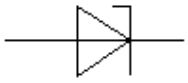
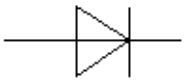
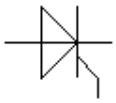
NUE064 Electronic Power and Control 1

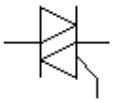
Revision Questions

Q1
Which of the following symbols represents a rectifier diode?

A 

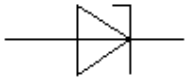
B 

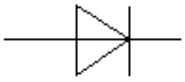
C 

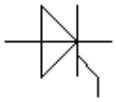
D 

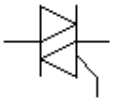
Circle the letter which corresponds to the correct answer.

Q2
Which of the following symbols represents a zener diode?

A 

B 

C 

D 

Circle the letter which corresponds to the correct answer.

Q3
Draw the circuit diagram symbol for each of the following solid state control devices.

a. PNP transistor

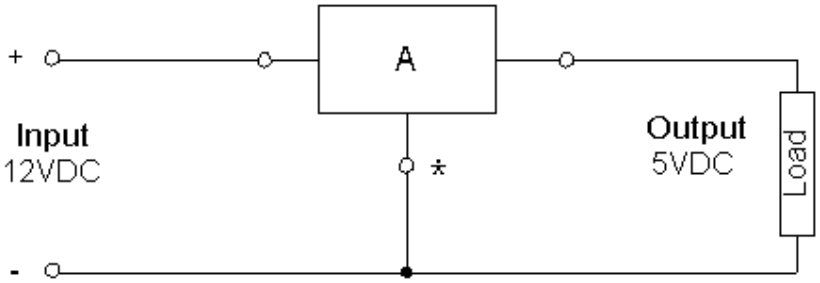
b. NPN transistor

c. SCR

Q4
Draw the circuit diagram symbol for the following solid state control devices.

a. DIAC
b. TRIAC

Q5
Consider the circuit diagram shown below.



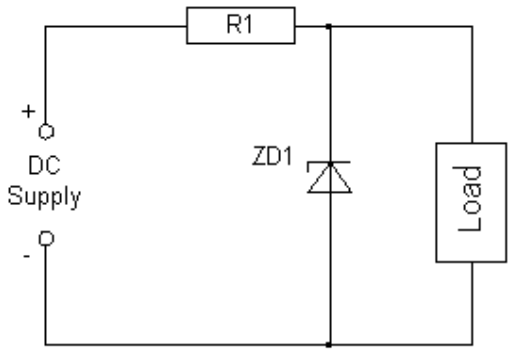
a. Name the solid state device indicated by the letter A.
b. Name the terminal marked with an asterisk (*).

Q6
The output voltage and polarity with respect to the common rail for a basic 3-terminal voltage regulator labelled “7912” are

A. 9 volts, positive.
B. 7 volts, negative.
C. 12 volts, negative.
D. 12 volts, positive.

Circle the letter which corresponds to the correct answer.

Q7
Consider the circuit diagram shown below. R_1 = 220Ω, ZD1 = 8.2V, 1W and DC Supply = 15V.

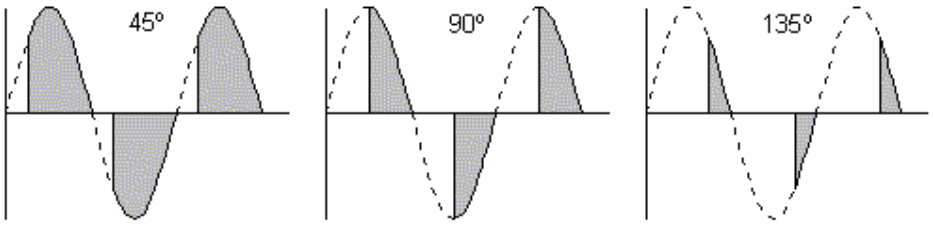


a. What is the name of this type of circuit? _____

b. Determine the value of the load voltage. _____

c. What is the purpose of resistor R_1? _____

Q8
Consider the diagrams of the current waveforms shown below.

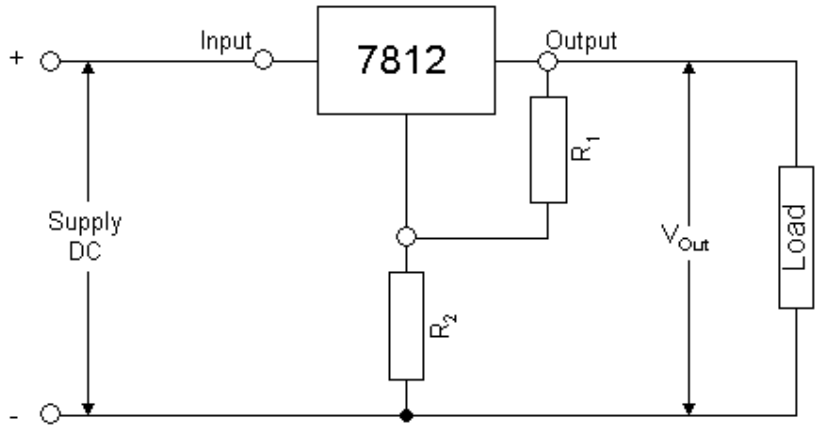


Which of the following applications would use the load current waveform shown in the diagrams?

A. TRIAC control
B. Zener control
C. SCR control
D. DIAC control

Circle the letter which corresponds to the correct answer.

Q9
Consider the circuit diagram below which shows a 3-terminal voltage regulator with a resistor network R_1 and R_2. Assume the DC Supply is 20 volts.



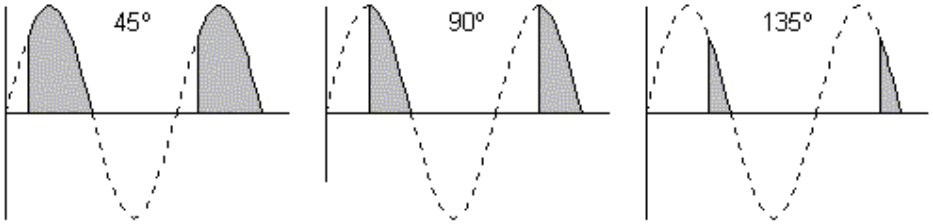
a. What is the function of this circuit? _____

b. Determine the value of the load voltage V_{Out} if R_2 is set to 0 ohms. _____

c. What effect does increasing the value of R_2 above 0 ohms have on the load voltage?

_____

Q10
Consider the diagrams below which show examples of waveforms produced by a variable power control circuit.



Which of the following applications would use the waveforms shown in the diagrams?

A. Full wave DC heating elements switched on/off by a thermostat
B. AC dimming control for incandescent lamps
C. Half wave speed control of a DC motor
D. AC heating elements controlled by a simmerstat

Circle the letter which corresponds to the correct answer.

Q11
Consider the partly completed circuit diagram shown below.

a. Complete the diagram to show a single-phase bridge full-wave bridge rectifier, arranged so that the marked load terminal (*) is positive. Label all components.

b. Given V_{AC} is 12V RMS, determine each of the following values.

   i. DC load voltage
   ii. peak inverse voltage of diode D_1

Q12
Consider the partly completed circuit diagram shown below.

a. Complete the diagram to show a three-phase bridge full-wave rectifier, arranged so that the marked load terminal (*) is positive. Label the diodes and load, and indicate the AC voltage V_{AC} used to determine the DC output.

b. Given V_{AC} is 400V RMS, determine each of the following values.

   i. DC load voltage
   ii. peak inverse voltage of diode D_1

Q14
Consider the partly completed circuit diagram shown below.

a. Complete the diagram to show a single-phase full-wave rectifier including centre-tapped transformer and two diodes, arranged so that the marked load terminal (*) is positive. Label the diodes and load, and indicate the AC voltage V_{AC} used to determine the DC output.

b. Given V_{AC} is 12V RMS, determine each of the following values.

   i. DC load voltage
   ii. peak inverse voltage of diode D_1

Q15
Consider the partly completed circuit diagram shown below.

a. Complete the diagram to show a three-phase half-wave rectifier, arranged so that the marked load terminal (*) is negative. Label the diodes and load, and indicate the AC voltage V_{AC} used to determine the DC output.

b. Given V_{AC} is 220V RMS, determine each of the following values.

   i. DC load voltage
   ii. peak inverse voltage of diode D_1

Q16
What is the name of the type of filter most suitable for low levels of load current, using diodes of low current rating?

A. capacitor filter
B. choke input 'L' filter
C. capacitor input 'L' filter
D. 'Pi' type filter

Circle the letter which corresponds to the correct answer.

Q17
Capacitors in equipment can hold a charge even when de-energised.

a. Describe **one** safety precaution that should be taken before working on such equipment.

_____

b. Explain the purpose of a small resistor that may be connected across a capacitor.

_____