Perioperative Electrophysiology Staff and Fellow Training Exam

1. When placing a magnet on an ICD, which two manufacturer types will emit a tone?
2. Which type of pacemaker will pace asynchronously at 85 when a magnet is placed on it (assume full battery)?
3. A Biotronik pacemaker is in the DDD-CLS mode. What type of rate response mode does this patient have?
4. You place a magnet on a patient’s pacemaker, and it paces asynchronously at 90 for 10 beats before reverting to the base-pacing mode. What type of pacemaker does this patient have?
5. Your patient has a Boston Scientific ICD in the DDDR mode and you need to turn off the ICD and convert the pacing mode to DOO. What will you have to do?
6. Your patient has a pacemaker that reportedly has a minute ventilation rate response mode. What type (manufacturer) of pacer is it?
7. A patient’s pacemaker set in the DDD mode with a lower rate of 60 starts to pace at 50 at 9 pm during an operation. What is the most likely reason for this?
8. Your patient has a Medtronic pacemaker in the AAI-DDD mode. What two things might you see on the rhythm strip that might seem worrisome to an anesthesiologist with little EP experience?
9. Your patient has a Biotronik ICD. You need to convert his pacer to DOO and turn off his ICD. How will you turn off the ICD?
10. Your patient has a Medtronic leadless pacemaker. How can you convert the pacer to an asynchronous pacing mode?
11. Which type of pacing—unipolar or bipolar—will typically cause the largest artifact on a surface EKG?
12. Which type of sensing is most susceptible to cautery interference—bipolar or unipolar sensing?
13. If a pacemaker dependent patient is going to undergo a very complicated procedure that is likely to be associated with hypoxemia, hypothermia, acidosis and even possibly hyperkalemia; what might you consider doing during the preoperative interrogation?
14. If you place a magnet on an Abbott/St Jude pacemaker what is the highest rate the pacer will pace?
15. Your patient has a Biotronik pacer in the DDD mode with a LRL=60. You place a magnet on the device and it paces at 90 for 10 beats then reverts to a rate of 60. Which magnet mode does this pacemaker have activated? Async, Auto, or Sync?
16. What rate will a typical Boston Scientific Pacemaker pace at when a magnet is placed on it (assume full battery)?
17. How does one inhibit a Boston Scientific Sub-Q ICD? Describe the option(s).
18. Describe the difference in the tones heard when placing a magnet on a Boston Scientific ICD and a Boston Scientific Sub-Q ICD.
19. You just finished an interrogation on a pacemaker. Thirty minutes later the anesthesiologist calls you because the magnet is not converting the pacer to an asynchronous pacing mode like it did before the interrogation. What is the manufacturer of this device?
20. Which of the following values of pacing amplitude and pulse wave duration is most likely to capture a given segment of myocardium?
21. 1.5 V with 0.2 ms PWD
22. 1.5 V with 2.0 ms PWD
23. 1.75 V with 0.2 ms PWD
24. 1.75 V with 2.0 ms PWD
25. Which of the following pacemaker sensitivity settings is the most sensitive?
    1. 2.0 mV
    2. 1.5 mV
26. Which pacemaker is most likely to detect electrocautery noise assuming both pacers A and B have the same sensitivity settings?
    1. Pacer A which is using unipolar sensing
    2. Pacer B which is using bipolar sensing
27. Which Manufacturer’s Pacemakers can be programmed to not pace asynchronously when exposed to a magnet? (3 companies)
28. Which Manufacturer’s ICDs can be programmed to ignore a magnet? (2 companies)
29. You are called by an anesthesiologist who thinks his patient’s pacer is malfunctioning—he has noticed very long PR intervals and occasional non-conducted P-waves. Assuming the pacer is in fact working normally, what special pacer function would explain this observation?
30. What two timing cycles when added together equal the Total Atrial Refractory Period (TARP)?
31. When using the Medtronic 5392 Temporary Pacemaker, what do you have to do in order to increase the paced AV-interval to 300 msec? There are two options.
32. The Medtronic 5392 Temporary Pacemaker’s AVI is set at 170 msec. What is the sensed AVI in this situation?
33. The patient has a Boston Scientific ICD in the DDDR mode. When placing this ICD in Electrocautery Safe Mode, what happens?
    1. The pacer is DOO, the anti-tachy therapy remains on
    2. The pacer is DOOR, the anti-tachy therapy remains on
    3. The pacer is DDD and the anti-tachy therapy is inhibited
    4. The pacer is DOO and the anti-tachy therapy is inhibited
34. If a patient’s ICD has been turned off with a magnet and R2 pads are applied and connected to a external defibrillator, what is the fastest way to defibrillate the patient if she goes into VF during knee surgery?
    1. Remove the magnet
    2. Defibrillate with the external defibrillator
35. If a patient has a CRT-D and is BiV-pacing 90% of the time, what should you do?
    1. Nothing—this is great
    2. Contact the patient’s EP physician
36. When looking at a CXR, what are two easy ways to differentiate an ICD from a pacemaker?
37. If a retrograde P-wave initiates a pacemaker mediated tachycardia, what is the typically the first timing cycle you will change to prevent a recurrence?
    1. Post ventricular blanking period
    2. Post atrial ventricular blanking period
    3. Post ventricular atrial refractory period
    4. Post atrial ventricular refractory period
38. What best determines the maximum tracking rate that can be set for a pacemaker?
    1. PVARP
    2. TARP
    3. ARP
    4. VRP
39. The sensed-AVI is typically \_\_\_\_\_\_\_\_\_than the paced-AVI
    1. Shorter by 30-50 msec
    2. Longer by 30-50 msec
40. Which of these mode(s) are non-tracking modes (circle all that apply)
    1. DDD
    2. VAT
    3. DDIR
    4. VVI
41. When applying a magnet to an ICD, what is going to happen to the device’s pacing component? Provide answer for the 4 major manufacturers (exclude Sorin).
42. Whenever doing an interrogation, what must you always do BEFORE making any changes to the device’s programming?
43. What special function on pacers will convert the pacer temporarily to asynchronous pacing during prolonged electrocautery?
44. Your patient’s pacer has a LRL of 60. In the preop period the patient has NSR at 70. After induction of anesthesia, the patient’s intrinsic HR is 54. The anesthesiologist calls you confused why the pacer is not pacing at 60 when the patient’s intrinsic rhythm is 54. What special function explains this observation?
45. Prior to ever turning off a patient’s ICD what should you make sure the patient has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on.
46. A pacemaker-dependent patient has a St Jude ICD programmed in DDDR at a rate of 70. For lower abdominal surgery you programmed it to DOO at 70. During the surgery, the HR is periodically decreasing to 50. What special function would best explain this.
47. What are the four most common effects of electrocautery on pacers or ICDs
48. If a patient with a DDD pacemaker goes into AF, what typically happens to the pacemaker mode and rate?
49. Your patient has an ICD and is clearly pacemaker dependent. The anesthesiologist wants to leave the anti-tachy therapy on and convert the pacer to DOO. What will you tell the anesthesiologist?
50. The patient has a CRT-D and is V-paced 99% of the time. Does this mean that the patient is clearly pacer dependent and will need the pacer converted to an asynchronous mode for thoracic surgery?
51. If you place a magnet on a DDD pacemaker and the device starts to pace at 100, what are the possible device manufacturers?
52. Can ECT stimulation be detected by an active ICD?
53. If a patient is in DDIR which of the following rates will not be relevant?
    1. Lower rate limit
    2. Upper tracking rate
    3. Upper sensor rate
54. Describe two very important steps to take before ever turning off a patient’s ICD
55. You place a magnet on a pacemaker in the DDD mode and it starts V-pacing at 60. What is likely true about the pacer’s battery?
56. What do most ICDs do after charging their capacitors just prior to delivering a shock?
57. Prior to converting any ICD to an asynchronous pacing mode, what must first be done?
58. What should you always do to an ICD prior to placing any wire into the heart? Why?
59. When disabling the Abbott/St Jude rate response mode, what should you do? Why?
60. If you convert an Abbott St Jude DDD pacemaker to DOO, what is the best way to minimize the difficulty of reprogramming the pacer post op?
61. A patient presents for surgery with a device, but she is not sure what it is. Describe how you would use a magnet to determine what type of device she has.
62. If a patient has an active ICD with a VT cutoff rate of 170, what might happen if you A-V pace at 86 with an external pacemaker?
63. Your patient has a Medtronic pacemaker programmed DDD with a lower rate limit of 60. He is in atrial fibrillation. He appears to be V-pacing at 70. How can you rapidly increase the paced heart rate without using a programmer?
64. Whenever you turn off a patient’s ICD, you\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.