

Lesson 5 – Answers

Q1. Explain Fleming's left- and right-hand rules.

Fleming's right-hand rule (for generators) shows the direction of induced current when a conductor attached to a circuit moves in a magnetic field. (Right to generate)

Fleming's left-hand rule (for electric motors) is a simple way of indicating the direction of motion of a conductor in a magnetic field. (Left to motor)

Q2. If the peak voltage of a sine wave is 12 V, what is the RMS and average values?

- A. 8.48 A and 7.6 A
- B. 7.6 V and 8.48 V
- C. 7.6 A and 8.48A
- D. 8.48 V and 7.6 V**

Q3. What is the instantaneous voltage at 33° of a sine wave with a peak-to-peak of 100 V?

- A. 54.46 V**
- B. 27.23 V
- C. 3.3 V
- D. 33.3 V

Q4. A sine wave has a RMS value of 17.65 V. What is the peak, P to P and average value?

- A. 50 V, 100 V and 31.8 V
- B. 25 V, 50 V and 15.9 V**
- C. 50 V, 25 V and 6.37 V
- D. Cannot be calculated.

Q 5. What is the period and wavelength of a signal at 144 MHz?

- A. 6.9 nS & 2metres**
- B. 69 nS & 2metres
- C. 0.69 nS & 2metres
- D. 0.069 nS & 2metres

Q6 A signal has a period of 2 mS, what is the frequency and wavelength?

- A. 500 Hz & 600 kM**
- B. 50 Hz & 600,000 M
- C. 5000 Hz & 600 kM
- D. 500 Hz & 60 kM

Q7 what is the third harmonic of 1 kHz?

- A. 3 kHz**
- B. 4 kHz
- C. 8 kHz
- D. 1 kHz

Q8 If one wave is 90 degrees out of phase with another wave, what does this mean?

One wave leads the other by 90deg

Q9 What is the classification of the following signals.

Frequency	Classification
350 MHz	Ultra High Frequency (UHF)
33 MHz	Very High Frequency (VHF)
33 kHz	Low Frequency (LF)

Q10. Can a transformer have more than one winding in the secondary?

Yes

No

Give reasons for answer. **Example centre tapped**

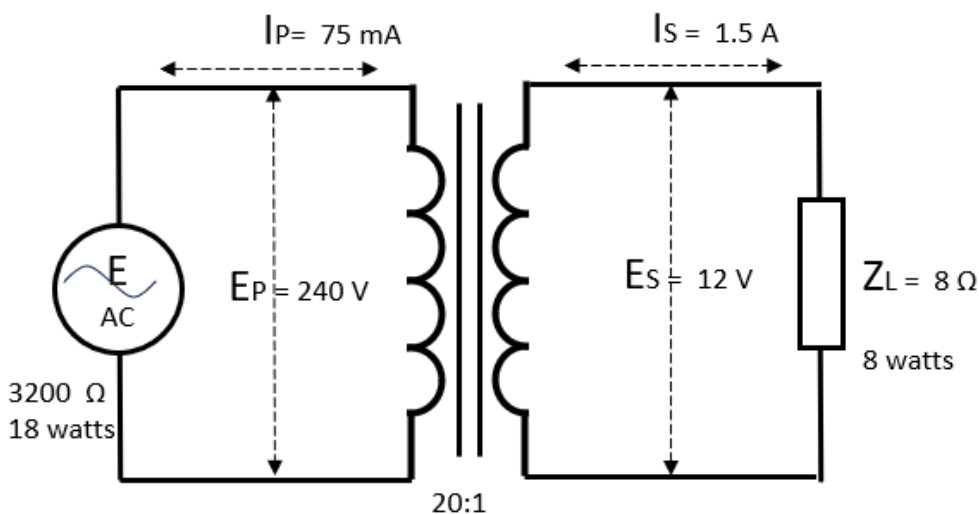
Q11 Why would a transformer have the same number of windings on the primary as the secondary?

- A. Need to use the copper.
- B. Want a DC supply.
- C. Need to isolate circuits.**
- D. Makes a good heater.

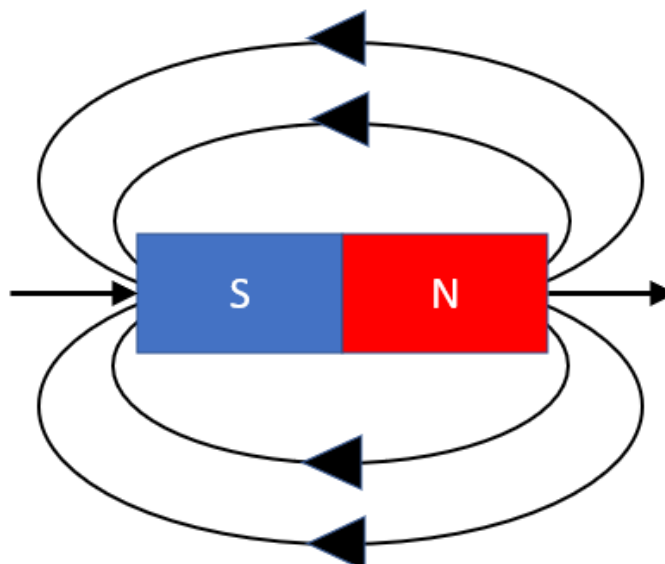
Q 12. Need a 48 V AC supply from a 240 V supply. What is the winding ratio?

- A. 2:1
- B. 5:1**
- C. 1:5
- D. 1:2

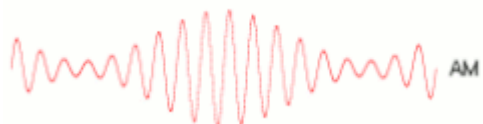
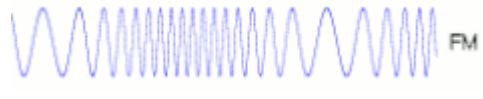
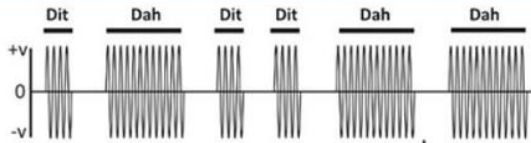
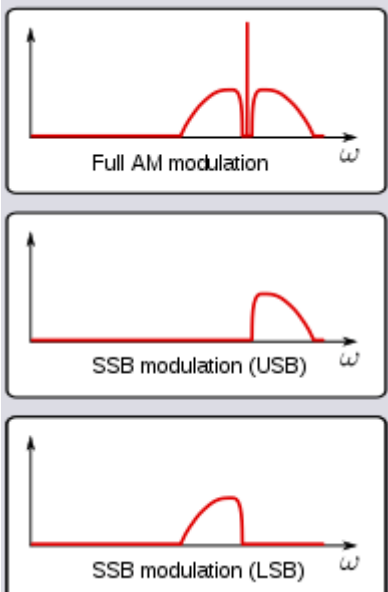
Q 13 Complete the missing details,



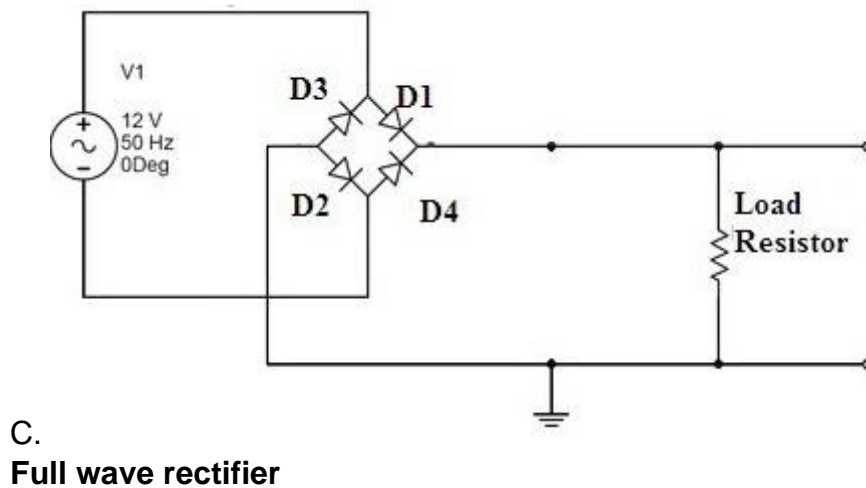
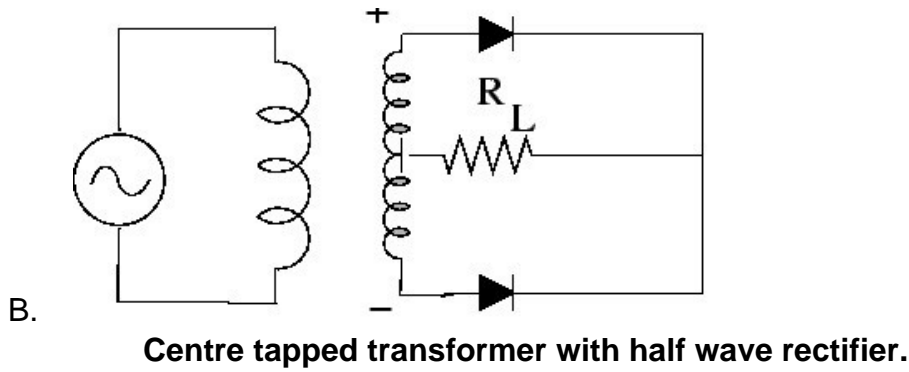
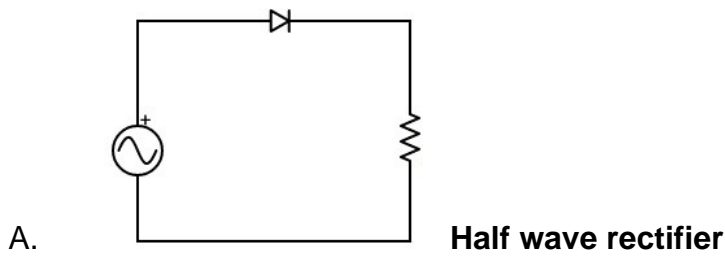
Q14 Draw in the lines of force and direction on the magnet below.



Q15 Name and describe the four modulation methods used by amateur radio operators.

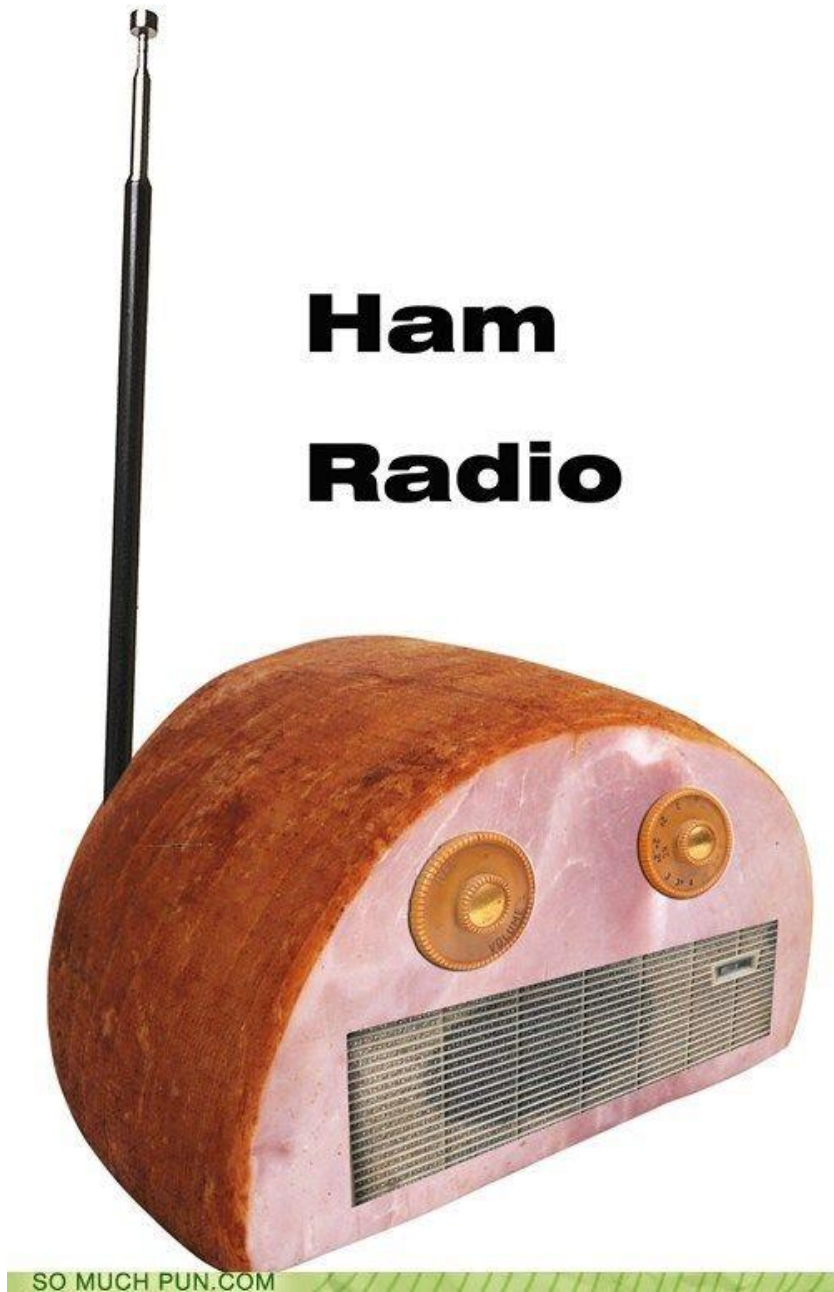
<p>Amplitude modulation (AM)</p>	<p>AM is a modulation technique where the amplitude of the carrier is varied in proportion to that of the message signal.</p>	
<p>Frequency modulation (FM)</p>	<p>FM is a modulation technique where the frequency of the carrier wave is varied by the message signal.</p>	
<p>Continuous Wave (CW)</p>	<p>The term continuous wave refers to a method of radio transmission in which a sinusoidal carrier wave is switched on and off as in Morse code.</p>	
<p>Single-Sideband modulation (SSB)</p>	<p>SSB is a refinement of amplitude modulation, SSB uses transmitter Single-sideband modulation avoids this bandwidth increase, and the power wasted on a carrier, at the cost of increased device complexity and more difficult tuning at the receiver.</p>	

Q16 Describe the operation and purpose of the following circuits. What would the output across the load look like with these circuits?



Q17 What is Peak Inverse Voltage (PIV) and how does it apply to the circuits above?
The PIV applies to the reverse voltage the diode can tolerate without breakdown.

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