

**THE INTERNATIONAL ASSOCIATION OF RADIO,
TELECOMMUNICATIONS & ELECTROMAGNETICS,
INC.**

840 Queen St. • New Bern, NC 28560 • (252) 672-0111 • www.narte.org

**Study Reference Guide and
Sample Questions
for
Telecommunication Technicians
Credential Certification Exams**





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STUDY REFERENCE GUIDE

TELECOMMUNICATIONS MASTER TECHNICIAN EXAM

The following subjects are covered in the MASTER TECHNICIAN examination:

| TOPIC | PERCENTAGE |
|-----------------------------|-------------------|
| Digital | 51% |
| Active Filters | 11% |
| Transistors .. | 9% |
| AC Theory ... | 7% |
| Oscillators ... | 6% |
| DC Theory ... | 4% |
| Decibel | 4% |
| Transformers..... | 2% |
| Operational Amplifiers..... | 2% |
| Wave Shapers..... | 2% |
| Function Circuits | |
| Math Circuits | |
| Derivative | |
| Integral | |
| Miscellaneous | 2% |
| Phase Lock Loop | |

The following books are suggested as study materials in preparation for the MASTER TECHNICIAN examination:

DIGITAL SYSTEMS

by Ronald J. Tocci, Sixth Edition, 1994, Published by Prentice Hall. ISBN 0132932008

OP-AMPS AND LINEAR INTEGRATED CIRCUITS

by Ramaknt A. Gayakwad, Third Edition, 1992, Published by Prentice Hall.
ISBN 0136303285

ELECTRONIC PRINCIPLES

by Albert Paul Malvino, Fifth Edition, 1993, Published by Glencoe McGraw-Hill.
ISBN 0028008456

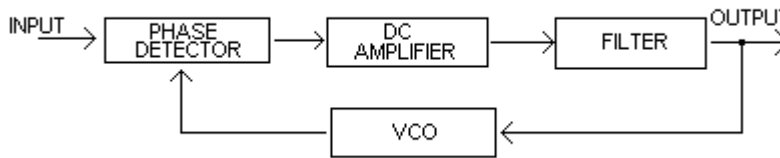


MASTER TECHNICIAN - SAMPLE TEST

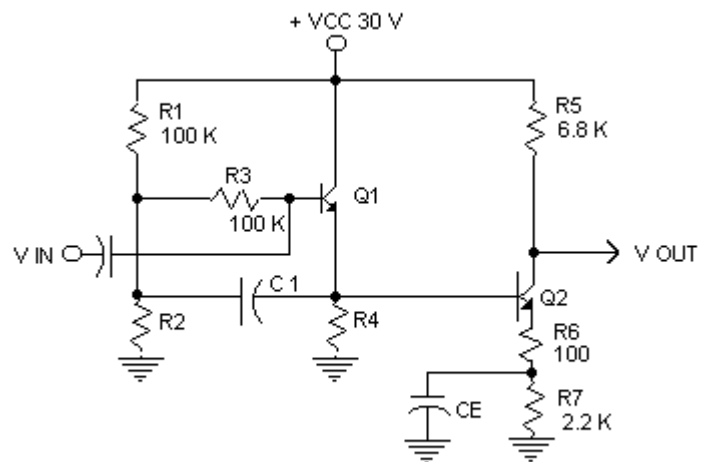
Answer key located on Page 10.

1. Push-pull frequency multipliers normally produce what order of harmonics?
 - a. Even order harmonics.
 - b. Odd order harmonics.
 - c. Both (a) and (b).
 - d. They are harmonic free.

2. The following block diagram is a typical representative of a:
 - a. quadrature oscillator.
 - b. frequency synthesizer.
 - c. phase-lock loop.
 - d. voltage-controlled oscillator.

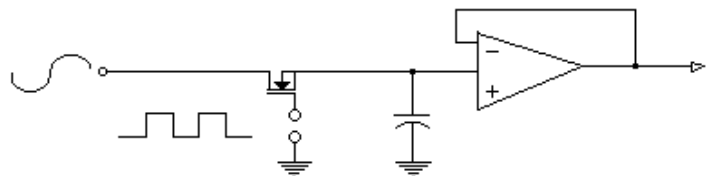


3. The purpose of the bootstrap capacitor C_1 is to:
 - a. provide negative feedback.
 - b. increase the input impedance.
 - c. by-pass the base-emitter junction.
 - d. couple signal to the base of Q_2 .



4. Parallel-to-serial conversion could be accomplished by one of the following?
 - a. full adder
 - b. comparator
 - c. RAM
 - d. shift register

5. What is the application of this circuit?
 - a. Sample and hold.
 - b. Voltage to frequency converter.
 - c. Switching regulator.
 - d. Digital-to-analog converter.





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STUDY REFERENCE GUIDE

TELECOMMUNICATIONS SENIOR TECHNICIAN EXAM

The following subjects are covered in the SENIOR TECHNICIAN examination:

| TOPIC | PERCENTAGE |
|------------------------------|-------------------|
| Digital | 40% |
| AC Circuits | 24% |
| Transformers | 12% |
| Decibel | 6% |
| Diodes | 6% |
| Power Supplies..... | 4% |
| Transformers | 3% |
| Operational Amplifiers | 1% |
| Oscillators | 1% |
| Filters | 1% |

The following books are suggested as study materials in preparation of the SENIOR TECHNICIAN examination:

ELECTRONIC PRINCIPLES

by Albert Paul Malvino; Fifth Edition, 1993, Published by McGraw-Hill.
ISBN 0028008456

DIGITAL SYSTEMS

by Ronald J. Tocci; Sixth Edition, 1994, Published by Prentice-Hall. ISBN 0132932008

OP-AMPS AND LINEAR INTEGRATED CIRCUITS

by Ramaknt A. Gayakwad, Third Edition, 1992, Published by Prentice Hall.
ISBN 0136303285



SENIOR TECHNICIAN - SAMPLE TEST

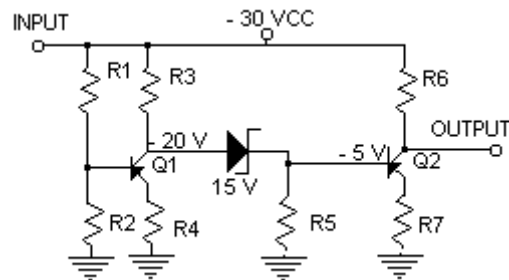
Answer key located on Page 10.

1. The half-adder circuit:
 - a. can add multiple columns of numbers.
 - b. can add only the least significant place column.
 - c. has provisions for adding the carry from a lower order place column.
 - d. shifts any number stored in it for purposes other than that of ordinary storage.

2. The number of flip-flops for 32 counts is:

- | | |
|------|-------|
| a. 8 | c. 16 |
| b. 4 | d. 5 |

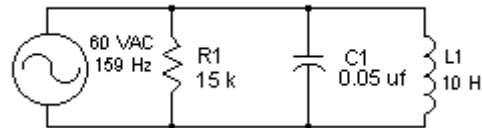
3. When Q1's base voltage varies from 0 degrees to 90 degrees, which of the following states are true?



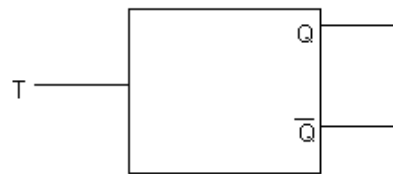
- a. Q1's forward bias increases.
- b. The voltage drop across R5 decreases.
- c. Q2's collector voltage becomes of a higher negative value.
- d. The zener diode voltage remains at 15 volts.

4. Determine I_T for the following circuit:

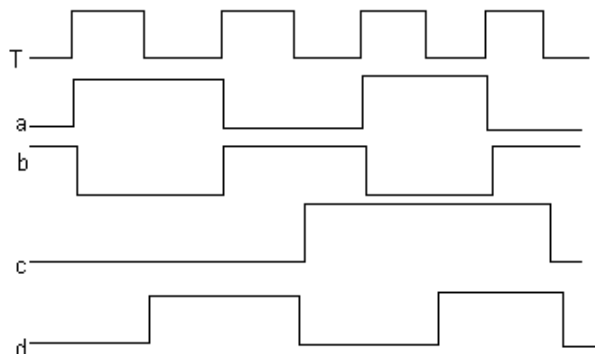
- a. 13 mA
- b. 2 mA
- c. 10 mA
- d. 5 mA



5. "Q" output for the "T" flip-flop is:



- a. waveform "a".
- b. waveform "b".
- c. waveform "b".
- d. waveform "d".





STUDY REFERENCE GUIDE

TELECOMMUNICATIONS JUNIOR TECHNICIAN EXAM

The following subjects are covered in the JUNIOR TECHNICIAN examination:

| TOPIC | PERCENTAGE |
|-----------------------------|-------------------|
| Digital | 34% |
| Transistor Circuits .. | 18% |
| Operational Amplifiers..... | 13% |
| AC Circuits ... | 12% |
| Power Supplies | 10% |
| Oscillators | 3% |
| Decibel | 3% |

The following books are suggested as study materials in preparation for the JUNIOR TECHNICIAN examination:

ELECTRONIC PRINCIPLES

by Albert Paul Malvino; Fifth Edition, 1993, Published by McGraw-Hill. ISBN 0028008456

DIGITAL SYSTEMS

by Ronald J. Tocci; Sixth Edition, 1994, Published by Prentice-Hall. ISBN 0132932008

APPLICATIONS AND DESIGN WITH ANALOG INTEGRATED CIRCUITS

by J. Michael Jacob; Second Edition, 1993, Published by Prentice Hall. ISBN 0130321451

OP-AMPS AND LINEAR INTEGRATED CIRCUITS

by Ramaknt A. Gayakwad, Third Edition, 1992, Published by Prentice Hall. ISBN 0136303285

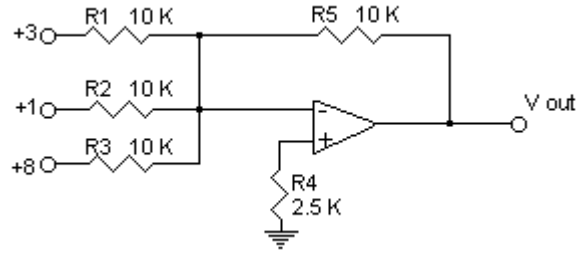


JUNIOR TECHNICIAN - SAMPLE TEST

Answer key located on Page 10.

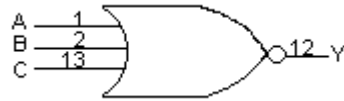
1. Determine the output voltage:

- a. -12 volts
- b. -4 volts
- c. -0.4 volts
- d. -3 volts



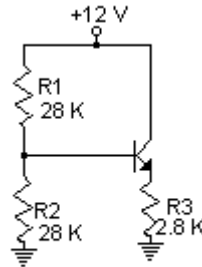
2. For a three-input NOR gate, the output at Y is:

- | | A | B | C | Y |
|----|---|---|---|---|
| a. | 0 | 0 | 0 | 0 |
| b. | 1 | 1 | 1 | 1 |
| c. | 1 | 0 | 1 | 1 |
| d. | 0 | 1 | 0 | 0 |



3. Determine the I_E in the following circuit:

- a. 1.893 mA
- b. 1.143 mA
- c. 4.286 mA
- d. 4.036 mA

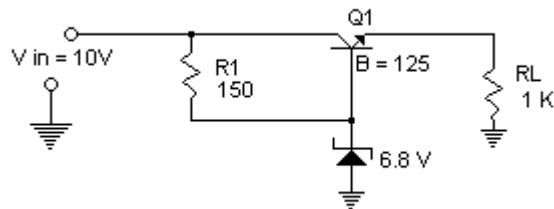


4. Which is an incorrect rule for binary addition?

- a. $1 + 1 = 2$
- b. $1 + 1 = 0$ with 1 carry
- c. $1 + 0 = 1$
- d. $0 + 1 = 1$

5. Determine the load voltage in this series voltage regulator.

- a. 6.8 volts
- b. 7.5 volts
- c. 6.1 volts
- d. 7.0 volts



KEY TO NARTE TECHNICIAN SAMPLE TESTS

MASTER

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

SENIOR

1 - B
2 - D
3 - D
4 - D
5 - D

JUNIOR

1 - A
2 - D
3 - A
4 - A
5 - C

