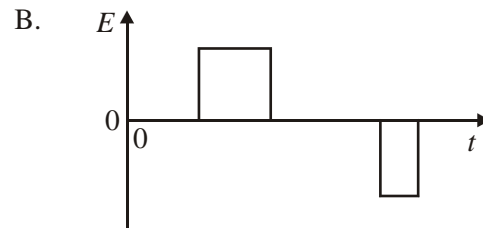
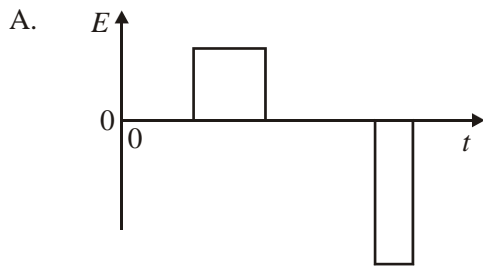


(1)

17. The variation with time t of the magnetic flux Φ through a coil is shown below.



Which of the following diagrams best shows the variation with time t of the e.m.f. E induced in the coil?



(1)

18. An ideal transformer has N_p turns on the primary coil and N_s turns on the secondary coil. The input power of the primary coil is P . The output power at the secondary coil is

- A. P .
- B. $\left(\frac{N_p}{N_s}\right)P$.
- C. $\left(\frac{N_s}{N_p}\right)P$.
- D. $1 - \left(\frac{N_s}{N_p}\right)P$.

(1)

1. B
2. D
3. C
4. C
5. D
6. A
7. D
8. C
9. A
10. B
11. B
12. B
13. D
14. C
15. A
16. B
17. A
18. A