EXTRA CLASS PRIVILEGES  (pages 1 - 8)

1.  X refers to the Gordon West Extra Class book.  BE refers to the optional Basic Electronics book.  
   Got both? ____________________________________________

2.  On which bands do you gain 25 kHz window of exclusive CW privileges at the bottom of each band?
   _____________________________________________________

3.  When you get to Extra, you gain____________kHertz of additional voice and data privileges?

4.  On 75 meters, your Extra Class voice privileges, not shared with other operators, are from 
    ___________MHz to ___________MHz?

5.  On the popular 20 meter band, Extras have non-shared voice privileges from____________MHz to 
    ___________MHz.

6.  As an Extra Class operator, you may test for all levels as a V__________
    E______________.

HAM RADIO HISTORY (pages 9 -14)

1.  How many hams in the U S A? ________________________________

2.  How old is the amateur radio service? __________________________

3.  In 1979, what test was eliminated for operation above 30 MHz? ______________

4.  In 2007, what test requirement was eliminated for high frequency licensing?
   ____________________________________________________________

5.  When did Volunteer testing begin? ______________________________

6.  Which test element is Element 2? ______________________________

7.  Which element is Element 3? ________________________________

8.  Which element is Element 4? ________________________________

9.  May an applicant go from Technician to Extra without taking the General Element?
   ____________________________________________________________

GETTING READY FOR THE EXAM (pages 15 - 20)

1.  How many test questions are on upcoming Extra Class Element 4 exam? ________

2.  Answer ___________________ or more correctly, and you pass!

3.  Confirm: Is your General Class license is current? __________________________

4.  Important: When you pass your Extra Class exam, the license term still remains the same – 
   you DON’T automatically get 10 more years before renewal.  Check your General license renewal date. 
   This is when your new Extra Class renewal is due.  Luckily, no re-test is required!
GETTING READY FOR THE EXAM (continued)

5. What does Extra subelement E9 cover? ____________________________

6. After my rearrangement of topics, how many topic areas are there? __________

7. OK, I scrambled the question numbers – where will you find the cross reference?
   p____________________ to p____________________? Hint: back of the book!

8. If you haven’t already, it’s time to play the audio CD in the front of the book. Did you play it?
   ___________________________________________________________________

RULES AND REGULATIONS (p 21 - p 38)

1. When operating USB, how close to the top of the band may you operate? ______

2. How much power output on 60 meters? ________________________________

3. How much power output on 30 meters code and data band? ________________

4. With an Extra ticket, you gain authority in most____________________ countries.

5. Where is line A restriction for portions of 70 cm? _________________________

6. What type of control for a common repeater up on a mountainside? __________

7. Where may repeater operation take place on 10 meters? _________________

8. Minimum age limit to become a Volunteer Examiner? ____________________

9. What is issued to an examinee after passing a test element? ________________

10. Fraudulent exam results might cost a VE team their own__________________?

PROPAGATION (p 39 - 54) BE (p 108 -119) Take the quiz for extra credit!

1. What are the two fields in an electromagnetic wave? _______________________

2. What is the polarization of an antenna whose ELECTRIC field is perpendicular to the surface of the earth? ________________________________

3. Which ham band provides great DX for nearly 24 hours? _________________

4. Twilight conditions between two distant stations may lead to fantastic DX, called __________ ____________ propagation?

5. Best band for a meteor scatter contact? _________________________________

6. What’s that “horn” you see in the sun photo on p 47? _____________________

7. A VHF/UHF contact, sometimes lasting for days between stations separated 2000 miles over the ocean is called ________________________________ ?

8. You tune in on a DX station on 14.120, who indicates they are listening “up 35”. Where should YOU transmit? _________________________________
SATELLITE AND SPACE COMMUNICATIONS (p 55 - 66)
1. Which class of amateur license allows satellite communication? ________________
2. What band do you receive on for satellite mode V/U? ________________
3. Why does a satellite signal tune in higher as it is coming up toward you from the horizon?
   ________________
4. What type of satellite appears in one steady position in the sky? ________________
5. Where might you find CW and data moon bounce communications on 2 meters?
   ________________
6. The best time to complete a moon bounce contact is when the moon is at
   ________________?

VISUAL AND VIDEO (p 67 - 76)
1. Amateurs still use analog ham radio TV transmissions. What is the name of the video signal that
   carries color information? ________________
2. Ham analog video fast scan TV is wide! - __________ MHz. Where on high frequency is a
   reserved spot for slow scan television? __________ MHz
3. On older oscilloscopes, if we exceed ________________ we could cause the cathode ray tube to
   generate X-rays.
4. What is the big benefit of a liquid crystal display? ________________

DIGITAL (p 77 - 88)  BE (p121 - 133) Take the quiz for extra credit!
1. What digital mode is common below 30 MHz? ________________
2. Which digital mode to transfer binary files? ________________
3. What is the formula to determine digital band width? ________________
4. Watch this level when adjusting PSK31? ________________
5. How might we send our position over the air? ________________
6. What is the common 2 meter frequency for sending digital position bursts?
   ________________
7. Spread spectrum transmissions are allowed above __________ MHz?
8. What is the maximum transmitter power for spread spectrum? __________ watts
9. What is the formula for calculating CW band width? ________________
MODULATION (p 89 -108) BE (p115 - 117) try the quiz on p 119

1. What is the formula for modulation index?

2. What is the formula for deviation ratio?

3. What type of wave consists of a sine wave plus all ODD harmonics? ________________ wave

4. What influences power output measured on your SSB peak reading watt meter? ____________ characteristics

5. What is RMS voltage on your wall socket? ______________________

6. What would be the Peak voltage on your wall socket? ________________

7. What stage can generate an FM phone emission? ______________________

8. How might we generate an SSB phone signal? ________________________

9. What does DSP stand for? ______________________

10. Which components in the upper arm of a filter will create low-pass? ______________________

11. Which components in the upper arm of a filter will create high-pass? ______________________

12. What is it called when too close proximity repeaters have signal mixes and create unwanted interference? ______________________

13. What are those large cans seen at repeater sites? ______________________

AMPLIFIERS & POWER SUPPLIES (p109 - 120) BE (p87 - 88, p17 -26)

1. Which amplifier class offers best linearity with least distortion? ________________

2. Which amplifier type eliminates even-order harmonics? ______________________

3. Which amplifier type offers best efficiency, but poor linearity? ______________________

4. What is the process for preventing unwanted oscillations in a power amplifier? ______________________

5. What devices do we find at UHF for power amplifier applications? ______________________

6. What device is used as a stable reference voltage in a linear voltage regulator? ______________________
AMPLIFIERS & POWER SUPPLIES (continued)
7. What circuit is shown in figure E7-3?
   ____________________________________________
8. What is the purpose of a bleeder resister?
   ____________________________________________
9. Watch out for this component – it can store a LETHAL voltage, even after the circuit is turned off?
   ____________________________________________

RECEIVERS & FILTERS (p121 - 138)
1. Which component in your radio develops the piezoelectric effect?
   ____________________________________________
2. Which filter has no ripple and good attenuation beyond the passband?
   ____________________________________________
3. The rearranged formula for determining intermodulation interference, frequency 2?
   ____________________________________________
4. Is -174 dBm great or fair for receiver sensitivity?
   ____________________________________________
5. You SSB voice filter network has this selectivity or greater? _________ kHz
6. Where is most of the noise coming from over your high frequency station antenna system?
   ____________________________________________
7. What device provides rectification and filtering of RF signals?
   ____________________________________________
8. What occurs within the mixer circuit if you introduce excessive pre-amplification?
   ____________________________________________
9. Noise blankers are good for eliminating this type of interference?
   ____________________________________________
10. What does DSP stand for?
    __________________________________________

OSCILLATORS & SYNTHESIZERS (p139-148) BE (p98-100, 153-174 TOPICAL REFERENCE)
1. The oscillator that uses a quartz crystal?
   ____________________________________________
2. Common oscillator for VFOs?
   ____________________________________________
3. What does PLL stand for?
   ____________________________________________
4. What does DDS stand for?
   ____________________________________________
5. What are the unwanted components of DDS?
   ____________________________________________
E = voltage  \( L \) = inductance in a coil  \( I \) = current  \( C \) = capacitive reactance in a capacitor

1. In an ELI circuit, is it voltage or current LEADING? ______________
2. In an ICE circuit, does current LEAD or LAG? ______________
3. When working phase angle questions on the test, most correct answers start off with ____________ degrees?
4. A (+j) reactance is inductive or capacitive? ______________
5. A circuit (-j) is capacitive or reactive? ______________
6. What coordinate system may display the phase angle of circuits containing resistance, inductance and/or capacitive reactance? ______________
7. In polar coordinates, when inductive reactance cancels capacitive reactance, leading only to resistance in series, what is the phase angle? _____ degrees?
8. Formula to determine half-power bandwidth? ______________
9. In a time constant circuit, how many time constants for a capacitor to be charged 63.2 per cent of the supply voltage? ____________ time constants
10. What page in the Gordo book allows you to visualize time constants? ______
11. As frequencies increase, RF current flows in a thinner layer of the conductor, close to the surface. What is this called? ______________
12. What is the term for out-of-phase non-productive power within a coil or capacitor? ______________
13. Formula for computing true power? ______________
14. Advantage of a toroidal core inductor? ______________

COMPONENTS (p 183-193)  BE (p 59-84 topically) For extra credit, complete the quiz for Chapter 4 BE

1. Draw a PNP transistor. ______________
2. Draw an N-channel dual gate mosfet ______________
3. What diode amplifies and oscillates? ______________
4. Draw a varactor diode ______________
5. Input voltage to a logic “low” in an old TTL device? ______________
6. What is a MMIC? ______________
7. MMIC devices require______________ volts?
1. Draw the symbol for an AND gate ______________________________________________________________________
2. You can spot an OR gate symbol by a____________________ on its nose.
3. A list of inputs and corresponding outputs for a digital device is called a ______________________.
4. This provides receiver calibration______________________________?
5. What does OP-AMP stand for? _________________________________
6. Formula for the gain of an inverting IC OP-AMP? _______________________
7. Typical output impedance of an integrated circuit OP-AMP? _________________
8. The tuning shaft and LED shine through this device? _______________________
9. What absorbs energy when light shines on a photovoltaic cell? ________________

TEST EQUIPMENT (p213 -218)
1. This instrument shows frequencies on the horizontal axis____________________
2. This instrument indicates pulses in a digital logic circuit. _______________________
3. This instrument measures frequencies. _________________________________
4. An increase in current on an RF ammeter in series with the antenna feedline indicates less or more current to the antenna? _______________________
5. What type of meter shows a traditional needle movement? ___________________

ANTENNAS (p219 - 236)
1. Do you want maximum or minimum radiation resistance of an antenna? ____________
2. What’s missing on an HF quarter wave antenna? ____________________________
3. What provides the best RF ground to Earth? _________________________________
4. What provides the best RF ground aboard a sailboat? _________________________
5. What is the approximate feedpoint impedance of a half wave dipole? __________
6. What is the approximate feedpoint impedance of a folded dipole? ____________
ANTENNAS (continued)

7. What antenna has no gain in any direction? ____________________________

8. To improve radiation efficiency of a mobile antenna, add a _______________ to increase top loading?

9. What antenna might produce patterns seen on page 229? ________________

10. Increasing the boom length does what for a Yagi antenna? ________________

SAFETY (p 237 – 260)

1. What is one type of matching network to a Yagi antenna? ________________

2. What instrument allows you to test antenna resonance? ________________

3. What is the typical velocity factor of coax cable with a solid polyethylene dielectric? ________________

4. P. 245, that little bird is sitting on which element of my stacked two meter Yagi? ________________

5. Which chart allows you to calculate impedance along transmission lines? ________________

6. Why don’t we see more rhombics in downtown neighborhoods? ________________

7. The bigger the dish, beamwidth ____________________________?

8. What does SAR measure? ________________

9. What type of direction finding requires multiple bearings at multiple locations? ________________

[END]