

# The Six Second ECG



## ECG Quiz 3A

Version 3.1

## Annotated Answer Key

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## The Six Second ECG Quiz 3A (version 3.1)

This annotated answer key is provided for ECG instructors and students as a reference for the Six Second ECG Quiz 3A (version 3.1). Answers and a brief explanation are provided.

### Question 1



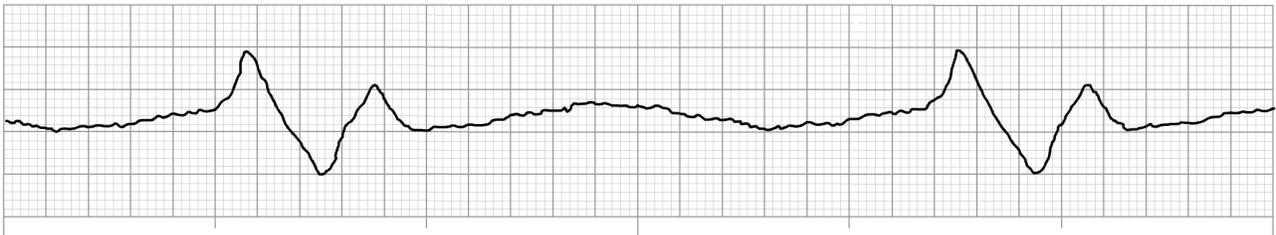
This ECG rhythm is called:

- a) Sinus rhythm with aberrant intraventricular conduction
- b) Accelerated idioventricular rhythm**
- c) Accelerated junctional rhythm with aberrant intraventricular conduction
- d) Junctional tachycardia

**Answer:** b) Accelerated idioventricular rhythm

**Explanation:** This regular ECG rhythm consists of wide QRS complexes and a rate of about 90/minute. Evidence of P waves is found before the 3<sup>rd</sup> and 8<sup>th</sup> QRS complexes with different PR intervals. This rhythm originates from the ventricles with a rate that is faster than a typical ventricular rate (20-40/minute) but slower than a tachycardia (100/minute). The presence of P waves peppered chaotically through this ECG rhythm (AV dissociation) also supports the decision to call this an accelerated idioventricular rhythm.

### Question 2

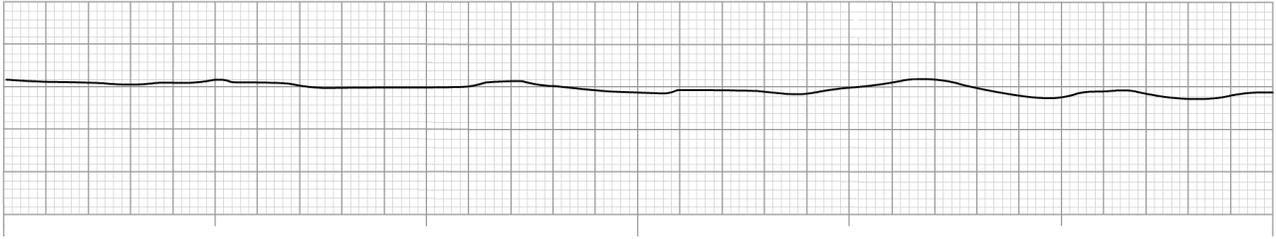


This ECG rhythm is called:

- a) Agonal rhythm**
- b) Idioventricular rhythm
- c) Junctional bradycardia
- d) Sinus bradycardia with aberrant intraventricular conduction

**Answer:** a) Agonal rhythm

**Explanation:** This ECG rhythm is not uncommon with people with advanced heart disease at the endpoint of cardiogenic shock and just prior to asystole. This rhythm is often referred to as an agonal rhythm. Technically, this could also be called ventricular bradycardia. The very wide and slow ventricular rhythm is almost always insufficient to sustain life.

**Question 3**

This ECG rhythm is called:

- a) Fine ventricular fibrillation
- b) Artifact
- c) Ventricular standstill
- d) **Asystole**

**Answer:** d) Asystole

**Explanation:** This ECG rhythm shows an absence of any waveforms. This could result from either disconnected electrodes or the relative absence of any cardiac electrical activity. The latter option is called asystole.

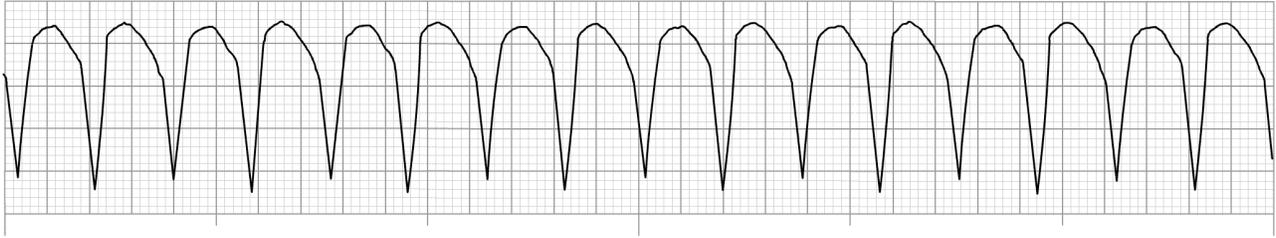
**Question 4**

This ECG rhythm is called:

- a) Sinus rhythm
- b) Junctional rhythm with artifact
- c) Sinus bradycardia
- d) **Paced atrial rhythm**

**Answer:** d) Paced atrial rhythm

**Explanation:** At first glance, this ECG rhythm appears to be a sinus rhythm: narrow QRS complexes, upright P waves and a rate of about 60/minute. On closer inspection, every P wave is immediately preceded by a vertical spike. This rhythm results from a paced atrium with a rate set at about 60/minute. The atria are consistently captured.

**Question 5**

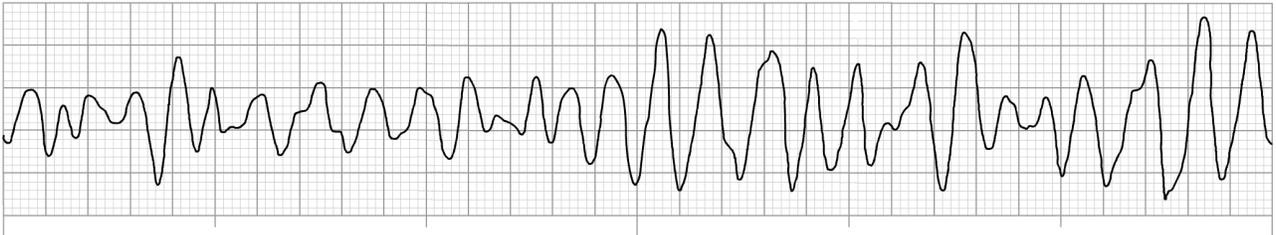
This ECG rhythm is called:

- a) Sinus tachycardia with aberrant intraventricular conduction
- b) Junctional tachycardia
- c) **Ventricular tachycardia**
- d) Supraventricular tachycardia (SVT)

**Answer:** c) Ventricular tachycardia

**Explanation:** This ECG rhythm presents with regular, rapid and wide QRS complexes. P waves are not evident. While this rhythm could be a supraventricular tachycardia with aberrant ventricular conduction, this rhythm is most likely ventricular tachycardia.

Note: While this rhythm is at times not associated with serious hemodynamic consequences, it is common for ventricular tachycardia to cause hemodynamic compromise or collapse. Serious hemodynamic consequences are linked to minimal ventricular filling time, lack of atrial kick and a tendency for ventricular tachycardia to deteriorate to ventricular fibrillation.

**Question 6**

This ECG rhythm is called:

- a) Multifocal atrial tachycardia
- b) **Coarse ventricular fibrillation**
- c) Ventricular tachycardia
- d) Fine ventricular tachycardia

**Answer:** b) Coarse ventricular fibrillation

**Explanation:** As a general rule, chaotic rhythms tend to be associated with fibrillation. In this case, the absence of any recognizable QRS complexes with a chaotic baseline is typical of ventricular fibrillation. Ventricular fibrillation (VF) with amplitudes greater than 3mm is often referred to as coarse ventricular fibrillation. Ventricular fibrillation with amplitudes less than 3mm is referred to as fine ventricular fibrillation.

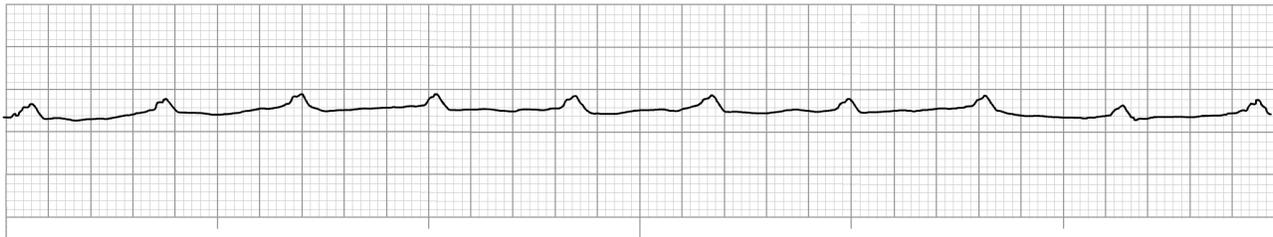
**Question 7**

This ECG rhythm is called:

- a) **Ventricular trigeminy**
- b) Junctional trigeminy
- c) Sinus rhythm with premature atrial complexes (PACs)
- d) Sinus arrhythmia with aberrant intraventricular conduction

**Answer:** a) Ventricular trigeminy

**Explanation:** The underlying ECG rhythm presents with narrow QRS complexes, upright P waves and a rate of about 80/minute. The underlying rhythm is a sinus rhythm. Every third QRS complex is wide and arrives prematurely. These are premature ventricular complexes (PVCs). While this ECG rhythm could be called a sinus rhythm with unifocal PVCs, since the PVCs occur every third QRS complex, this ECG rhythm is commonly referred to as ventricular trigeminy.

**Question 8**

This ECG rhythm is called:

- a) **Ventricular standstill**
- b) Idioventricular rhythm
- c) Agonal rhythm
- d) Ventricular fibrillation

**Answer:** a) Ventricular standstill

**Explanation:** While this rhythm could be an accelerated idioventricular rhythm with low amplitude, this option is extremely unlikely (amplitude of only 2-3 mm). Rather, this ECG rhythm is only a collection of regularly occurring P waves without QRS complexes. This ECG rhythm is called ventricular standstill. Effectively similar to asystole, ventricular standstill might be one initial outcome of third degree AV block with a failed ventricular pacemaker.

**Question 9**

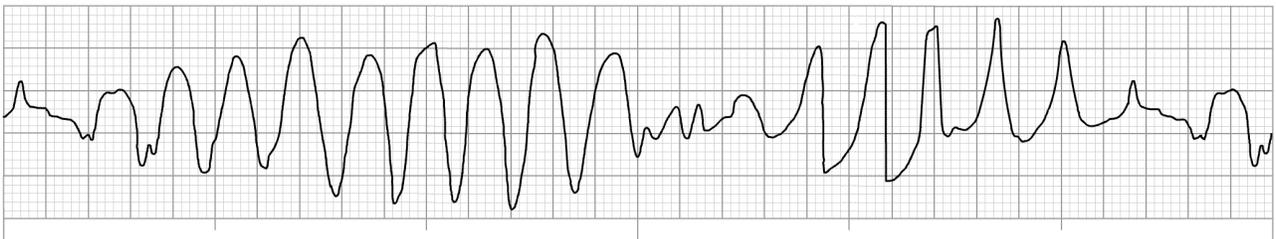
This ECG rhythm is called:

- a) Sinus bradycardia with aberrant intraventricular conduction
- b) Idioventricular rhythm
- c) Paced ventricular rhythm**
- d) Junctional rhythm with non-conducted premature atrial complexes

**Answer:** c) Paced ventricular rhythm

**Explanation:** The narrow vertical spike immediately preceding each QRS complex is useful evidence for a paced ventricular rhythm.

Note: The P waves march through this rhythm without any relationship to the QRS complexes (i.e. the PR interval is chaotic). Without the paced ventricular complexes, the underlying rhythm would be third degree AV block or possibly even ventricular standstill.

**Question 10**

This ECG rhythm is called:

- a) Ventricular tachycardia
- b) Multifocal atrial tachycardia
- c) Sinus rhythm with artifact
- d) Torsades de Pointes**

**Answer:** d) Torsades de Pointes

**Explanation:** This ECG rhythm shows a chaotic pattern but pieces of this rhythm also present with rapid and wide QRS complexes – albeit with varying morphologies (shapes). There appears to be segments of ventricular fibrillation alternating with runs of polymorphic ventricular tachycardia. If this rhythm played out further, another pattern would appear – a cyclical pattern of increasing then decreasing amplitude. The presence of all of these characteristics form a rhythm called torsades de pointes (twists of the pointes). Torsades de pointes is often associated with rhythms that present with prolonged QT intervals.

**Question 11**

This ECG rhythm is called:

- a) Sinus rhythm
- b) Paced rhythm with complete loss of capture**
- c) Accelerated junctional rhythm
- d) Junctional tachycardia

**Answer:** b) Paced rhythm with complete loss of capture

**Explanation:** At first glance, this ECG rhythm sports regularly occurring narrow QRS complexes at a rate of 70/minute. On a second look, a number of pieces are missing from this ECG such as P waves and T waves. Also of interest is the QRS complex being *so* narrow at about 0.02 seconds ( $\frac{1}{2}$  mm). Putting this evidence together (of course, knowing the patient would be of great help here), these narrow complexes are electronic pacer spikes only. Since no QRS complexes are generated, this is called a paced rhythm with a complete loss of capture. The patient is in asystole.

**Question 12**

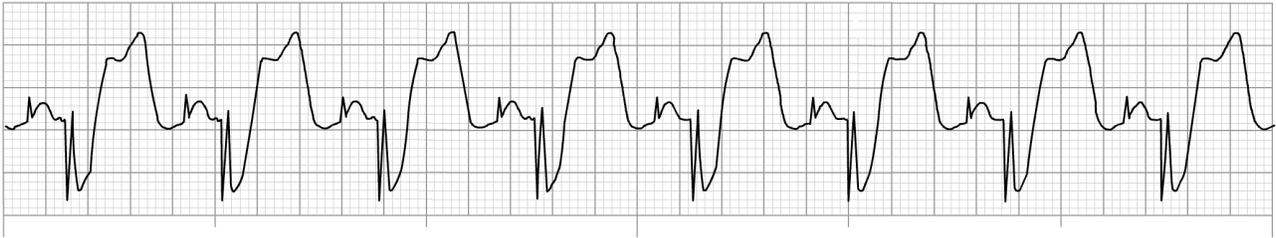
This ECG rhythm is called:

- a) Idioventricular rhythm**
- b) Sinus bradycardia
- c) Junctional bradycardia
- d) Paced ventricular rhythm

**Answer:** a) Idioventricular rhythm

**Explanation:** This ECG rhythm consists of a slow and regular series of wide QRS complexes, occurring at a rate of 40/minute. P waves are absent. This is most likely an idioventricular rhythm (only ventricular). This rhythm could also be correctly called a ventricular escape rhythm with a rate of 40/minute or just a ventricular rhythm with a rate of 40/minute. Less likely is the possibility that this ECG rhythm is a junctional rhythm with aberrant intraventricular conduction.

Note: The polarity of the QRS complex is opposite to the polarity of the T wave, a fairly common phenomenon with ventricular beats.

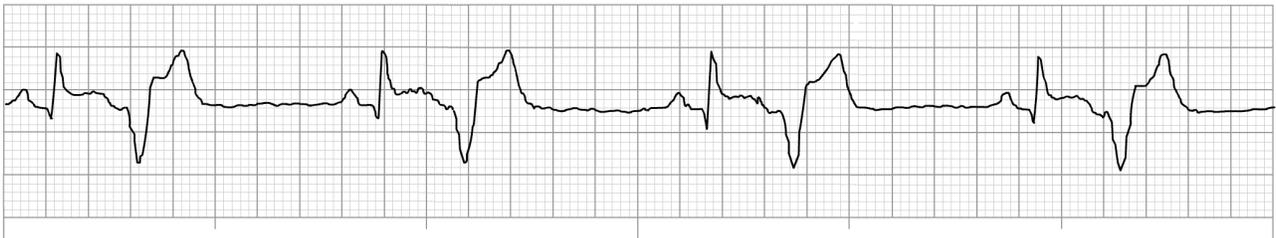
**Question 13**

This ECG rhythm is called:

- a) Sinus rhythm
- b) Paced ventricular rhythm
- c) Paced AV sequential rhythm**
- d) Accelerated idioventricular rhythm

**Answer:** c) Paced AV sequential rhythm

**Explanation:** This ECG rhythm presents with regularly occurring upright P waves consistently preceding wide QRS complexes at a rate of about 80/minute. While the evidence is compelling for this to be a sinus rhythm with aberrant intraventricular conduction, the addition of vertical spikes placed consistently before both each P wave and each wide QRS complex makes this ECG rhythm a paced AV sequential rhythm instead. This results from a dual chamber pacemaker that is consistently capturing first the atria and then the ventricles.

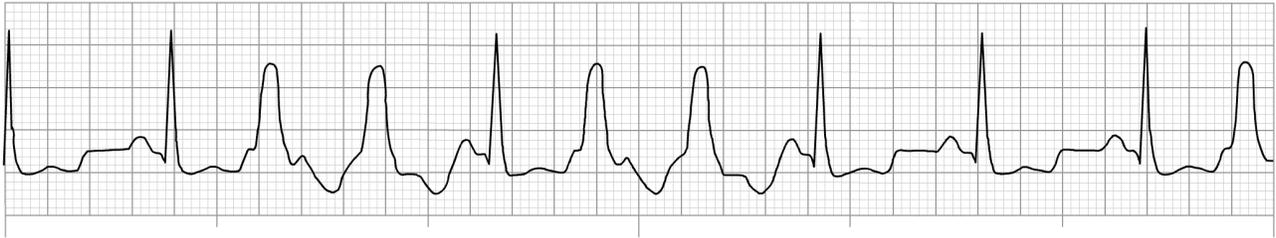
**Question 14**

This ECG rhythm is called:

- a) Atrial fibrillation with premature ventricular complexes (PVCs)
- b) Sinus rhythm with premature atrial complexes (PACs)
- c) Ventricular bigeminy**
- d) Junctional rhythm with PACs

**Answer:** c) Ventricular bigeminy

**Explanation:** The underlying ECG rhythm presents with narrow QRS complexes, upright P waves and a rate of about 80/minute. The underlying rhythm is a sinus rhythm. Every second QRS complex is wide and arrives prematurely. These are premature ventricular complexes (PVCs). While this ECG rhythm could be called a sinus rhythm with unifocal PVCs, since the PVCs occur every second QRS complex, this ECG rhythm is commonly referred to as ventricular bigeminy.

**Question 15**

This ECG rhythm is called:

- a) Sinus rhythm with ST depression and multifocal PVCs
- b) Sinus rhythm with ST depression, ventricular couplets and a PVC**
- c) Accelerated junctional rhythm with ST depression and a PVCs
- d) Sinus rhythm with ST depression and PACs

**Answer:** b) Sinus rhythm with ventricular couplets and a PVC

**Explanation:** The underlying ECG rhythm features upright P waves and narrow QRS complexes with ST depression (2 mm) occurring at a rate of about 75/minute. The underlying rhythm is a sinus rhythm with ST depression. The underlying rhythm is interrupted by two sets of ventricular couplets and completed by a single PVC. This ECG rhythm certainly demonstrates ventricular irritability.