

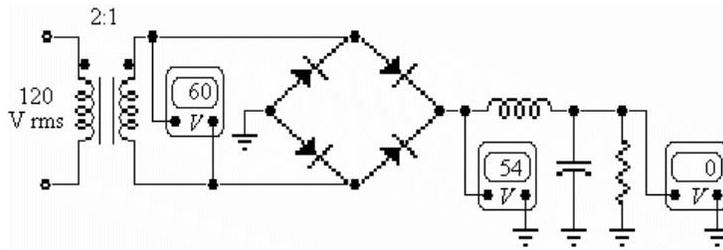
**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- 1) A diode conducts current when forward-biased and blocks current when reverse-biased. 1) \_\_\_\_\_
- 2) The larger the ripple voltage, the better the filter. 2) \_\_\_\_\_
- 3) Clamping circuits use capacitors and diodes to add a dc level to a waveform. 3) \_\_\_\_\_
- 4) Reverse bias permits full current through a pn junction. 4) \_\_\_\_\_
- 5) One of the advantages of using transformer coupling in a half-wave rectifier is that it allows the ac source to be directly connected to the load. 5) \_\_\_\_\_
- 6) The PIV rating of a diode in a full-wave bridge rectifier is more than that required for a full-wave center-tapped configuration. 6) \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 7) A typical value of reverse breakdown voltage in a diode is 7) \_\_\_\_\_  
A) 50 V or larger.      B) 0.7 V.      C) 0 V.      D) 0.3 V.
- 8) A typical value of reverse breakdown voltage in a diode is 8) \_\_\_\_\_  
A) 0.3 V.      B) 0 V.      C) 50 V or larger.      D) 0.7 V.
- 9) The small current when a diode is reverse-biased is called 9) \_\_\_\_\_  
A) reverse breakdown current.      B) forward-bias current.  
C) conventional current.      D) reverse-leakage current.
- 10) As the forward current through a forward-biased diode decreases, the voltage across the diode 10) \_\_\_\_\_  
A) increases and then decreases.      B) increases.  
C) is relatively constant.      D) immediately drops to 0 V.
- 11) The resistance of a forward-biased diode is 11) \_\_\_\_\_  
A) minimal below the knee of the curve.      B) infinite.  
C) minimal above the knee of the curve.      D) perfectly linear.
- 12) A reverse-biased diode has the \_\_\_\_\_ connected to the positive side of the source, and the 12) \_\_\_\_\_  
\_\_\_\_\_ connected towards the negative side of the source.  
A) base, anode      B) anode, cathode      C) cathode, base      D) cathode, anode
- 13) The forward voltage across a conducting silicon diode is about 13) \_\_\_\_\_  
A) 0.7 V.      B) -0.3 V.      C) 1.3 V.      D) 0.3 V.
- 14) Reverse bias is a condition that essentially \_\_\_\_\_ current through the diode. 14) \_\_\_\_\_  
A) amplifies      B) increases      C) prevents      D) allows
- 15) What must be used in series with a forward-biased diode to prevent damage due to excessive 15) \_\_\_\_\_  
current?  
A) Ammeter      B) NC switch  
C) Resistor      D) Nothing is required.
- 16) The knee voltage of a diode is approximately equal to the 16) \_\_\_\_\_  
A) reverse voltage.      B) applied voltage.

- C) breakdown voltage. D) barrier potential.
- 17) A silicon diode measures a high value of resistance with the meter leads in both positions. The trouble, if any, is 17) \_\_\_\_\_  
 A) the diode is internally shorted. B) the diode is open.  
 C) nothing; the diode is good. D) the diode is shorted to ground.
- 18) How much forward diode voltage is there with the ideal-diode approximation? 18) \_\_\_\_\_  
 A) 0.7 V B) 1 V  
 C) More than 0.7 V D) 0 V
- 19) A DMM measures  $0.13 \Omega$  in both directions when testing a diode. The diode is 19) \_\_\_\_\_  
 A) constructed of Si and is good. B) open.  
 C) shorted. D) operating normally.
- 20) On diode check, a shorted diode will measure 20) \_\_\_\_\_  
 A) 0.3 V. B) 0.79 V. C) 0 V. D) 0.7 V.
- 21) A nonconducting diode is \_\_\_\_\_ biased. 21) \_\_\_\_\_  
 A) forward B) reverse C) poorly D) inverse
- 22) The application of a dc voltage to control diode conduction is called 22) \_\_\_\_\_  
 A) oscillation. B) a pn junction. C) bias. D) amplification.
- 23) A reverse-biased silicon diode is connected in series with a 12 V source and a resistor. The voltage across the resistor is 23) \_\_\_\_\_  
 A) 0.7 V. B) 0 V. C) 0.3 V. D) 12 V.
- 24) A reverse-biased silicon diode is connected in series with a 12 V source and a resistor. The voltage across the diode is 24) \_\_\_\_\_  
 A) 0.3 V. B) 0 V. C) 0.7 V. D) 12 V.
- 25) A diode is operated in reverse bias. As the reverse voltage is decreased, the depletion region 25) \_\_\_\_\_  
 A) widens. B) has a constant width.  
 C) is not related to reverse voltage. D) narrows.
- 26) If the positive lead of an ohmmeter is placed on the cathode and the negative lead is placed on the anode, which of the following readings would indicate a defective diode? 26) \_\_\_\_\_  
 A)  $1 \text{ M}\Omega$  B)  $\infty \Omega$  C)  $0 \Omega$  D)  $400 \text{ k}\Omega$
- 27) The diode in a half-wave rectifier conducts for \_\_\_\_\_ of the input cycle. 27) \_\_\_\_\_  
 A)  $90^\circ$  B)  $45^\circ$  C)  $180^\circ$  D)  $0^\circ$
- 28) A full-wave bridge rectifier uses \_\_\_\_\_ diode(s) in a bridge circuit. 28) \_\_\_\_\_  
 A) 3 B) 1 C) 2 D) 4
- 29) A silicon diode is connected in series with a  $10 \text{ k}\Omega$  resistor and a 12 V battery. If the cathode of the diode is connected to the positive terminal of the battery, the voltage from the anode to the negative terminal of the battery is 29) \_\_\_\_\_  
 A) 12 V. B) 0.7 V. C) 11.3 V. D) 0 V.
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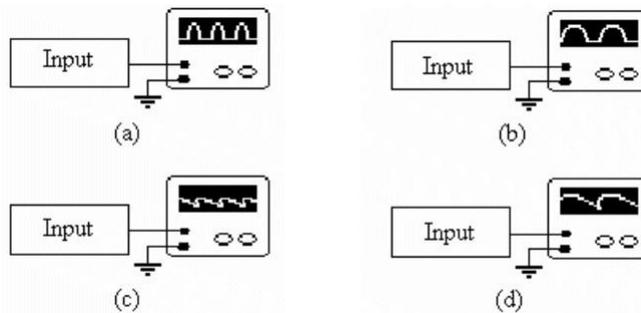


30) Refer to the figure above. If the voltmeter across the transformer secondary reads 0 V, the probable trouble is that 30) \_\_\_\_\_

- A) the filter capacitor is open.
- B) the inductor is open.
- C) the transformer secondary is open.
- D) one of the diodes is open.
- E) No trouble exists; everything is normal.

31) Refer to the figure above. In servicing this power supply, you notice that the ripple voltage is higher than normal and that the ripple frequency has changed to 60 Hz. The probable trouble is that 31) \_\_\_\_\_

- A) the filter capacitor has opened.
- B) a diode has shorted.
- C) a diode has opened.
- D) the inductor has opened.



32) Refer to the figure above. This oscilloscope trace indicates the output from 32) \_\_\_\_\_

- A) a full-wave filtered rectifier with an open diode.
- B) a full-wave filtered rectifier.
- C) a full-wave rectifier with no filter and an open diode.
- D) a half-wave filtered rectifier.

33) Refer to the figure above. The trace on this oscilloscope indicates the output from 33) \_\_\_\_\_

- A) a full-wave filtered rectifier with an open diode.
- B) a half-wave rectifier with no filter.
- C) a full-wave filtered rectifier.
- D) a full-wave rectifier with no filter.

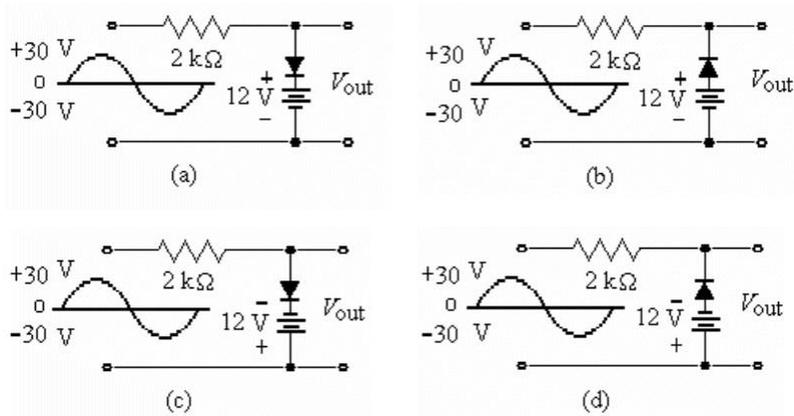
34) Refer to the figure above. This is the output from 34) \_\_\_\_\_

- A) a full-wave filtered rectifier.
- B) a half-wave rectifier with no filter.
- C) a full-wave rectifier with no filter and an open diode.
- D) a full-wave filtered rectifier with an open diode.

35) Refer to the figure above. This trace shows the output from 35) \_\_\_\_\_

- A) a half-wave rectifier with an open diode.
- B) a full-wave filtered rectifier with an open diode.
- C) a half-wave rectifier with no filter.

D) a full-wave rectifier with no filter and an open diode.



36) Refer to the figure above. These circuits are known as  
 A) amplifiers.      B) clampers.      C) rectifiers.      D) clippers.

36) \_\_\_\_\_

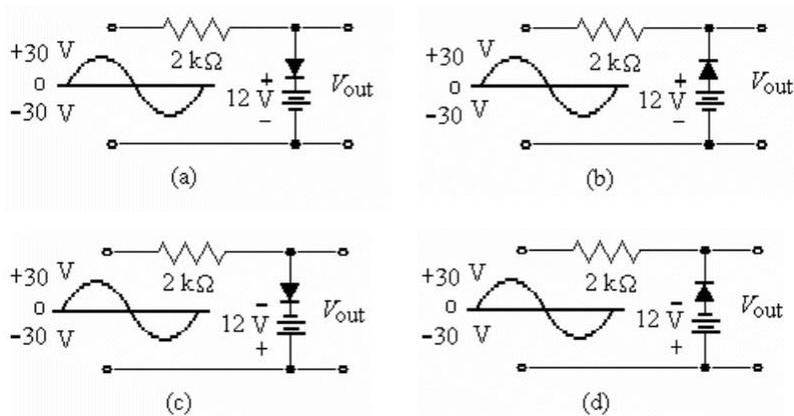


Figure I

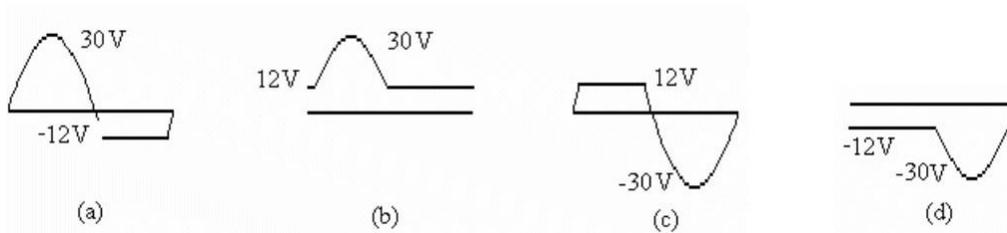


Figure II

37) Which of the circuits in Figure I will produce the signal in Figure II (a)?  
 A) (a)      B) (b)      C) (c)      D) (d)

37) \_\_\_\_\_

38) Which of the circuits in Figure I will produce the signal in Figure II (b)?  
 A) (a)      B) (b)      C) (c)      D) (d)

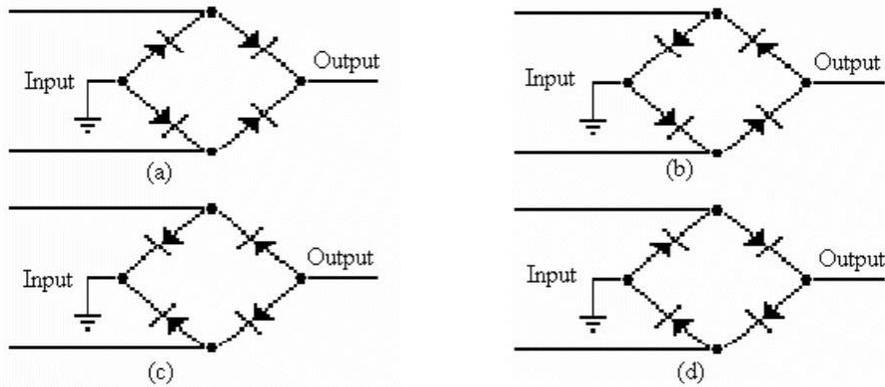
38) \_\_\_\_\_

39) Which of the circuits in Figure I will produce the signal in Figure II (c)?  
 A) (a)      B) (b)      C) (c)      D) (d)

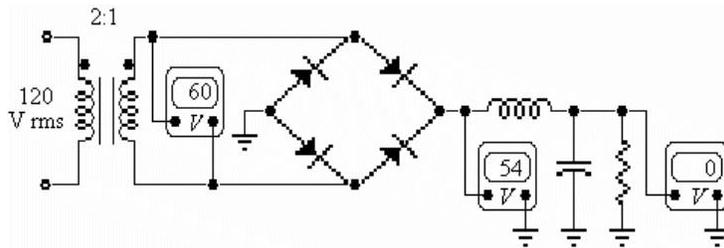
39) \_\_\_\_\_

40) Which of the circuits in Figure I will produce the signal in Figure II (d)?  
 A) (a)      B) (b)      C) (c)      D) (d)

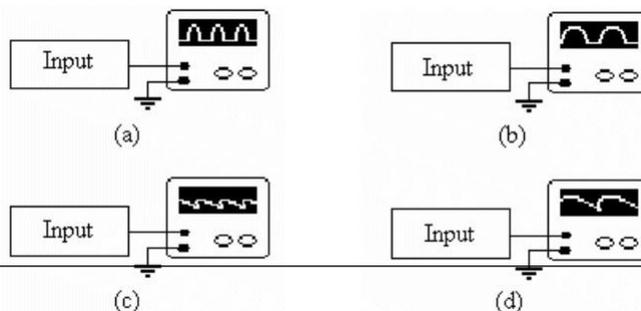
40) \_\_\_\_\_



- 41) Refer to (c) in the figure above. This rectifier arrangement 41) \_\_\_\_\_  
 A) is incorrectly connected. B) will produce a negative output voltage.  
 C) will produce a positive output voltage. D) A or C above.
- 42) Refer to (d) in the figure above. This rectifier arrangement 42) \_\_\_\_\_  
 A) will produce a negative output voltage. B) is incorrectly connected.  
 C) will produce a positive output voltage. D) None of the above.
- 43) A silicon diode has a voltage to ground of 117 V from the anode. The voltage to ground from the cathode is 117.7 V. The diode is 43) \_\_\_\_\_  
 A) reverse-biased. B) shorted.  
 C) forward-biased. D) conducting.



- 44) Refer to the figure above. The probable trouble, if any, indicated by these voltages is 44) \_\_\_\_\_  
 A) an open transformer secondary.  
 B) one of the diodes is open.  
 C) the filter capacitor is open.  
 D) an open transformer primary.  
 E) the inductor is open.
- 45) Refer to the figure above. If the voltmeter across the transformer secondary reads 0 V, the probable trouble, if any, would be 45) \_\_\_\_\_  
 A) the inductor is open. B) the inductor is shorted.  
 C) one of the diodes is open. D) an open transformer primary.



- 46) Refer to the figure above. Which oscilloscope trace indicates the output from a filtered full-wave rectifier 46) \_\_\_\_\_

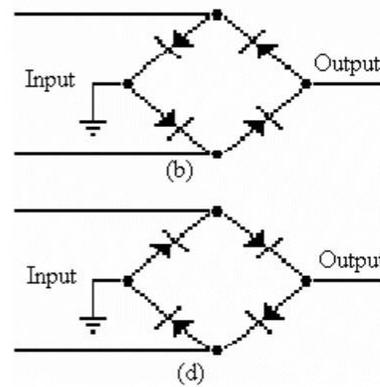
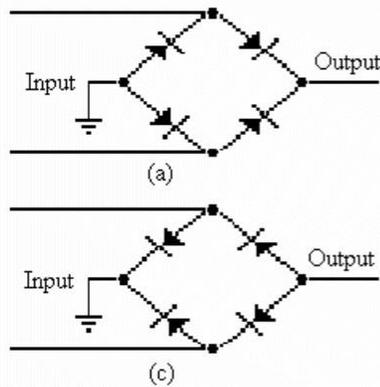
with an open diode?

- A) (a)                      B) (b)                      C) (c)                      D) (d)

47) The ripple frequency of a bridge rectifier is  
 A) four times the input frequency.  
 C) one-half the input frequency.

B) double the input frequency.  
 D) the same as the input frequency.

47) \_\_\_\_\_



48) Refer to the figure above. The correct diode arrangement to supply a positive output voltage is  
 A) (a).                      B) (b).                      C) (c).                      D) (d).

48) \_\_\_\_\_

49) With a half-wave rectified voltage across a load resistor, load current exists for what part of a cycle?  
 A) 360 degrees                      B) 90 degrees                      C) 0 degrees                      D) 180 degrees

49) \_\_\_\_\_

50) When a 60 Hz sinusoidal signal voltage is applied to the input of a half-wave rectifier, the output frequency is  
 A) 30 Hz.                      B) 60 Hz.                      C) 120 Hz.                      D) 90 Hz.

50) \_\_\_\_\_

51) The average value of the half-wave rectified output voltage is approximately \_\_\_\_\_ of  $V_p$ .  
 A) 31.8%                      B) 63.6%                      C) 100%                      D) 70.7%

51) \_\_\_\_\_

52) Using a practical forward-biased diode, if the voltage at the anode were 10 V, the voltage at the cathode would equal  
 A) 10.7 V.                      B) 9.3 V.                      C) 10 V.                      D) 10.3 V.

52) \_\_\_\_\_

53) If input frequency is 60 Hz, the output frequency of a bridge rectifier is  
 A) 240 Hz.                      B) 120 Hz.                      C) 30 Hz.                      D) 60 Hz.

53) \_\_\_\_\_

54) To reduce surge current, \_\_\_\_\_ should be added to a power supply circuit.  
 A) a varactor tuning circuit                      B) a surge-limiting resistor  
 C) a larger fuse                      D) additional filter capacitance

54) \_\_\_\_\_

55) The dc current through each diode in a bridge rectifier equals  
 A) twice the dc load current.                      B) one-fourth the dc load current.  
 C) the load current.                      D) half the dc load current.

55) \_\_\_\_\_

56) The peak inverse voltage across a nonconducting diode in an unfiltered bridge rectifier equals approximately  
 A) twice the peak secondary voltage.  
 B) half the peak secondary voltage.

56) \_\_\_\_\_

- C) the peak value of the secondary voltage.  
D) four times the peak value of the secondary voltage.
- 57) The ideal dc output voltage of a capacitor-input filter equals the \_\_\_\_\_  
A) average value of the rectified voltage.  
B) peak-to-peak value of the secondary voltage.  
C) peak value of the rectified voltage.  
D) rms value of the rectified voltage.
- 58) A filtered full-wave rectifier voltage has a smaller ripple than does a half-wave rectifier voltage \_\_\_\_\_  
for the same load resistance and capacitor values because  
A) of the longer time between peaks.  
B) of the shorter time between peaks.  
C) the larger the ripple, the better the filtering action.  
D) None of the above.
- 59) As the load resistance in a filtered power supply varies, the output voltage \_\_\_\_\_  
A) does not change. B) is unaffected.  
C) remains constant. D) varies.
- 60) The voltage regulation stage in a power supply \_\_\_\_\_  
A) is connected to the input of the rectifier(s).  
B) follows the filter stage.  
C) is inside the transformer.  
D) is located preceding the transformer primary.
- 61) A voltage regulator compensates for changes in \_\_\_\_\_  
A) the input voltage. B) the load conditions.  
C) temperature. D) All of the above.
- 62) Another name for a diode limiter is \_\_\_\_\_  
A) bridger. B) clipper. C) dc restorer. D) clamper.
- 63) A diode clamper will \_\_\_\_\_  
A) add a dc voltage to a signal.  
B) clip off a portion of the input signal.  
C) add an ac voltage to a signal.  
D) eliminate the positive or negative alternation of a signal.
- 64) Voltage multipliers use \_\_\_\_\_ action to increase peak rectified voltages without increasing the \_\_\_\_\_  
input transformer voltage rating.  
A) clipping B) clamping C) cropping D) charging
- 65) All of the following diode information is provided by a manufacturer's data sheet except \_\_\_\_\_  
A) mechanical data. B) frequency response.  
C) PIV ratings. D) temperature parameters.
-

- 1) TRUE
  - 2) FALSE
  - 3) TRUE
  - 4) FALSE
  - 5) FALSE
  - 6) FALSE
  - 7) A
  - 8) C
  - 9) D
  - 10) C
  - 11) C
  - 12) D
  - 13) A
  - 14) C
  - 15) C
  - 16) D
  - 17) B
  - 18) D
  - 19) C
  - 20) C
  - 21) B
  - 22) C
  - 23) B
  - 24) D
  - 25) D
  - 26) C
  - 27) C
  - 28) D
  - 29) D
  - 30) C
  - 31) C
  - 32) C
  - 33) D
  - 34) A
  - 35) B
  - 36) D
  - 37) D
  - 38) B
  - 39) A
  - 40) C
  - 41) B
  - 42) B
  - 43) A
  - 44) E
  - 45) D
  - 46) D
  - 47) B
  - 48) A
  - 49) D
  - 50) B
  - 51) A
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- 52) B
- 53) B
- 54) B
- 55) C
- 56) C
- 57) C
- 58) B
- 59) D
- 60) B
- 61) D
- 62) B
- 63) A
- 64) B
- 65) B