PRACTICE EXAM 14

1. Which physical principle allows a radar sensor to measure the relative speed of a lead vehicle?

A. The Doppler shift in the frequency of the reflected radar signal

B. The time delay of an ultrasonic pulse returning to the sensor

C. The change in lens focal length as the target moves closer

D. The variation in infrared heat emitted by the moving vehicle

2. An ultrasonic parking sensor determines distance to an object primarily by measuring:

A. The elapsed time for an emitted sound pulse to return as an echo

B. The Doppler frequency shift of the reflected radar wave pattern

C. The brightness of light reflected from the object's painted surface

D. The change in electrical resistance across the sensor's contact face

3. A forward-facing camera identifies lane markings primarily by detecting:

A. The Doppler shift between the vehicle and the painted lane lines

B. Contrast and edges between the road surface and the lane paint

C. The ultrasonic echo time between the bumper and the lane edge

D. The magnetic field generated by metallic content in the paint

4. Which ADAS feature warns the driver of an impending forward collision without automatically applying the brakes?

A. Automatic emergency braking that decelerates the vehicle to a stop

B. Lane keeping assist that applies steering torque toward the lane center

C. Forward collision warning that alerts the driver to a potential impact

D. Blind spot warning that signals a vehicle in the adjacent travel lane

5. Which ADAS feature applies steering input to keep the vehicle centered in its lane?

A. Forward collision warning that alerts the driver to an impact risk

B. Adaptive cruise control that maintains a set following distance

C. Lane keeping or lane centering assist that steers within the lane

D. Blind spot warning that detects vehicles in the adjacent lane

6. A lidar sensor differs fundamentally from radar in that lidar measures distance using:

A. The Doppler shift of a continuous radio-frequency carrier wave

B. The elapsed time of an emitted ultrasonic pulse and its echo

C. The change in electrical capacitance near a conductive object

D. The travel time of emitted laser light pulses to a target and back

7. Which system uses rear-facing corner radar sensors to detect vehicles approaching from behind in adjacent lanes?

A. Adaptive cruise control maintaining a set gap to a lead vehicle

B. Blind spot warning detecting vehicles in adjacent rear zones

C. Forward collision warning alerting to an impact ahead of the vehicle

D. Traffic sign recognition reading posted speed limit signs

8. The composite vehicle Type 1 reference is used on the L4 test primarily to:

A. Provide the certification's required passing score for each domain

B. List the part numbers of one specific production vehicle model

C. Describe a standardized, manufacturer-neutral ADAS design for questions

D. Serve as the printed answer key for radar-related test items

9. A radar sensor operating in a higher frequency band (such as 77 GHz versus 24 GHz) generally provides:

A. Finer resolution and more precise distance and angle measurement

B. Longer ultrasonic echo times for closer parking object detection

C. Greater immunity to all forms of windshield optical distortion

D. Reduced dependence on the vehicle's ride height and pitch aim

10. Which component provides the steering position data that lane keeping and stability systems require?

A. The wheel-speed sensor mounted at each individual road wheel

B. The ultrasonic parking sensor located in the rear bumper cover

C. The forward radar sensor mounted behind the front grille emblem

D. The steering angle sensor located in the steering column assembly

11. Traffic sign recognition (TSR) relies primarily on which sensing technology?

A. Rear corner radar sensors scanning the adjacent travel lanes

B. A forward camera optically reading and classifying posted signs

C. Ultrasonic sensors measuring the distance to roadside signposts

D. Wheel-speed sensors correlating vehicle speed to sign location

12. A driver attention monitor (DAM) that watches the driver's face and eyes uses which sensing approach?

A. A forward radar sensor measuring the closing speed to traffic

B. An ultrasonic array detecting the driver's seat occupancy weight

C. An interior camera tracking driver gaze and eyelid movement

D. A steering angle sensor inferring drowsiness from wheel inputs

13. Which statement BEST describes how sensor fusion improves ADAS reliability?

A. Combining inputs from multiple sensors compensates for each one's weaknesses

B. Using only the single most accurate sensor and ignoring all others

C. Averaging the battery voltage across every module on the network

D. Replacing camera data entirely with ultrasonic distance readings

14. Adaptive cruise control maintains a set following distance primarily using data from:

A. The interior driver-facing camera tracking the driver's gaze

B. The forward radar sensor measuring range and closing speed

C. The rear corner radar sensors monitoring adjacent lane traffic

D. The ultrasonic bumper sensors used during low-speed parking

15. Which sensing technology is MOST limited by darkness when operating without supplemental illumination?

A. A visible-light forward camera relying on available scene lighting

B. A radar sensor emitting and receiving radio-frequency energy

C. An ultrasonic sensor emitting and receiving sound-pressure pulses

D. A lidar unit emitting its own laser light pulses toward targets

16. A vehicle network that allows ADAS modules to share data over a shared twisted-pair bus most commonly uses:

A. A CAN (Controller Area Network) digital communication bus

B. A single dedicated analog wire for each individual sensor output

C. A wireless Bluetooth pairing between each sensor and the cluster

D. A direct cellular uplink streaming each sensor to a remote server

17. Automatic emergency braking (AEB) differs from forward collision warning (FCW) in that AEB:

A. Only illuminates a warning lamp without alerting the driver audibly

B. Detects vehicles approaching from the rear in adjacent travel lanes

C. Can autonomously apply the brakes to mitigate or avoid a collision

D. Reads posted speed limit signs to adjust the cruise set speed

18. Which factor MOST commonly degrades ultrasonic parking sensor performance in real-world use?

A. Bright direct sunlight overwhelming the sensor's optical lens

B. The Doppler shift produced by fast-moving adjacent traffic

C. A windshield sticker placed in the forward camera's view

D. Mud, ice, or debris covering the sensor face on the bumper

19. Which describes the role of the forward camera in a radar-plus-camera fusion ACC system?

A. Measuring the precise closing speed using radio-frequency Doppler

B. Emitting ultrasonic pulses to gauge distance to the lead vehicle

C. Classifying and confirming objects and reading lane and sign data

D. Supplying the steering angle signal used by the stability system

20. A blind spot monitoring radar sensor is typically mounted at which location?

A. Behind the windshield glass near the interior rearview mirror

B. Within the rear bumper cover at each rear corner of the vehicle

C. In the steering column directly behind the steering wheel hub

D. On the engine block adjacent to the powertrain control module

21. Which best explains why a camera mounted to the windshield requires recalibration after glass replacement?

A. The new glass changes the radar sensor's horizontal beam spread

B. Replacement raises the vehicle's ride height above specification

C. The camera's aim reference shifts when its mounting glass is changed

D. The steering angle sensor zero-point resets during the glass swap

22. Which ADAS technology is LEAST affected by heavy fog or rain among the following?

A. A visible-light forward camera reading lane markings and signs

B. A lidar unit relying on emitted laser light reflections

C. An optical driver-attention camera tracking the driver's eyes

D. A radar sensor using radio-frequency energy to detect vehicles

23. A pedestrian automatic emergency braking system typically combines radar with which sensor to classify a pedestrian?

A. An ultrasonic bumper sensor measuring low-speed echo distance

B. A wheel-speed sensor correlating vehicle motion to the target

C. A forward camera that visually recognizes the pedestrian's shape

D. A steering angle sensor inferring the pedestrian's lane position

24. Which statement about radar sensor mounting and aim is correct?

A. Radar aim has no measurable effect on adaptive cruise control behavior

B. A small aim error can cause the radar to track the wrong lane's traffic

C. Radar sensors require no defined aim because they scan in all directions

D. Vertical aim is irrelevant; only the horizontal aim affects detection

25. A surround-view (bird's-eye) camera system creates its composite image by:

A. Using a single front camera and rotating it mechanically around the car

B. Emitting ultrasonic pulses from each corner to map the surroundings

C. Combining radar returns from the four corner sensors into a top view

D. Stitching the views from multiple cameras into one overhead perspective

26. Which describes the primary function of a vehicle's gateway module in an ADAS network?

A. Supplying calibration targets to the forward camera during service

B. Physically aiming the radar sensor to the vehicle's thrust line

C. Generating the ultrasonic pulses used by the parking sensors

D. Routing and managing data traffic between different network segments

27. Lane departure warning (LDW) differs from lane keeping assist (LKA) in that LDW:

A. Applies continuous steering torque to keep the vehicle centered

B. Automatically brakes the vehicle when it crosses a lane boundary

C. Alerts the driver of lane drift without applying steering correction

D. Detects vehicles in the blind spot of the adjacent travel lane

28. Which sensing limitation explains why radar alone may struggle to distinguish a stopped car from a stationary roadside object?

A. Radar cannot measure the relative speed of any detected object

B. Radar only functions when the host vehicle is completely stationary

C. Radar requires direct sunlight to return a usable signal echo

D. Radar may detect both but cannot always classify object type alone

29. A vehicle's automatic high-beam control determines when to dim primarily using:

A. A forward camera detecting oncoming and preceding vehicle lights

B. An ultrasonic sensor measuring the distance to oncoming traffic

C. A rear corner radar tracking vehicles in the adjacent lanes

D. The steering angle sensor predicting the road's upcoming curvature

30. Which is the MOST accurate description of "static" ADAS calibration?

A. The vehicle is driven on the road at a set speed to learn lane lines

B. The vehicle is stationary while targets are positioned to specification

C. The sensors self-calibrate automatically with no targets or driving

D. The battery is disconnected to force all modules into a relearn mode

31. Which is the MOST accurate description of "dynamic" ADAS calibration?

A. The vehicle is driven under specified conditions so sensors self-learn

B. The vehicle is stationary while fixed targets are precisely positioned

C. The technician manually enters aim values into the scan tool by hand

D. The sensors require no calibration because they ship pre-aligned

32. A cross-traffic alert system that warns of vehicles approaching while backing out of a space typically uses:

A. The forward-facing camera bonded behind the windshield glass

B. The interior driver-attention camera tracking the driver's gaze

C. The ultrasonic front parking sensors in the front bumper cover

D. The rear corner radar sensors scanning laterally behind the vehicle

33. Which factor would MOST directly reduce a forward radar's effective range?

A. A clean, undamaged emblem positioned in front of the sensor face

B. Heavy ice, snow, or thick non-OEM paint over the sensor's path

C. Correct tire pressures set to the door-placard specification value

D. A fully charged battery maintaining nominal system voltage levels

34. The "thrust line" used in ADAS sensor aiming is defined as:

A. The horizontal radar beam pattern emitted from the front sensor

B. The maximum towing capacity printed on the driver's door placard

C. The direction the rear axle points relative to the vehicle centerline

D. The optical axis of the forward camera bonded to the windshield

35. Which describes a key advantage of radar over a visible-light camera for ACC?

A. Radar reads posted speed limit signs more accurately than a camera

B. Radar identifies lane markings better than a camera in clear daylight

C. Radar classifies object types more precisely than any camera system

D. Radar measures distance and closing speed well in darkness and rain

36. A vehicle equipped with night vision for pedestrian detection most commonly uses which sensor type?

A. A thermal (infrared) imaging camera sensing heat signatures

B. An ultrasonic array measuring echo time to nearby pedestrians

C. A rear corner radar scanning the adjacent rear travel lanes

D. The steering angle sensor inferring pedestrian crossing paths

37. Which statement BEST captures why ADAS calibration is required after certain wheel alignments?

A. Changing the thrust angle shifts the sensor reference to vehicle travel

B. Alignment erases the stored software image inside the forward camera

C. Alignment raises tire pressures, which confuses the radar module

D. Alignment magnetically demagnetizes the ultrasonic bumper sensors

38. Which describes the primary purpose of a post-repair scan (post-scan)?

A. To set the steering angle sensor zero-point before an alignment

B. To verify all systems function and no new DTCs remain after repair

C. To physically aim the radar sensor to the vehicle's thrust line

D. To generate the ultrasonic pulses used by the parking array

39. A camera-based system's ability to detect a pedestrian at night without supplemental lighting is limited primarily by:

A. The Doppler shift between the camera and the moving pedestrian

B. The ultrasonic echo time being too short at pedestrian distances

C. The radar sensor overriding the camera during nighttime hours

D. The reduced visible light available for the optical sensor to use

40. Which best describes the function of adaptive (steering-responsive) headlights?

A. The headlights pivot with steering input to illuminate around curves

B. The headlights read posted speed limit signs to set their brightness

C. The headlights detect blind spot vehicles using corner radar sensors

D. The headlights measure following distance to the lead vehicle ahead

41. Which is the MOST likely effect of a forward radar sensor aimed too far to one side horizontally?

A. The radar gains additional detection range straight down the roadway

B. The radar may track vehicles in an adjacent lane or miss the lead car

C. The radar automatically switches its input to the ultrasonic sensors

D. The radar improves its ability to classify pedestrians versus vehicles

42. Which network condition would MOST likely cause multiple ADAS modules to report "no communication" simultaneously?

A. A single forward camera bracket loosening after a windshield swap

B. One rear corner radar sensor's face being covered with road debris

C. A fault in a shared bus segment or the gateway routing their data

D. A windshield sticker placed within the forward camera's field of view

43. Which statement about ultrasonic sensors and low or angled objects is correct?

A. Ultrasonic sensors detect all object shapes equally at any height

B. Low or angled objects can fall outside the ultrasonic detection field

C. Ultrasonic sensors require darkness to detect any object accurately

D. Ultrasonic sensors measure object closing speed using Doppler shift

44. Which describes why OEM service information is the authoritative calibration source?

A. It is always faster to follow than any aftermarket procedure available

B. It removes the need to verify ride height or tire specification first

C. It eliminates the requirement to perform a functional road test

D. It specifies the exact geometry and conditions validated for the vehicle

45. A radar sensor's "field of view" refers to:

A. The optical image area captured by the forward-facing camera lens

B. The range of battery voltages the radar module can safely operate on

C. The angular region within which the sensor can detect and track targets

D. The set of network messages the radar transmits over the data bus

46. Which describes the MOST appropriate first step when an ADAS warning lamp is illuminated?

A. Perform a scan to retrieve stored DTCs and identify the affected system

B. Immediately replace the forward radar sensor as the likely root cause

C. Clear all codes without diagnosis and release the vehicle to the owner

D. Disconnect the battery for thirty minutes to force a full system relearn

47. Which best explains the purpose of a battery support unit during calibration?

A. It increases the radar sensor's maximum rated detection range

B. It maintains a stable system voltage so modules do not reset

C. It physically aims the camera to the vehicle's thrust line reference

D. It generates the ultrasonic pulses used by the parking sensor array

48. Which sensing technology directly measures the angle and range to multiple targets using emitted radio waves?

A. A visible-light forward camera capturing the scene optically

B. A radar sensor emitting and analyzing reflected radio-frequency energy

C. An ultrasonic sensor emitting and timing sound-pressure pulses

D. A thermal camera sensing infrared heat emitted by warm objects

49. Which describes a correct relationship between ride height and sensor aim?

A. Ride height affects only the camera and never the radar sensor aim

B. Ride height has no measurable effect on any ADAS sensor's aim

C. Ride height matters only for ultrasonic sensors in the rear bumper

D. Ride height changes sensor pitch, affecting both radar and camera aim

50. Which is the single BEST confirmation that an ADAS repair and calibration succeeded?

A. The dashboard warning lamp is no longer illuminated at key-on only

B. The scan tool displayed a "calibration complete" status one time

C. A post-scan plus a functional road test confirms correct operation

D. The diagnostic trouble code memory was cleared after the repair

Answer Key & Full Answer Explanations

1. A — Radar measures relative speed through the Doppler shift: the reflected signal's frequency changes in proportion to the target's closing or separating velocity. Ultrasonic timing, lens optics, and infrared heat are different modalities. Doppler is what gives radar its direct speed measurement for ACC.

2. A — Ultrasonic sensors emit a sound pulse and measure the elapsed time for the echo to return, converting time-of-flight into distance. They do not use Doppler radar, reflected light, or contact resistance. Echo timing is the basis of parking-distance detection.

3. B — A forward camera finds lane markings by detecting contrast and edges between the darker road surface and the brighter painted lines. It does not use Doppler, ultrasonic echo, or magnetic fields. Optical contrast is what makes lane lines visible to the camera.

4. C — Forward collision warning alerts the driver to a potential impact but does not itself apply the brakes. AEB brakes, LKA steers, and BSW watches adjacent lanes. FCW is the warning-only forward feature.

5. C — Lane keeping or lane centering assist applies steering input to hold the vehicle within its lane. FCW only warns, ACC manages following distance, and BSW monitors adjacent lanes. Active steering is the defining LKA function.

6. D — Lidar measures distance using the travel time of emitted laser light pulses to a target and back. It does not use radio Doppler, ultrasonic echo, or capacitance. Laser time-of-flight is the lidar principle.

7. B — Blind spot warning uses rear corner radar to detect vehicles approaching from behind in adjacent lanes. ACC watches ahead, FCW warns of frontal impacts, and TSR reads signs. Rear-corner radar coverage is the BSW hallmark.

8. C — The composite vehicle Type 1 reference describes a standardized, manufacturer-neutral ADAS design used by many test questions. It is not a passing-score list, a production part catalog, or an answer key. Standardization lets ASE test reasoning fairly.

9. A — Higher-frequency radar such as 77 GHz offers finer resolution and more precise distance and angle measurement than lower bands. Frequency does not change ultrasonic echo time, windshield optics, or ride-height dependence. Better resolution is the key benefit.

10. D — The steering angle sensor in the steering column provides the steering position data that lane keeping and stability systems require. Wheel-speed, ultrasonic, and forward radar sensors serve other functions. Steering position comes from the steering angle sensor.

11. B — Traffic sign recognition relies on a forward camera optically reading and classifying posted signs. Rear radar, ultrasonic sensors, and wheel-speed sensors do not read signs. Optical recognition is the TSR mechanism.

12. C — A driver attention monitor uses an interior camera tracking the driver's gaze and eyelid movement. Forward radar, ultrasonic occupancy, and steering inputs are not the primary face-monitoring method. The inward camera watches the driver directly.

13. A — Sensor fusion combines inputs from multiple sensors so each one's weaknesses are compensated by another's strengths. It does not rely on a single sensor, average voltages, or replace the camera with ultrasonics. Complementary inputs improve reliability.

14. B — ACC maintains following distance using the forward radar sensor's range and closing-speed data. The driver-facing camera, rear radar, and bumper ultrasonics serve other roles. Forward radar is the core ACC sensor.

15. A — A visible-light forward camera depends on available scene lighting and is most limited by darkness without supplemental illumination. Radar, ultrasonic, and lidar emit their own energy and are far less light-dependent. The passive optical camera needs light.

16. A — ADAS modules commonly share data over a CAN digital bus on a shared twisted pair. Dedicated analog wires, Bluetooth, and cellular uplinks are not the standard in-vehicle architecture. CAN is the typical network.

17. C — AEB can autonomously apply the brakes to mitigate or avoid a collision, which distinguishes it from warning-only FCW. AEB is not merely a lamp, a rear-traffic detector, or a sign reader. Autonomous braking is the difference.

18. D — Ultrasonic parking performance is most commonly degraded by mud, ice, or debris covering the sensor face. Sunlight, Doppler shift, and windshield stickers affect other modalities. A blocked sensor face is the typical real-world issue.

19. C — In fusion ACC, the forward camera classifies and confirms objects and reads lane and sign data, complementing the radar's range/speed measurement. It does not measure Doppler, emit ultrasonics, or supply steering angle. Object confirmation is the camera's role.

20. B — Blind spot radar sensors are typically mounted within the rear bumper cover at each rear corner. They are not behind the windshield, in the steering column, or on the engine block. Rear-corner placement gives the needed coverage.

21. C — A windshield-mounted camera's aim reference shifts when its mounting glass is replaced, requiring recalibration. The swap does not change radar beam spread, raise ride height, or reset the steering zero-point. The disturbed camera reference is the reason.

22. D — Among the options, a radar sensor using radio-frequency energy is least affected by heavy fog or rain. Visible-light cameras, lidar, and optical driver cameras all degrade in poor visibility. Radar's RF penetration is its weather advantage.

23. C — Pedestrian AEB combines radar with a forward camera that visually recognizes the pedestrian's shape for classification. Ultrasonic, wheel-speed, and steering sensors do not classify pedestrians. The camera provides visual identification.

24. B — A small radar aim error can cause the sensor to track the wrong lane's traffic, so aim matters. Radar aim does affect ACC, radar does not scan all directions without a defined aim, and vertical aim also matters. Accurate aim is essential.

25. D — A surround-view system stitches the views from multiple cameras into one overhead perspective. It does not rotate a single camera, use ultrasonic mapping, or combine radar returns. Multi-camera stitching creates the bird's-eye image.

26. D — The gateway module routes and manages data traffic between different network segments. It does not supply calibration targets, aim radar, or generate ultrasonic pulses. Traffic routing is the gateway's core function.

27. C — Lane departure warning alerts the driver of lane drift without applying steering correction, unlike LKA which steers. LDW does not brake or monitor blind spots. Warning without intervention defines LDW.

28. D — Radar may detect both a stopped car and a roadside object but cannot always classify object type on its own, which is why camera fusion helps. Radar does measure relative speed, works while the host moves, and does not need sunlight. Classification is radar's weak point.

29. A — Automatic high-beam control uses a forward camera to detect oncoming and preceding vehicle lights and dim accordingly. Ultrasonic, rear radar, and steering sensors do not perform this. The camera senses other vehicles' lights.

30. B — Static calibration is performed with the vehicle stationary while targets are positioned to specification. It is not a road drive, an automatic self-calibration, or a battery-disconnect relearn. Stationary target-based setup defines static calibration.

31. A — Dynamic calibration has the vehicle driven under specified conditions so the sensors self-learn. It is not stationary target placement, manual value entry, or a no-calibration scenario. On-road learning defines dynamic calibration.

32. D — Rear cross-traffic alert uses the rear corner radar sensors scanning laterally behind the vehicle while backing out. The forward camera, interior camera, and front ultrasonics do not provide this. Rear-corner radar covers cross traffic.

33. B — Heavy ice, snow, or thick non-OEM paint over the sensor's path most directly reduces forward radar range by attenuating the signal. A clean emblem, correct tire pressure, and a charged battery support normal operation. Obstruction degrades radar range.

34. C — The thrust line is the direction the rear axle points relative to the vehicle centerline. It is not a radar beam, a towing rating, or the camera's optical axis. Thrust line describes rear-axle direction for aiming.

35. D — Radar's key advantage over a visible-light camera for ACC is measuring distance and closing speed well in darkness and rain. Radar does not read signs or lane markings better, nor classify objects more precisely than a camera. All-condition ranging is radar's strength.

36. A — Night vision for pedestrian detection commonly uses a thermal (infrared) imaging camera sensing heat signatures. Ultrasonic, rear radar, and steering sensors are not used for this. Thermal imaging detects body heat in darkness.

37. A — Certain alignments change the thrust angle, which shifts the sensor reference relative to vehicle travel, requiring recalibration. Alignment does not erase camera software, raise tire pressure to confuse radar, or demagnetize ultrasonics. The geometric shift is the reason.

38. B — A post-scan verifies all systems function and no new DTCs remain after the repair. It does not set the steering zero-point, aim radar, or generate ultrasonic pulses. Post-repair verification is its purpose.

39. D — Nighttime camera pedestrian detection is limited primarily by the reduced visible light available for the optical sensor. Doppler, ultrasonic timing, and radar override do not explain the limitation. Low light constrains the camera.

40. A — Adaptive headlights pivot with steering input to illuminate around curves. They do not read signs for brightness, detect blind spots, or measure following distance. Steering-responsive aiming defines the feature.

41. B — A forward radar aimed too far to one side may track an adjacent lane's vehicles or miss the lead car. It does not gain straight-ahead range, switch to ultrasonics, or improve classification. Horizontal misaim corrupts target tracking.

42. C — Multiple modules reporting "no communication" together points to a fault in a shared bus segment or the gateway routing their data. A single loose camera bracket, one covered radar, or a windshield sticker affect one system. A shared-network fault explains the pattern.

43. B — Low or angled objects can fall outside the ultrasonic detection field, a normal design limitation. Ultrasonic sensors do not detect all shapes equally, require darkness, or use Doppler. Field geometry limits detection of low objects.

44. D — OEM service information is authoritative because it specifies the exact geometry and conditions validated for that vehicle. It is not chosen for speed, nor does it waive ride-height, tire, or road-test steps. Validated specificity makes it definitive.

45. C — A radar's field of view is the angular region within which it can detect and track targets. It is not the camera image area, a voltage range, or a message set. Angular coverage defines field of view.

46. A — The appropriate first step for an illuminated ADAS lamp is to scan for stored DTCs and identify the affected system. Replacing parts, clearing codes blindly, or forcing a relearn skip diagnosis. Retrieving codes guides the repair.

47. B — A battery support unit maintains stable system voltage so modules do not reset during calibration. It does not extend radar range, aim the camera, or generate ultrasonic pulses. Voltage stability is its purpose.

48. B — A radar sensor emits and analyzes reflected radio-frequency energy to measure angle and range to multiple targets. Cameras use light, ultrasonics use sound, and thermal cameras sense heat. Radio waves are the radar's medium.

49. D — Ride height changes sensor pitch, affecting both radar and camera aim. It is not limited to the camera, irrelevant, or unique to ultrasonics. Pitch change from ride height affects multiple sensors.

50. C — The single best confirmation of a successful ADAS repair and calibration is a post-scan plus a functional road test confirming correct operation. A dark lamp, a one-time "complete" status, or cleared codes alone do not prove real-world function. Functional verification validates the repair.