

The Six Second ECG



ECG Quiz 2A

Version 2.1

Annotated Answer Key

Annotated Answer Key

The Six Second ECG Quiz 2A (version 2.1)

This annotated answer key is provided for ECG instructors and students as a reference for the Six Second ECG Quiz 2A (version 2.1). Answers and a brief explanation are provided.

Question 1



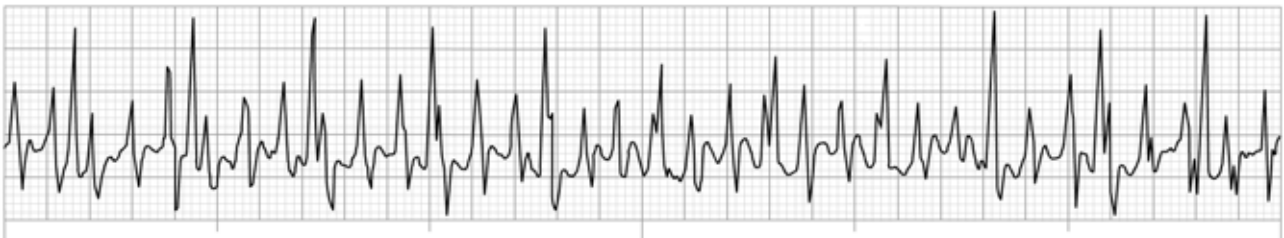
This ECG rhythm is called:

- a) Sinus bradycardia
- b) Ectopic atrial rhythm
- c) Sinus rhythm with aberrant intraventricular conduction
- d) Accelerated junctional rhythm**

Answer: d) Accelerated junctional rhythm

Explanation: The ECG rhythm includes a series of narrow QRS complexes, *inverted P* waves and a rate of about 70/minute. This rhythm originates from the AV junction. Because this rhythm occurs at rates faster than the junction typically fires (40-60/minute) but less than a tachycardia (100/minute), this ECG rhythm is called an accelerated junctional rhythm.

Question 2



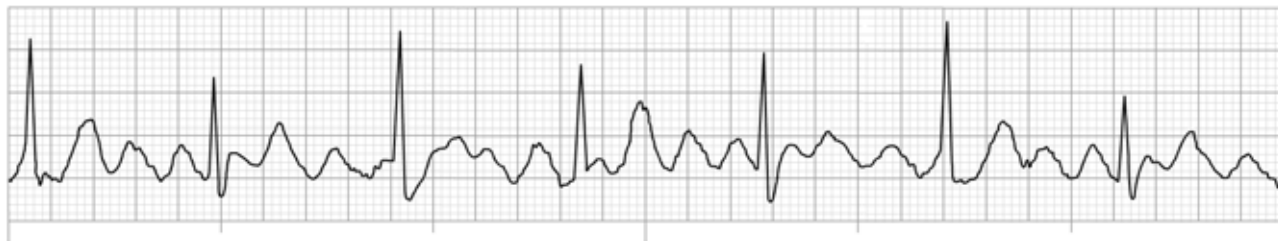
This ECG rhythm is called:

- a) Supraventricular tachycardia (SVT)
- b) Movement artifact**
- c) Atrial fibrillation
- d) Atrial flutter

Answer: b) Movement artifact

Explanation: At a quick glance, this ECG rhythm appears to be a very rapid SVT with a rate near 300/minute. While this is possible (but unlikely), a more plausible explanation is that this is movement artifact caused by brushing one's teeth, for example. Note the narrow QRS complexes with larger amplitude that occur regularly. These are probably an underlying SVT at a rate of about 110/minute.

Question 3



This ECG rhythm is called:

- a) Atrial fibrillation
- b) Sinus rhythm with movement artifact
- c) Atrial flutter with 2:1 ventricular response
- d) **Atrial flutter with 4:1 ventricular response**

Answer: d) Atrial flutter with 4:1 ventricular response

Explanation: The ECG rhythm includes a series of regularly occurring, narrow QRS complexes at a rate of about 70/minute. The presence of the classic saw-tooth shaped flutter waves between the QRS complexes points to atrial flutter. In atrial flutter, the atria tend to beat at rates close to 300/minute. The ventricular rate of 70/minute is about $\frac{1}{4}$ the atrial rate of 300. The atria are firing four times for every ventricular beat.

Question 4



This ECG rhythm is called:

- a) Sinus tachycardia
- b) Atrial fibrillation with rapid ventricular response
- c) **Junctional tachycardia**
- d) Ventricular tachycardia

Answer: c) Junctional tachycardia

Explanation: This rapid ECG rhythm includes narrow QRS complexes, an absence of P waves prior to each QRS and a rate faster than 100/minute. This rhythm occurs at a rate of about 180-190/minute. Notice the inverted waveform after many of the QRS complexes – possible further evidence for junctional tachycardia (inverted P waves).

Note: At very rapid rates (>160 /minute), the presence of P waves is often shrouded by the T waves. As a result, fast rhythms with narrow QRS complexes are comfortably called SVT (not an option with this question).

Question 5

This ECG rhythm is called:

- a) Sinus arrhythmia
- b) Junctional rhythm
- c) **Junctional bradycardia**
- d) Sinus bradycardia

Answer: c) Junctional bradycardia

Explanation: This extremely slow ECG rhythm includes narrow QRS complexes, *no P waves* and a rate of about 30/minute. This rhythm originates from the AV junction. Because this rhythm occurs at a rate slower than the junction typically fires (40-60/minute), this ECG rhythm is called a junctional bradycardia.

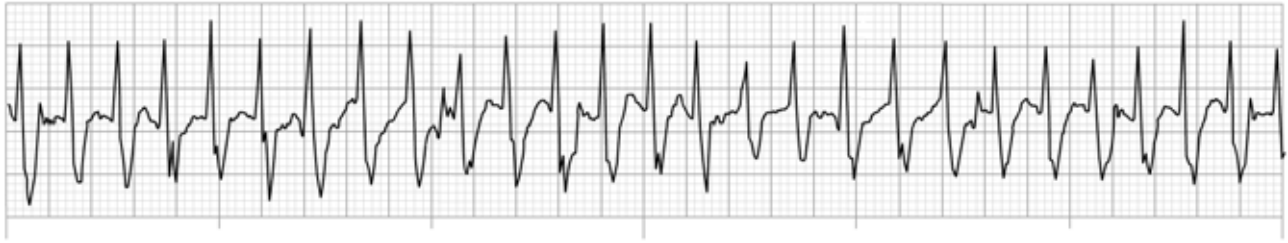
Question 6

This ECG rhythm is called:

- a) **Multifocal atrial tachycardia**
- b) Sinus tachycardia
- c) Junctional tachycardia
- d) Ventricular tachycardia

Answer: a) Multifocal atrial tachycardia

Explanation: This rhythm might initially appear to be a ventricular tachycardia (VT) because of the wide QRS complexes or atrial fibrillation due to the rhythm's irregular pattern. This ECG rhythm is not VT due to its irregular pattern. Ventricular tachycardia generally follows a rapid regular pattern. The atrial fibrillation with aberrant ventricular conduction is also possible but at close inspection – the 1st, 2nd, 4th and 6th complexes for example – consistently shaped P waves are evident. At least three different P wave configurations are seen with this rhythm strip, leading to a claim that this is a multifocal atrial tachycardia.

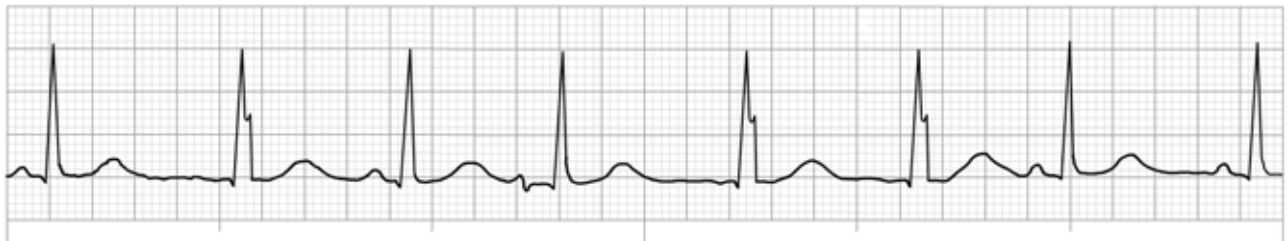
Question 7

This ECG rhythm is called:

- a) Junctional tachycardia
- b) Supraventricular tachycardia (SVT)**
- c) Sinus tachycardia
- d) Atrial fibrillation with fast ventricular response

Answer: b) Supraventricular tachycardia (SVT)

Explanation: This extremely rapid ECG rhythm includes narrow QRS complexes and a rate of about 270/minute. While this may only be movement artifact, assuming the patient is still and that the electrodes have good skin contact, this rhythm could be atrial fibrillation with rapid ventricular response, atrial flutter with a 1:1 ventricular response, atrial tachycardia and/or a consequence of Wolff-Parkinson-White syndrome for example. To be safe, the best answer is probably just supraventricular tachycardia (a classification that serves to include all of the previous mentioned rhythms).

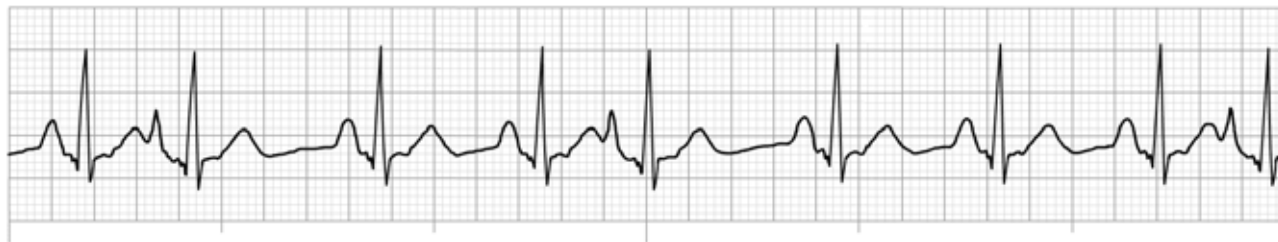
Question 8

This ECG rhythm is called:

- a) Sinus arrhythmia
- b) Wandering pacemaker**
- c) Sinus rhythm
- d) Atrial fibrillation

Answer: b) Wandering pacemaker

Explanation: A slower version of multifocal atrial tachycardia, the narrow QRS complexes, the various P wave configurations and an irregular rate of about 80/minute all support this ECG rhythm to be a wandering pacemaker. While this rhythm is slightly irregular (this is typical of sinus arrhythmia), the changing P waves is the most important finding. Note how the P waves are initially upright (sinus), then absent with inverted P waves buried in the QRS complex (junctional), then biphasic (atrial) with unpredictable patterns thereafter (classic findings for a wandering pacemaker).

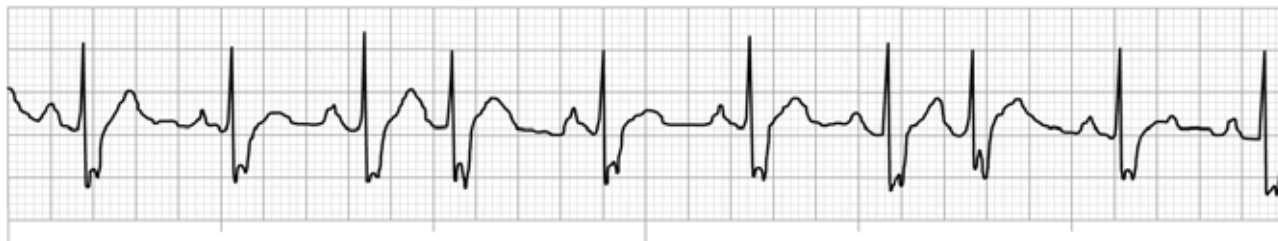
Question 9

This ECG rhythm is called:

- a) Sinus arrhythmia
- b) Atrial fibrillation with ectopic atrial beats
- c) Sinus tachycardia with premature ventricular complexes (PVCs)
- d) **Sinus rhythm with premature atrial complexes (PACs)**

Answer: d) Sinus rhythm with premature atrial complexes (PACs)

Explanation: Since this ECG rhythm is irregular, this rhythm requires closer scrutiny. The narrow QRS complexes with the accompanying upright P waves and a rate of close to 90/minute forms the underlying sinus rhythm. The three premature complexes are identical in shape – narrow QRS complex and a peaked P wave preceding. These complexes are premature atrial complexes (PACs).

Question 10

This ECG rhythm is called:

- a) Sinus rhythm with aberrant intraventricular conduction and two PVCs
- b) Atrial fibrillation with aberrant intraventricular conduction
- c) **Sinus rhythm with two PJCs with aberrant intraventricular conduction**
- d) Sinus arrhythmia with aberrant intraventricular conduction

Answer: c) Sinus rhythm with two PJCs

Explanation: The underlying sinus rhythm presents with marginally wide QRS complexes, upright P waves and a rate of just less than 100/minute. The premature QRS complexes are narrow making these either premature atrial complexes (PACs) or premature junctional complexes (PJCs). Looking carefully for clues, notice that the QRS complexes of these premature beats include a deeper inverted notch than the other QRS complexes. When taken together with the absence of any P waves before these premature QRS complexes, the evidence points strongly to premature junctional complexes (PJCs).

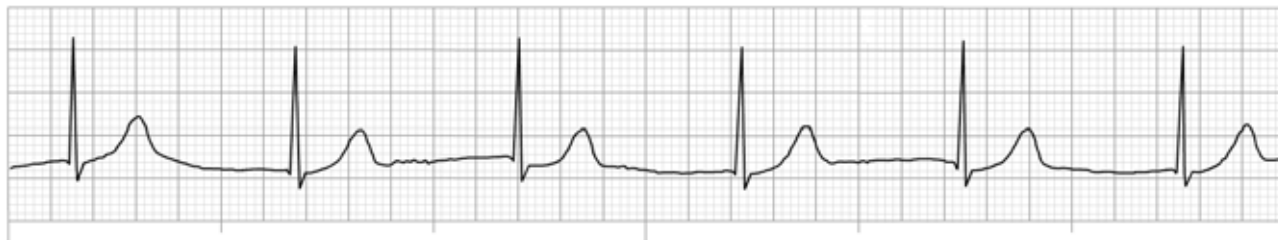
Question 11

This ECG rhythm is called:

- a) Atrial fibrillation with rapid ventricular response
- b) Accelerated junctional rhythm
- c) Sinus tachycardia
- d) **Junctional tachycardia**

Answer: d) Junctional tachycardia

Explanation: This rapid ECG rhythm includes narrow QRS complexes, *no* P waves and a rate of about 150/minute. The absence of P waves suggests that this rhythm originates from the AV junction. Thus, this ECG rhythm is a junctional tachycardia.

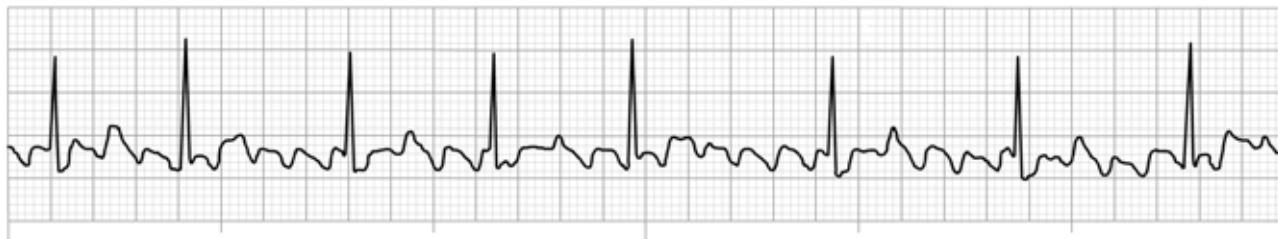
Question 12

This ECG rhythm is called:

- a) Wandering pacemaker
- b) Sinus rhythm
- c) **Junctional rhythm**
- d) Accelerated idioventricular rhythm

Answer: c) Junctional rhythm

Explanation: This ECG rhythm could be a normal sinus rhythm except that the narrow QRS complexes are not accompanied by any P waves. Therefore, this rhythm that occurs at a rate of about 60/minute originates from the AV junction. Because this rhythm occurs at a rate characteristic of a junctional pacemaker (40-60/minute), this ECG rhythm is a junctional rhythm.

Question 13

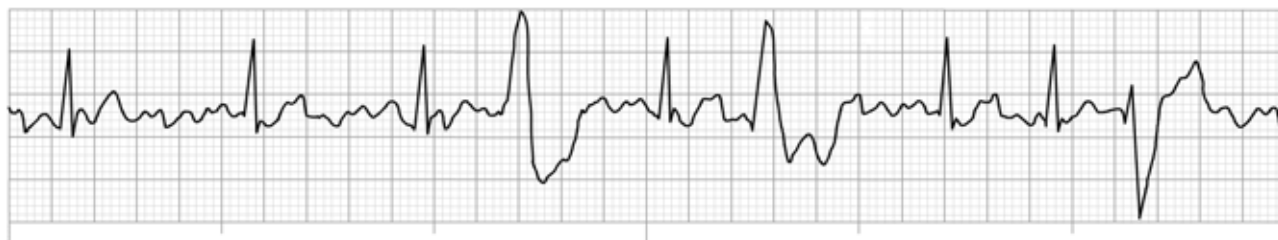
This ECG rhythm is called:

- a) **Atrial flutter with variable ventricular response**
- b) Sinus rhythm with PACs
- c) Atrial fibrillation with fast ventricular response
- d) Sinus arrhythmia

Answer: a) Atrial flutter with variable ventricular response

Explanation: The saw-tooth flutter waves together with some regularity in its pattern give this ECG rhythm away. Note that the flutter waves occur at a rate close to 300/minute. The R-R intervals suggest rates of close to 100/minute (3:1 ventricular response), then 75/minute (4:1 ventricular response) and later a rate of 60/minute (5:1 response). The atrial flutter is presenting with variable AV blocking resulting in variable ventricular response.

Note: Atrial flutter does tend to deteriorate into atrial fibrillation. This could also be occurring here with periods of atrial flutter deteriorating into atrial fibrillation then back to atrial flutter.

Question 14

This ECG rhythm is called:

- a) Atrial flutter with multifocal PVCs
- b) **Atrial fibrillation with multifocal PVCs**
- c) Sinus bradycardia with multifocal PVCs
- d) Accelerated junctional rhythm with PACs

Answer: b) Atrial fibrillation with multifocal premature ventricular complexes (PVCs)

Explanation: This *chaotic* underlying ECG rhythm includes narrow QRS complexes and a rate of about 90/minute. The chaotic baseline displays coarse fibrillatory waves in keeping with atrial fibrillation (rather than the orderly saw-tooth pattern seen with atrial flutter). The wide premature QRS complexes present with at least two morphologies (shapes) making these multifocal PVCs.

Question 15

This ECG rhythm is called:

- a) Sinus rhythm with a PVC
- b) Sinus rhythm with a PAC
- c) **Accelerated junctional rhythm with a PVC**
- d) Junctional tachycardia with a PVC

Answer: c) Accelerated junctional rhythm with a PVC

Explanation: The underlying ECG rhythm includes narrow QRS complexes, *no P waves* and a rate of about 80/minute. This rhythm originates from the AV junction. While not quite a tachycardia (>100/minute), this rhythm occurs at a rate quicker than the junction typically fires (40-60/minute) making this an *accelerated* junctional rhythm. The wide and premature QRS complex without an accompanying P wave is a premature ventricular complex (PVC).