МИНИСТЕРСТВО НАУКИ, ВЫСШЕГО ОБРАЗОВАНИЯ И ИННОВАЦИИ КЫРГЫЗСКОЙ РЕСПУБЛИКИ
ОШСКИЙ МЕЖДУНАРОДНЫЙ МЕДИЦИНСКИЙ УНИВЕРСИТЕТ

УТВЕРЖДЕНО
Председатель УМС ОММУ
_____ к.б.н. Орунбаева Б.М.
От 2 сентября 2025г.

РАССМОТРЕННО
на зседании кафедры,
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Зав.каф.,к.м.н. Абдимомунова Б.Т.

ФОНД ТЕСТОВЫХ ЗАДАНИЙ

Для итогового контроля по дисциплине
«ЭКГ 5лет»
на 2025-2026 учебный год
Направление: Лечебное дело (GM)
Курс – 4, семестр - 8

Наименование дисциплины	Всего	Кредит	Аудиторные занятия		СРС
			Лекции	Практические	
«ЭКГ 5лет»	60	2	12	18	30
Количество вопросов	150				

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Ф.И.О. *Подпись*

Ош, 2025

ECG test

1. Which phase of the cardiomyocyte corresponds to the rapid depolarization in a typical ventricular action potential?
A. Phase 0
B. Phase 1
C. Phase 2
D. Phase 3

2. Which ion predominantly accounts for the plateau (phase 2) of the ventricular action potential?
A. Sodium Na^+
B. Potassium K^+
C. Calcium Ca^{2+}
D. Chloride Cl^-

3. Which cardiac node normally has the highest intrinsic automaticity in a healthy person?
A. Sinoatrial node
B. Atrioventricular node
C. His bundle
D. Purkinje fibers

4. Which ECG interval reflects the time from the sinoatrial node through the atria to the start of ventricular depolarization?
A. QRS
B. PR
C. QT
D. ST

5. Which finding typically indicates left axis deviation of the heart's electrical axis?
A. Positive QRS in leads II and III
B. Negative QRS in lead I
C. Positive QRS in lead I and negative QRS in lead II
D. Positive QRS in all leads

6. Which of the following leads is a unipolar precordial (chest) lead?
A. I
B. II
C. aVF
D. V3

7. Prolongation of which ECG interval is associated with an increased risk of ventricular arrhythmias such as torsades de pointes?
A. PR
B. QRS
C. QT
D. RR

8. Which mechanism underlies myocardial refractoriness?
A. Depletion of extracellular Na^+
B. Inactivation of sodium channels and slow recovery
C. Increased chloride conductance
D. Decreased intracellular calcium

9. Which ECG sign is most characteristic of acute transmural ischemia?

A. Shortened PR
B. ST-segment elevation in the corresponding leads
C. QRS widening without ST changes
D. Presence of a U wave

10. What is an early ECG effect of hyperkalemia?
A. QT prolongation
B. Tall, peaked T waves
C. Deep Q waves
D. Immediate PR prolongation and wide QRS

11. Which statement best describes the principle of recording the potential difference between two body-surface points?
A. Ohm's law
B. The dipole principle and projection of the heart's vector field onto the lead
C. Faraday's law
D. Principle of synaptic summation

12. Which artifact most commonly arises from poor electrode-skin contact?
A. Sinus tachycardia
B. Baseline wander and mains interference/noise
C. QRS shortening
D. Increased P-wave amplitude

13. Which parameter affects sampling frequency in digital ECG recording and why is it important?
A. Signal amplitude; affects display color
B. Sampling frequency; it determines accurate reconstruction of QRS morphology and high-frequency components
C. Input impedance; affects PR duration
D. Recording duration; affects heart rate measurement

14. Which ECG criterion is most indicative of left ventricular hypertrophy?
A. Low voltages in all leads
B. Increased combined amplitude of R in V5/V6 and S in V1 (Sokolow–Lyon criterion)
C. Shortened QT
D. Pathological Q waves in lead III

15. What does a small Q wave in lead V1 typically represent when within normal limits?
A. Anterior wall myocardial infarction
B. Normal initial septal depolarization from left to right
C. Complete bundle branch block
D. Rightward electrical axis

16. What ECG pattern is produced by right bundle branch block?
A. Wide QRS with rSR' pattern in V1–V2
B. Narrow QRS and tall T in V6
C. ST elevation in all leads
D. PR prolongation without QRS changes

17. Which parameter is most informative for assessing conduction through the atrioventricular node?
A. QRS duration
B. T-wave amplitude
C. PR interval
D. QT interval

18. What is the standard paper speed for a resting 12-lead ECG in most clinical settings?
A. 12.5 mm/s
B. 25 mm/s
C. 50 mm/s
D. 100 mm/s

19. What calibration is conventionally used to represent 1 mV on ECG paper at standard settings?
A. 5 mm vertical deflection
B. 10 mm vertical deflection
C. 20 mm vertical deflection
D. 1 mm vertical deflection

20. Which electrode placement error most commonly produces inverted P waves and QRS changes in limb leads?
A. Chest lead misplacement
B. Limb lead reversal
C. Using low-impedance electrodes
D. Incorrect paper speed

21. Which lead system forms Einthoven's triangle for limb lead vector analysis?
A. Precordial leads V1–V6
B. Augmented leads aVR, aVL, aVF
C. Limb leads I, II, III
D. Posterior leads V7–V9

22. Which filter is primarily used to reduce baseline wander caused by respiration and patient movement?
A. Low-pass filter
B. High-pass filter (baseline filter)
C. Notch filter at 50/60 Hz
D. Band-stop at 0.5–1 Hz

23. Which filter is most appropriate to attenuate high-frequency muscle (EMG) noise while preserving QRS morphology?
A. High-pass filter at 0.5 Hz
B. Low-pass filter (cutoff ~100–150 Hz)
C. Notch filter at 0.5 Hz
D. Band-stop at 0–0.5 Hz

24. What is the main purpose of a 50/60 Hz notch filter in ECG acquisition?
A. Remove baseline wander
B. Eliminate mains (power line) interference
C. Increase sampling rate
D. Calibrate amplitude

25. Which property of the ECG amplifier helps reject common-mode interference from external noise?
A. Low input impedance
B. High common-mode rejection ratio (CMRR)
C. Narrow bandwidth
D. Low gain

26. What minimum input impedance is generally recommended for ECG amplifiers to avoid signal attenuation?

A. 1 kΩ
B. 10 kΩ
C. 10 MΩ
D. 1 GΩ

27. Which electrode preparation step most reduces skin-electrode impedance?
A. Applying cold gel only
B. Abrading or cleaning the skin and using conductive gel/paste
C. Placing electrode over clothing
D. Using dry electrodes without gel

28. Which chest lead position corresponds to the fourth intercostal space at the right sternal border?
A. V1
B. V2
C. V3
D. V4

29. Which recording artifact is characterized by regular, high-frequency spikes synchronized with mains power?
A. Baseline wander
B. Muscle tremor
C. AC (mains) interference
D. Electrode motion artifact

30. What is the typical recommended minimum sampling frequency for diagnostic 12-lead ECGs to avoid aliasing of QRS components?
A. 100 Hz
B. 250 Hz
C. 500 Hz
D. 50 Hz

31. Which lead reference is created by averaging the limb electrodes to form a common reference for unipolar chest leads?
A. Wilson central terminal
B. Einthoven reference
C. Goldberger lead system
D. Precordial average reference

32. Which practice improves patient safety during ECG recording with external equipment?
A. Connecting multiple devices to different mains outlets without isolation
B. Ensuring proper electrical isolation and using patient-isolated amplifiers
C. Removing all grounding from the room
D. Using metal jewelry as reference points

33. Which change on the ECG is most likely if the gain is accidentally set to 0.5× instead of 1×?
A. Waveforms appear twice as tall
B. Waveforms appear half as tall (reduced amplitude)
C. Paper speed doubles
D. QRS duration shortens

34. Which step is recommended immediately before starting a 12-lead ECG to minimize artifacts?
A. Ask the patient to hold their breath for 5 minutes
B. Ensure the patient is relaxed, remove mobile devices, and check electrode contact
C. Place electrodes over thick clothing

D. Increase room temperature to 30°C

35. What is the normal duration of the PR interval in adults?
A. 0.04–0.08 s
B. 0.08–0.12 s
C. 0.12–0.20 s
D. 0.20–0.28 s

36. Which feature is expected for a normal P wave in limb leads?
A. Duration > 0.12 s and amplitude > 3 mm
B. Duration ≤ 0.12 s and amplitude ≤ 2.5 mm
C. Not visible in all leads
D. Always biphasic in lead II

37. What is the normal QRS complex duration on a standard 12-lead ECG?
A. ≤ 0.10 s
B. 0.12–0.14 s
C. 0.15–0.18 s
D. ≥ 0.20 s

38. Which description best fits a normal T wave?
A. Tall, peaked and narrow in all leads
B. Inverted in leads V5–V6 normally
C. Upright in most leads except aVR and V1, asymmetric with slower descent
D. Always identical in amplitude to the P wave

39. Which axis orientation is considered normal for the mean QRS electrical axis in adults?
A. −90° to −30°
B. −30° to +90°
C. +90° to +180°
D. +180° to −90°

40. What is the normal resting sinus heart rate range in adults?
A. 30–50 bpm
B. 50–59 bpm
C. 60–100 bpm
D. 100–140 bpm

41. Which lead normally shows a small initial Q wave representing septal depolarization?
A. V1 only
B. V5–V6 only
C. V1–V2 (small Q may be present)
D. aVR only

42. Which statement about the QT interval is correct for a normal ECG?
A. QT is independent of heart rate
B. QTc (corrected QT) is typically ≤ 0.40 s in adults
C. QTc > 0.50 s is normal in young adults
D. QT is always shorter than PR

43. Which of the following is a normal finding in lead aVR?
A. Prominent upright P, QRS, and T waves
B. Predominantly negative QRS and T waves
C. Large R waves similar to V6
D. ST elevation in healthy subjects

44. Which precordial lead normally has the largest R-wave amplitude in a normal ECG?
A. V1
B. V2
C. V5 or V6
D. aVL

45. Which pattern indicates normal ventricular depolarization sequence?
A. Initial septal Q in left precordial leads followed by large R in lateral leads
B. Large Q in all leads then small R
C. No R waves in precordial leads
D. Identical QRS morphology in all 12 leads

46. Which of the following is a normal relationship between P waves and QRS complexes in sinus rhythm?
A. More QRS than P waves
B. Each P wave followed by a QRS with constant PR interval
C. P waves absent with normal QRS
D. Variable PR with dropped beats

47. Which finding is considered a normal variant rather than pathology in young, healthy adults?
A. Marked ST elevation in all leads
B. Early repolarization with mild ST elevation in V2–V5
C. Pathological Q waves in anterior leads
D. Wide QRS > 0.12 s

48. Which lead pair is most useful to assess inferior wall electrical activity in a normal ECG?
A. V1–V2
B. I and aVL
C. II, III, and aVF
D. V5–V6 only

49. Which statement about U waves in a normal ECG is true?
A. U waves are always pathological
B. Small U waves may be normal, best seen in V2–V4
C. U waves are larger than T waves normally
D. U waves indicate atrial depolarization

50. Which change would NOT be expected in a normal ECG recorded at standard calibration?
A. P wave preceding each QRS in sinus rhythm
B. QRS duration of 0.08 s
C. QTc of 0.55 s in an asymptomatic adult
D. Upright T waves in lateral leads

51. Which criterion best defines normal ST segment in a resting ECG?
A. ST elevation > 2 mm in limb leads is normal
B. ST segment is isoelectric or within ±0.5 mm of baseline in most leads
C. ST depression of 3 mm is normal at rest
D. Any ST change is normal if patient is asymptomatic

52. What is the first step in a systematic ECG analysis?
A. Measure QT interval
B. Assess rhythm and heart rate
C. Evaluate ST segments
D. Calculate electrical axis

53. Which finding most directly indicates atrial enlargement on ECG?

A. Wide QRS > 120 ms
B. Tall, peaked T waves
C. P-wave duration > 120 ms or biphasic P in V1
D. Inverted T in V2–V3

54. Which criterion is used to determine left axis deviation?
A. Positive QRS in aVR and negative in II
B. QRS axis < −30° (negative in II, positive in I)
C. QRS axis > +90°
D. QRS axis between −90° and −30° only in children

55. What ECG change is most specific for acute transmural myocardial infarction?
A. Diffuse T-wave inversion
B. New ST-segment elevation in contiguous leads with reciprocal changes
C. Sinus bradycardia
D. Low QRS voltages

56. Which pattern suggests left bundle branch block (LBBB)?
A. Narrow QRS with rSR' in V1
B. QRS ≥ 120 ms with broad, notched R in I, V5–V6 and absent Q in V5–V6
C. ST elevation in inferior leads only
D. Short PR interval with delta wave

57. How is the corrected QT (QTc) commonly calculated for clinical use?
A. Bazett's formula
B. Direct subtraction of PR from QT
C. Multiplying QT by heart rate
D. Averaging QRS durations

58. Which ECG sign suggests hyperkalemia progression?
A. Small U waves
B. Progressive PR prolongation, peaked T waves, then wide QRS
C. Shortened QT and tall P waves
D. New left axis deviation only

59. What does electrical alternans on ECG most commonly indicate?
A. Pericardial effusion with swinging heart
B. Acute anterior MI
C. Hyperthyroidism
D. Bundle branch block

60. Which feature helps distinguish supraventricular from ventricular tachycardia?
A. QRS width alone always distinguishes them
B. Presence of AV dissociation or capture/fusion beats suggests ventricular tachycardia
C. Any rate > 150 bpm is ventricular in origin
D. P waves absent always mean ventricular tachycardia

61. Which change is typical for digitalis effect (therapeutic level) on ECG?
A. Marked ST elevation in all leads
B. Sagging ST depression with flattened or inverted T waves (reverse tick)
C. Wide QRS > 200 ms immediately
D. New left bundle branch block

62. What does a pathological Q wave usually represent?
A. Early repolarization
B. Prior transmural myocardial infarction with loss of viable myocardium

C. Normal septal depolarization in all leads
D. Hyperkalemia

63. Which ECG finding indicates first-degree AV block?
A. PR interval > 200 ms with 1:1 AV conduction
B. Dropped QRS complexes without PR change
C. Progressive PR prolongation then dropped beat
D. Short PR < 120 ms

64. Which observation suggests right ventricular hypertrophy on ECG?
A. Dominant R in V1 and right axis deviation > +90°
B. Low voltage in all leads
C. Large R in V5–V6 only
D. Inverted P in lead II

65. How is ischemia (non-transmural) most commonly manifested on ECG?
A. ST-segment depression or T-wave inversion in corresponding leads
B. Large Q waves immediately
C. Tall peaked T waves only
D. Shortened PR interval

66. Which sign on ECG supports the diagnosis of ventricular preexcitation (Wolff-Parkinson-White)?
A. Prolonged PR > 200 ms
B. Short PR interval with delta wave and wide QRS
C. rSR' in V1 only
D. Inverted T in aVR only

67. What does low QRS voltage in all leads suggest?
A. Pericardial effusion, obesity, or pulmonary disease
B. Left ventricular hypertrophy
C. Acute ST elevation MI
D. Normal variant in athletes only

68. Which approach is recommended when ECG and clinical picture disagree?
A. Always trust ECG over clinical exam
B. Correlate with history, repeat ECG, obtain serial enzymes/imaging as indicated
C. Ignore ECG and treat empirically for arrhythmia
D. Discharge patient immediately if ECG is normal

69. Which ECG feature most reliably indicates atrial fibrillation?
A. Regular narrow QRS at 150 bpm
B. Absent P waves with irregularly irregular R-R intervals
C. Sawtooth flutter waves in V1 only
D. Progressive PR prolongation before a dropped beat

70. Which finding is characteristic of atrial flutter with 2:1 conduction?
A. Irregularly irregular rhythm with no flutter waves
B. Regular ventricular rate about 150 bpm with sawtooth flutter waves in inferior leads
C. Wide QRS complexes with AV dissociation
D. Short PR interval with delta wave

71. Which ECG sign suggests multifocal atrial tachycardia (MAT)?
A. Identical P-wave morphology in all beats
B. At least three different P-wave morphologies and irregular R-R intervals
C. Regular narrow complex tachycardia at 250 bpm

D. Fixed PR interval with dropped beats

72. Which ECG pattern indicates ventricular tachycardia rather than supraventricular tachycardia with aberrancy?
A. Narrow QRS with visible P waves preceding each QRS
B. AV dissociation, capture or fusion beats, and extreme axis deviation
C. Regular rhythm at 90 bpm with normal axis
D. Short PR and delta waves

73. Which ECG feature is typical for torsades de pointes?
A. Monomorphic wide QRS tachycardia at 200 bpm
B. Polymorphic ventricular tachycardia with twisting QRS axis around the baseline and prolonged QT
C. Regular narrow complex tachycardia with P waves
D. ST elevation in anterior leads only

74. Which ECG finding is diagnostic for complete (third-degree) AV block?
A. PR interval progressively lengthening until a beat is dropped
B. Constant PR interval with occasional dropped beats
C. Complete AV dissociation with independent atrial and ventricular rates
D. Short PR interval with delta waves

75. Which rhythm is suggested by a regular narrow-complex tachycardia at 180 bpm with absent visible P waves and sudden onset/termination?
A. Sinus tachycardia
B. Atrial fibrillation
C. Paroxysmal supraventricular tachycardia (PSVT) such as AV nodal reentrant tachycardia
D. Ventricular tachycardia

76. Which ECG sign suggests Wolff-Parkinson-White syndrome during sinus rhythm?
A. Prolonged PR > 200 ms
B. Short PR interval, delta wave, and widened QRS
C. Inverted T waves in V1–V3 only
D. Low voltage QRS in all leads

77. Which change on ECG commonly accompanies digoxin toxicity and predisposes to arrhythmias?
A. Tall peaked T waves only
B. Increased PR interval, scooped ST depression, and various atrial or ventricular arrhythmias
C. Shortened PR with delta waves
D. New left bundle branch block only

78. Which ECG feature is most consistent with sinus node dysfunction (sick sinus syndrome)?
A. Persistent sinus tachycardia without pauses
B. Sinus bradycardia, sinus pauses or arrest, and alternating brady-tachy episodes
C. Constant PR prolongation > 300 ms
D. Wide QRS complexes with rSR' in V1

79. Which ECG finding suggests ventricular fibrillation?
A. Organized wide QRS complexes at 120 bpm
B. Chaotic, irregular baseline with no discernible QRS complexes or P waves
C. Regular sawtooth waves in inferior leads
D. Long PR interval with dropped beats

80. Which observation supports the diagnosis of accelerated idioventricular rhythm?
A. Ventricular rhythm at 20 bpm with AV dissociation

B. Ventricular rhythm 40–100 bpm with wide QRS complexes, often transient after reperfusion
C. Narrow complex tachycardia with P waves preceding each QRS
D. Polymorphic VT with torsades morphology

81. Which ECG sign indicates junctional escape rhythm?
A. Absent P waves or retrograde P waves with narrow QRS and rate typically 40–60 bpm
B. Tall peaked P waves preceding each QRS
C. Wide QRS with delta waves
D. Rapid irregular rhythm with no P waves

82. Which feature suggests premature ventricular complexes (PVCs) rather than premature atrial complexes (PACs)?
A. Narrow QRS with preceding abnormal P wave
B. Wide, bizarre QRS not preceded by a P wave and compensatory pause
C. Shortened PR before the premature beat
D. Identical morphology to sinus QRS complexes

83. Which ECG pattern is typical for Brugada syndrome and associated with sudden cardiac death risk?
A. ST-segment elevation in V1–V3 with coved or saddleback morphology and right bundle branch block pattern
B. Diffuse ST depression in all leads
C. Tall R waves in V5–V6 only
D. Low voltage in limb leads only

84. Which approach is recommended when encountering wide-complex tachycardia of uncertain origin?
A. Assume supraventricular origin and give AV nodal blockers immediately
B. Treat as ventricular tachycardia until proven otherwise, especially if hemodynamically unstable
C. Ignore rhythm and focus only on blood pressure
D. Always cardiovert without assessment

85. Which ECG finding is most suggestive of pacemaker malfunction (failure to capture)?
A. Regular pacing spikes followed by appropriate QRS complexes
B. Pacing spikes present without subsequent QRS complexes (loss of capture)
C. Absence of pacing spikes with normal intrinsic rhythm only
D. Short PR interval with delta waves

86. Which ECG finding defines first-degree atrioventricular (AV) block?
A. Progressive PR prolongation with dropped beat
B. PR interval > 200 ms with 1:1 AV conduction
C. Intermittent absence of P waves
D. Wide QRS > 120 ms with AV dissociation

87. Which pattern is diagnostic for Mobitz type I (Wenckebach) second-degree AV block?
A. Constant PR with occasional dropped QRS
B. Progressive PR prolongation followed by a nonconducted P wave
C. Randomly dropped beats without PR change
D. PR < 120 ms with delta waves

88. Which ECG feature characterizes Mobitz type II second-degree AV block?
A. Progressive PR prolongation before a dropped beat
B. Fixed PR intervals with sudden dropped QRS complexes
C. Short PR and wide QRS with delta wave
D. Sinus pauses > 3 s only

89. Which finding indicates complete (third-degree) AV block?
A. PR interval progressively lengthening
B. AV dissociation with independent atrial and ventricular rates
C. Short PR with delta waves
D. Intermittent bundle branch block only during exercise

90. What ECG pattern is typical for right bundle branch block (RBBB)?
A. Narrow QRS with tall R in V6
B. QRS ≥ 120 ms with rSR' in V1–V2 and wide S in lateral leads
C. QRS < 100 ms with deep Q in V1
D. ST elevation in inferior leads only

91. Which ECG features indicate left bundle branch block (LBBB)?
A. QRS ≥ 120 ms, broad notched R in I, V5–V6, and absent Q in lateral leads
B. rSR' in V1 and narrow QRS
C. Short PR and delta wave in preexcitation
D. Isolated tall R in V1 only

92. Which ECG sign suggests left anterior fascicular block (left anterior hemiblock)?
A. Right axis deviation > +90° and tall R in V1
B. Left axis deviation (≈ −30° to −90°) with small Q in leads I and aVL and small R in II, III, aVF
C. rSR' in V1 with wide QRS
D. Diffuse low voltage in limb leads

93. Which ECG finding is typical for left posterior fascicular block (left posterior hemiblock)?
A. Left axis deviation and tall R in I
B. Right axis deviation with small R in I and deep S in II, III, aVF, without other causes
C. Delta wave in precordial leads
D. ST elevation in V2–V4

94. What does bifascicular block usually refer to on ECG?
A. Any single fascicular delay only
B. RBBB plus either left anterior or left posterior fascicular block
C. Complete AV block with ventricular escape rhythm
D. Intermittent delta waves with short PR

95. Which ECG constellation raises concern for impending complete heart block (trifascicular disease)?
A. RBBB with first-degree AV block (prolonged PR) and intermittent dropped beats
B. Isolated short PR interval only
C. Sinus tachycardia with normal conduction intervals
D. Early repolarization pattern in V2–V5

96. Which mechanism best explains phase 3 (tachycardia-dependent) bundle branch block?
A. Block occurs because tissue is still refractory when a premature or rapid impulse arrives
B. Block due to fibrosis only at rest
C. Block caused by electrolyte depletion exclusively
D. Block that appears only during sleep

97. Which ECG feature suggests rate-related (exercise-induced) bundle branch block?
A. Bundle branch block present at rest and disappears with exercise
B. New bundle branch block that appears at higher heart rates and resolves at lower rates
C. Constant QRS widening regardless of rate
D. Delta waves appearing with tachycardia

98. Which observation indicates alternating bundle branch block and increased risk of complete AV block?
A. Stable RBBB pattern over months
B. Intermittent switching between RBBB and LBBB morphologies on serial ECGs
C. Persistent left axis deviation only
D. Isolated U waves in precordial leads

99. Which ECG sign suggests infra-nodal (His-Purkinje) conduction disease rather than AV nodal disease?
A. Narrow QRS with prolonged PR only
B. Wide QRS escape rhythm (ventricular) and high-grade AV block with slow escape rate
C. Short PR with delta wave
D. Sinus bradycardia without conduction delay

100. Which change on ECG is most consistent with pacemaker capture failure?
A. Pacing spikes followed immediately by appropriate QRS complexes
B. Pacing spikes present without subsequent QRS complexes (loss of capture)
C. Absence of pacing spikes with normal intrinsic rhythm only
D. Regular narrow QRS at 70 bpm with no spikes

101. Which ECG finding is characteristic of bundle branch reentry ventricular tachycardia?
A. Narrow complex tachycardia with P waves preceding each QRS
B. Monomorphic wide-complex tachycardia with LBBB or RBBB morphology and evidence of His-Purkinje involvement
C. Polymorphic VT with twisting axis (torsades) only
D. Sinus rhythm with first-degree AV block only

102. Which approach is recommended when high-grade conduction disease is suspected on ECG but the patient is asymptomatic?
A. Immediate empiric AV nodal blocker therapy
B. Correlate clinically, obtain ambulatory monitoring or electrophysiology testing, and consider pacing if indicated
C. Ignore and discharge without follow-up
D. Start high-dose antiarrhythmic drugs immediately

103. Which ECG criterion suggests left atrial enlargement?
A. P-wave duration > 120 ms in lead II
B. Tall peaked P waves in II
C. Biphasic P in V1 with terminal negative portion > 40 ms and >1 mm depth
D. Absent P waves

104. Which ECG sign indicates right atrial enlargement (P-pulmonale)?
A. P-wave amplitude > 2.5 mm in lead II
B. P-wave duration > 120 ms in lead II
C. Biphasic P in V1 with large terminal negative portion
D. Inverted P in lead II

105. Which voltage criterion is part of the Sokolow–Lyon index for LVH?
A. R in aVL > 11 mm alone
B. S in V1 + R in V5 or V6 > 35 mm
C. R in II + S in III > 25 mm
D. R in V1 > 20 mm

106. Which non-voltage ECG feature supports the diagnosis of LVH?
A. ST-segment depression and T-wave inversion in lateral leads (strain pattern)
B. Tall R in V1 only

C. Short PR interval
D. Prominent U waves in V2–V4

107. Which ECG pattern suggests right ventricular hypertrophy (RVH)?
A. Dominant R wave in V1 and right axis deviation > +90°
B. Large R in V5–V6 with left axis deviation
C. Low voltage in all leads
D. Deep Q in V1 only

108. Which lead combination is most informative for assessing left ventricular hypertrophy?
A. V1 and V2 only
B. V5–V6 and V1 (for Sokolow–Lyon)
C. II and III only
D. aVR and aVF only

109. Which ECG change is commonly seen with severe LVH and associated diastolic dysfunction?
A. Left ventricular strain: ST depression and T inversion in V5–V6 and I, aVL
B. Tall peaked T waves in all leads
C. Shortened QRS duration < 60 ms
D. Prominent Q in V1 only

110. Which finding best indicates biatrial enlargement on ECG?
A. P-wave amplitude > 2.5 mm in II and biphasic P in V1 with large terminal negative portion
B. Absent P waves with irregular rhythm
C. Short PR interval with delta wave
D. Inverted T waves in inferior leads only

111. Which criterion is part of the Cornell voltage index for LVH?
A. R in aVL + S in V3 > 28 mm (men) or > 20 mm (women)
B. S in V1 + R in V5 > 35 mm only in women
C. R in II + S in III > 30 mm
D. R in V1 > 15 mm

112. Which ECG sign may be a false positive for LVH in a thin athletic person?
A. High QRS voltages without repolarization abnormalities
B. ST depression with T inversion in lateral leads
C. Low voltage in limb leads
D. Pathological Q waves in anterior leads

113. Which change suggests isolated right atrial enlargement rather than RVH?
A. Tall peaked P waves in II with otherwise normal QRS voltages
B. Dominant R in V1 with right axis deviation
C. Left axis deviation with tall R in V5
D. ST elevation in V2–V4

114. Which ECG feature supports the presence of concentric LVH due to hypertension?
A. Increased QRS voltages plus left ventricular strain pattern in lateral leads
B. Low QRS voltages and diffuse T inversion
C. Dominant R in V1 only
D. Short PR interval with delta wave

115. Which observation is typical for RVH in the context of pulmonary disease?
A. Right axis deviation, R/S ratio >1 in V1, and small R in V6
B. Left axis deviation and tall R in V6
C. Low voltage in precordial leads only
D. Pathological Q waves in inferior leads

116. Which ECG finding is most specific for left atrial enlargement in lead II?
A. Notched (M-shaped) P wave with duration > 120 ms
B. Tall peaked P wave > 2.5 mm
C. Absent P wave
D. Inverted P wave

117. Which combination increases the diagnostic accuracy for LVH on ECG?
A. Voltage criteria plus repolarization (strain) changes and clinical correlation (e.g., hypertension)
B. Voltage criteria alone without clinical context
C. Presence of U waves only
D. Short PR interval with delta wave

118. Which ECG change may regress after successful treatment of LVH (e.g., BP control)?
A. Reduction in QRS voltages and improvement of strain pattern over time
B. Immediate disappearance of all QRS complexes
C. Development of new pathological Q waves
D. Permanent tall R in V1 only

119. Which limitation applies to ECG diagnosis of ventricular hypertrophy?
A. Low sensitivity; many cases of anatomical hypertrophy are ECG-negative, requiring imaging for confirmation
B. ECG is 100% sensitive and specific for hypertrophy
C. ECG cannot detect atrial enlargement at all
D. ECG always overestimates chamber size in obese patients

120. Which ECG change is most specific for acute transmural (ST-elevation) myocardial infarction?
A. Diffuse T-wave inversion
B. New ST-segment elevation in contiguous leads with reciprocal ST depression
C. Isolated U waves
D. Low QRS voltages

121. Which ECG finding is typical for subendocardial ischemia (non-transmural ischemia)?
A. ST-segment elevation in contiguous leads
B. ST-segment depression and/or horizontal/downsloping ST depression in corresponding leads
C. Large pathological Q waves immediately
D. Tall peaked T waves only

122. Which lead changes suggest an acute inferior wall MI?
A. ST elevation in V1–V4
B. ST elevation in II, III, and aVF with possible reciprocal ST depression in I and aVL
C. ST depression in V5–V6 only
D. Diffuse ST elevation in all leads

123. Which ECG sign indicates prior (old) transmural infarction?
A. Persistent pathological Q waves in appropriate leads with reduced R amplitude
B. Tall peaked T waves in all leads
C. Shortened PR interval
D. Isolated ST elevation that resolves with exercise

124. Which pattern is characteristic of posterior myocardial infarction on a standard 12-lead ECG?
A. ST elevation in V3–V4 with tall R waves in V1–V2 and ST depression in V1–V2 (mirror image)
B. ST elevation in II, III, aVF only
C. Diffuse low voltage QRS complexes
D. Prominent Q waves in aVR only

125. Which change on the ECG is an early sign of acute ischemia before ST changes appear?
A. New pathological Q waves
B. Hyperacute (broad-based) T-wave peaking in leads overlying the ischemic territory
C. Persistent U waves in all leads
D. Chronic low QRS voltage

126. Which combination of ECG findings increases suspicion for left main coronary artery occlusion?
A. Widespread ST depression with ST elevation in aVR and possibly V1
B. Isolated ST elevation in II only
C. Tall R in V6 with no ST changes
D. Normal ECG with chest pain only

127. Which ECG change is most consistent with reperfusion after acute STEMI?
A. Immediate disappearance of all Q waves
B. Resolution of ST elevation and appearance of reperfusion T-wave changes (peaked T then T inversion)
C. New persistent ST elevation despite clinical improvement
D. Development of new left axis deviation only

128. Which ECG finding suggests ischemia in the lateral wall?
A. ST elevation in V1–V2 only
B. ST depression in II, III, aVF only
C. ST elevation or T-wave changes in I, aVL, V5–V6
D. Prominent R in V1 only

129. Which statement about pathological Q waves is correct?
A. They always appear immediately at symptom onset in acute MI
B. They indicate transmural necrosis when deep and wide in anatomically contiguous leads
C. They are diagnostic of ischemia without clinical correlation
D. They are normal in lead aVR only

130. Which ECG feature is most helpful to distinguish early repolarization from anterior STEMI?
A. Early repolarization shows concave ST elevation, prominent J-point notching, and stable pattern across serial ECGs; STEMI shows convex/straight ST elevation with reciprocal changes.
B. Early repolarization always has reciprocal ST depression.
C. STEMI never has T-wave inversion.
D. Early repolarization is associated with pathological Q waves.

131. Which leads should be added when posterior MI is suspected but V1–V3 show ST depression?
A. Right precordial leads V3R–V4R only
B. Posterior leads V7–V9 (placed on the back) to detect ST elevation
C. Limb leads only
D. aVR and aVL only

132. Which ECG change is commonly seen with ischemia due to coronary artery spasm (Prinzmetal angina)?
A. Transient ST-segment elevation during pain that resolves when pain subsides
B. Persistent pathological Q waves at baseline
C. Chronic low QRS voltage
D. Permanent left bundle branch block only

133. Which ECG finding in the context of chest pain warrants immediate activation of reperfusion pathways (PCI/thrombolysis) in most protocols?

A. New ST-segment elevation ≥1 mm in two contiguous limb leads or ≥2 mm in two contiguous precordial leads (or equivalent criteria)
B. Isolated T-wave flattening in a single lead
C. Small U waves in V2–V3 only
D. Sinus bradycardia without ST changes

134. Which ECG change may indicate myocardial ischemia in the setting of left bundle branch block (LBBB)?
A. Sgarbossa criteria: concordant ST elevation ≥1 mm in leads with positive QRS, or concordant ST depression in V1–V3, or excessively discordant ST elevation
B. Any ST change is ignored in LBBB
C. Only Q waves matter in LBBB
D. LBBB always rules out ischemia

135. Which serial ECG strategy improves detection of evolving ischemia?
A. Single ECG only at presentation
B. Obtain serial ECGs (e.g., at presentation and repeated at short intervals) and compare for dynamic changes
C. Only perform ECG after 24 hours
D. Rely solely on troponin without repeat ECGs

136. Which ECG pattern is associated with Wellens syndrome and indicates critical proximal LAD stenosis?
A. Deeply inverted or biphasic T waves in V2–V3 during pain-free periods with minimal ST elevation
B. Tall peaked T waves in inferior leads only
C. Diffuse low voltage QRS complexes
D. Persistent ST elevation in V7–V9 only

137. Which ECG pattern is characteristic of hypertrophic cardiomyopathy (HCM)?
A. Low QRS voltages in all leads
B. Deep Q waves in lateral and inferior leads with high R-wave voltages and repolarization abnormalities
C. Diffuse ST elevation in all leads
D. Persistent left bundle branch block

138. Which ECG finding is commonly associated with pulmonary embolism?
A. New right bundle branch block, S1Q3T3 pattern, and T-wave inversion in V1–V4
B. Tall R in V5–V6 only
C. Pathological Q waves in anterior leads
D. Short PR interval with delta wave

139. Which ECG sign suggests pericarditis rather than myocardial infarction?
A. Localized convex ST elevation with reciprocal depression
B. Diffuse concave ST elevation with PR depression and no reciprocal changes
C. Persistent pathological Q waves in contiguous leads
D. New left bundle branch block

140. Which ECG pattern is typical for Brugada syndrome?
A. ST-segment elevation in V1–V3 with coved or saddleback morphology and right precordial RBBB-like pattern
B. Diffuse low voltage QRS complexes
C. Tall R waves in lateral leads only
D. Marked ST depression in inferior leads only

141. Which ECG feature is most suggestive of cardiac tamponade?

A. Electrical alternans and low QRS voltages
B. High QRS voltages and tall T waves
C. Persistent ST elevation in anterior leads only
D. Delta waves in precordial leads

142. Which ECG change is commonly seen in hyperthyroidism?
A. Sinus bradycardia with long PR
B. Sinus tachycardia, atrial fibrillation, and increased P-wave dispersion
C. Wide QRS with rSR' in V1 only
D. Persistent U waves in all leads

143. Which ECG finding is characteristic of electrolyte disturbance hypocalcemia?
A. Shortened QT interval
B. Prolonged QT interval due to prolonged ST segment
C. Tall peaked T waves only
D. Wide QRS immediately

144. Which ECG pattern is associated with Takotsubo cardiomyopathy (stress cardiomyopathy)?
A. Transient ST elevation, deep T-wave inversions, and QT prolongation often mimicking anterior MI
B. Persistent delta waves and short PR
C. Low voltage with electrical alternans only
D. Chronic left bundle branch block only

145. Which ECG sign suggests infiltrative cardiomyopathy such as amyloidosis?
A. Low QRS voltages despite increased ventricular wall thickness on imaging
B. Very high QRS voltages with tall R in V6 only
C. Delta waves in precordial leads
D. Isolated ST elevation in inferior leads

146. Which ECG abnormality is commonly seen in chronic obstructive pulmonary disease (COPD)?
A. Right axis deviation, low voltage, and poor R-wave progression in precordial leads
B. Left axis deviation with tall R in V6
C. Pathological Q waves in anterior leads
D. Marked ST elevation in lateral leads

147. Which ECG feature is typical for Wolff-Parkinson-White syndrome during sinus rhythm?
A. Short PR interval, delta wave, and widened QRS complex
B. Prolonged PR > 200 ms only
C. Low QRS voltages in limb leads only
D. Deep inverted T waves in V2–V3 only

148. Which ECG finding suggests myocarditis?
A. Diffuse ST elevation or depression, T-wave inversions, and possible arrhythmias without a single coronary territory pattern
B. Isolated delta waves only
C. Persistent left bundle branch block without other changes
D. Electrical alternans only

149. Which ECG change is commonly associated with severe hypothermia?
A. Osborn (J) waves and bradycardia
B. Tall peaked T waves only
C. Shortened QT interval only
D. Delta waves in precordial leads

150. Which ECG pattern is characteristic of arrhythmogenic right ventricular cardiomyopathy (ARVC)?

A. Epsilon waves in the right precordial leads, T-wave inversion in V1–V3, and ventricular arrhythmias of RV origin

B. Low voltage in all leads only

C. Delta waves and short PR only

D. Deep Q waves in lateral leads only