ITE 1 Practice Exam — CA-1 (Applied Vignettes)

All 50 questions are clinical-application stems testing the same core facts as the recall version. Answer key follows the questions.

Questions

1. You are transferring a patient from the PACU to the floor on 6 L/min nasal O2. The attached E-cylinder gauge reads 1200 psi. Approximately how long until the cylinder is empty?
A. ~200 minutes
B. ~66 minutes
C. ~30 minutes
D. ~130 minutes

2. You anesthetize a patient at a facility in Denver (barometric pressure 630 mmHg) using a standard variable-bypass isoflurane vaporizer. Which statement is correct?
A. The vaporizer cannot function at altitude and must be recalibrated
B. Delivered vol% will be lower than the dial setting; anesthesia will be lighter than expected
C. Delivered vol% will be higher than the dial setting, but the anesthetic partial pressure (and clinical depth) will be roughly the same
D. Isoflurane's saturated vapor pressure falls at altitude

3. A colleague suggests pouring desflurane into an empty isoflurane variable-bypass vaporizer to save time. You refuse because:
A. Desflurane is not detectable by agent analyzers outside its own vaporizer
B. Desflurane's saturated vapor pressure (~669 mmHg at 20°C) is nearly atmospheric, so a conventional vaporizer would deliver erratic, dangerously high concentrations
C. Desflurane corrodes the isoflurane vaporizer's metal components
D. The agents have different colors and would be indistinguishable

4. Twenty minutes into a case, inspired CO2 rises and the capnograph loses its normal alveolar plateau shape. You trace the problem to a unidirectional valve. Which valve is stuck and what does it cause?
A. Inspiratory valve stuck closed → loss of tidal volume
B. Inspiratory valve stuck open → dilution of inspired gas
C. Expiratory valve stuck → rebreathing of exhaled CO2
D. APL valve stuck → barotrauma

5. Five minutes after induction, the capnograph suddenly goes completely flat. The ventilator bellows still move, airway pressures are unchanged, and SpO2 is 96% and falling slowly. Most likely cause?
A. Circuit disconnection at the sampling line / gas sampling failure
B. Pulmonary embolism
C. Malignant hyperthermia
D. Endobronchial intubation

6. A 65-year-old with severe COPD is under general anesthesia. Intraoperatively the capnograph develops a slurred, prolonged upslope ('shark fin'). Most consistent diagnosis?
A. Pulmonary embolism
B. Circuit leak
C. Hyperventilation
D. Bronchospasm

7. A trauma patient with a small residual apical pneumothorax (chest tube in place) undergoes laparoscopy. The surgeon asks why you refuse nitrous oxide. Your answer:
A. N2O is 35× more soluble than nitrogen and diffuses into the pleural space faster than N2 leaves, expanding the pneumothorax
B. N2O increases pulmonary vascular resistance and worsens hypoxemia
C. N2O inactivates the chest tube's suction mechanism
D. N2O reduces the effectiveness of positive-pressure ventilation

8. A half-used oxygen E-cylinder reading 1000 psi sits on a 0°C loading dock, then is wheeled into a 20°C OR. What happens to the pressure?
A. It falls proportionally to temperature
B. It rises ~7%, proportional to the change in absolute temperature
C. It doubles
D. It stays exactly 1000 psi

9. A healthy 30-year-old for elective laparoscopic cholecystectomy at 10:00 drank a latte (whole milk) at 06:00. She says 'coffee is a clear liquid, right?' You respond:
A. Proceed but use rapid sequence induction
B. Proceed with a prokinetic agent only
C. Milk is not a clear liquid; treat as a light meal — she is not compliant with a 10:00 start and the case should be delayed
D. Correct — proceed; dairy clears in 2 hours

10. A 70-year-old in septic shock from a perforated bowel (BP 85/50 on norepinephrine) needs emergency RSI. Which induction agent best preserves hemodynamics?
A. Thiopental 4 mg/kg
B. Propofol 2 mg/kg
C. Ketamine 1.5 mg/kg
D. Midazolam 0.3 mg/kg alone

11. A 55-year-old with severe aortic stenosis needs urgent intubation for a hip fracture. You choose the agent least likely to drop blood pressure. Which side effect should you anticipate and mention to your attending?
A. Severe pain on injection leading to movement
B. Prolonged apnea
C. Histamine release and hypotension
D. Transient adrenocortical suppression and myoclonus

12. A patient paraplegic from a motor vehicle collision 3 weeks ago needs rapid sequence intubation for emergency surgery. Appropriate neuromuscular plan?
A. Succinylcholine 1.5 mg/kg — fast onset
B. Succinylcholine with pre-treatment defasciculating dose
C. Pancuronium with neostigmine reversal
D. Rocuronium 1.2 mg/kg — avoid succinylcholine

13. During an outpatient case aborted before incision, the patient received rocuronium 0.8 mg/kg with TOF 0/4. You need full reversal within 2 minutes for extubation. Best choice?
A. Neostigmine 5 mg with glycopyrrolate
B. Wait for spontaneous recovery — nothing else works
C. Sugammadex 16 mg/kg
D. Edrophonium bolus

14. After neostigmine reversal at case end, the patient's heart rate falls from 80 to 38. What should have been co-administered, and why did this happen?
A. Glycopyrrolate — neostigmine increases ACh at muscarinic as well as nicotinic receptors
B. Ephedrine — neostigmine causes vasodilation
C. Atropine was unnecessary; this is normal — observe
D. Calcium chloride — neostigmine causes hypocalcemic bradycardia

15. A craniotomy is planned with profound opioid coverage intraoperatively and rapid neurologic wake-up at the end, expected to run 4+ hours. Which opioid best fits?
A. Remifentanil infusion — context-sensitive half-time ~3–4 min regardless of duration
B. Morphine infusion — reliable titration
C. Hydromorphone boluses — long acting
D. Fentanyl infusion — short half-life

16. For a wide-awake local anesthesia no-tourniquet (WALANT) carpal tunnel release in a 70-kg patient using plain 1% lidocaine, the maximum you can inject is approximately:
A. 50 mL (500 mg)
B. 20 mL (200 mg)
C. 10 mL (100 mg)
D. 31 mL (315 mg)

17. Midway through an axillary block injection, the patient reports tingling lips and ringing in the ears and appears agitated. Immediate correct response?
A. Switch to a different local anesthetic and finish
B. Stop injecting, call for help/lipid emulsion, prepare to treat seizure or cardiovascular collapse
C. Give midazolam 5 mg and continue the block faster
D. Reassure — these are expected vasovagal prodrome symptoms; continue injecting

18. A patient seizes then becomes hypotensive and bradycardic 20 minutes after a bupivacaine block. Best treatment?
A. 20% lipid emulsion 1.5 mL/kg bolus over 1 min, then 0.25 mL/kg/min
B. Amiodarone 300 mg for the arrhythmia
C. Propofol infusion to suppress seizures
D. Epinephrine 1 mg IV bolus for the hypotension

19. You need a peripheral nerve block working within 10 minutes for an urgent incision. Which property of your chosen agent matters most, and which agent fits?
A. Lipid solubility — etidocaine
B. pKa closest to physiologic pH — lidocaine (pKa 7.9), most unionized at pH 7.4, fastest onset
C. Protein binding — bupivacaine (most bound, fastest)
D. Molecular weight — chloroprocaine

20. A patient arrests after inadvertent intravascular bupivacaine injection; ventricular arrhythmias are refractory despite standard ACLS. Why is bupivacaine cardiac arrest so difficult to resuscitate?
A. It causes sustained coronary vasospasm
B. It directly destroys myocytes
C. It causes irreversible AV node ablation
D. It binds cardiac Na channels avidly and dissociates very slowly ('fast-in, slow-out'), so each beat worsens blockade

21. A 92-year-old received midazolam and fentanyl premedication. Compared with a healthy 30-year-old, the alveolar sevoflurane concentration needed for surgical anesthesia is:
A. Higher — age increases MAC
B. Unpredictable without BIS monitoring
C. Unchanged — MAC is a fixed property of the agent
D. Lower — both age and premedication decrease MAC

22. An ASA-1 patient keeps moving despite 1.2 MAC sevoflurane; she later admits using amphetamines daily. Explanation?
A. Amphetamines acutely deplete catecholamines and lower MAC
B. Chronic stimulant use increases MAC — more volatile (or adjuvant) is required
C. Amphetamines raise her blood-gas partition coefficient
D. Tolerance makes volatile agents entirely ineffective

23. An 8-year-old in near-fatal status asthmaticus with wheezing and air-trapping needs emergent intubation. Best induction agent?
A. Propofol — smooth onset
B. Etomidate — hemodynamic stability only
C. Thiopental — reliable depth
D. Ketamine — bronchodilation with maintained pressures

24. For an awake fiberoptic intubation in a patient with a difficult airway, you choose dexmedetomidine for sedation. You accept which limitation?
A. Unreliable amnesia — patients may recall the procedure
B. Severe hypertension during infusion
C. Complete loss of spontaneous ventilation
D. Profound respiratory depression requiring apneic technique

25. A patient found unresponsive after an opioid overdose: room-air ABG shows PaO2 55, PaCO2 65, pH 7.22. The cause of hypoxemia is:
A. V/Q mismatch from aspiration
B. Low inspired FiO2
C. Shunt from atelectasis
D. Hypoventilation — the elevated PaCO2 means a normal A-a gradient explains the low PaO2

26. During anesthesia a patient is hyperventilated to PaCO2 22 (respiratory alkalosis). Effect on the oxyhemoglobin dissociation curve and tissue oxygen delivery?
A. No change — PaCO2 does not affect hemoglobin affinity
B. Left shift with decreased P50 — O2 binds tighter and unloads less readily at the tissues
C. Right shift — enhanced unloading
D. Curve becomes biphasic

27. A marathon runner arrives in mild lactic acidosis (pH 7.30). Which lab or physiologic change accompanies the shift that favors tissue oxygen unloading?
A. Left-shifted curve
B. Increased hemoglobin affinity
C. Increased P50
D. Decreased P50

28. A patient on high PEEP (20 cmH2O) with low pulmonary artery pressure develops lung regions where alveolar pressure exceeds both arterial and venous pressures. These regions correspond to which West zone, and what is their flow?
A. Zone 1 — no flow (alveolar dead space)
B. Zone 2 — moderate flow
C. Zone 3 — maximal flow
D. Zone 4 — edematous flow

29. After switching a patient to a longer breathing circuit with greater internal volume, PaCO2 climbs despite unchanged minute ventilation. Mechanism?
A. Increased circuit resistance causing hypoventilation
B. Rebreathing from a failed absorber only
C. CO2 absorption by the circuit tubing
D. Increased equipment dead space — part of each tidal volume never reaches the alveoli

30. A 72-year-old obese smoker under general anesthesia supine has SpO2 drifting downward despite 100% FiO2 and normal PaCO2. Most likely mechanism?
A. Pulmonary embolism
B. Closing volume exceeding FRC — airways close during tidal breathing, creating shunt-like low-V/Q units
C. Hypoventilation
D. Diffusion limitation

31. A hypotensive ICU patient with CVP 2 increases stroke volume markedly with a 500 mL bolus. Later, with CVP 18, another bolus produces no change. Explanation?
A. CVP correlates inversely with stroke volume
B. The fluid was the wrong type
C. On the flat portion of the Frank-Starling (length-tension) curve, additional preload cannot increase stroke volume
D. The heart has failed — no bolus can help after failure

32. During strabismus surgery, heart rate drops to 38 when the surgeon pulls on a rectus muscle. First response and underlying reflex?
A. Deflate the endotracheal cuff — cuff stimulation triggers the reflex
B. Ask the surgeon to stop traction (remove stimulus); reflex is V1 afferent → vagus efferent; give an anticholinergic if it persists
C. Give epinephrine immediately — trigeminovagal reflex
D. Increase anesthetic depth — light anesthesia is the cause

33. After a spinal anesthetic, a patient's sensory level is T2 with BP 70/40 and HR 45. The best explanation for the bradycardia?
A. Bezold-Jarisch reflex triggered by decreased venous return alone
B. Local anesthetic directly depresses the SA node
C. A high spinal always causes fixed tachycardia
D. Sympathetic cardioaccelerator fibers (T1–T4) are blocked, leaving unopposed vagal tone

34. A patient with Hb 5 g/dL on 100% O2 has PaO2 400 mmHg. Despite the high PaO2, total arterial oxygen content remains critically low because:
A. Alveolar-capillary membrane failure
B. High PaO2 denatures hemoglobin
C. Dissolved oxygen (0.003 × PaO2) contributes only ~1.2 mL/dL — content depends overwhelmingly on Hb-bound O2 (1.34 × Hb × SaO2)
D. Pulse oximetry overestimates saturation in anemia

35. A smoke-inhalation victim has SpO2 100%, PaO2 90 on room air, and cherry-red skin. Why is the pulse oximeter unreliable and what should you order?
A. Order a standard ABG only — it directly measures carboxyhemoglobin
B. CO raises tissue perfusion — the reading is accurate
C. CO-Hb absorbs light at 660/940 nm nearly identically to O2Hb, so SpO2 reads falsely high — order co-oximetry
D. Probe misplacement — reposition and remeasure

36. After benzocaine spray for awake intubation, SpO2 reads 85% and does not improve on 100% O2; blood looks chocolate-brown. Diagnosis and treatment?
A. Methemoglobinemia — methylene blue 1–2 mg/kg IV
B. Severe hypoxemia — increase PEEP
C. Cyanide toxicity — hydroxocobalamin
D. Carbon monoxide poisoning — hyperbaric oxygen

37. You measure NIBP on a morbidly obese arm using a standard-width cuff. The reading compared with a correctly sized cuff will be:
A. Falsely high
B. Falsely low
C. Unmeasurable
D. Accurate — width does not matter

38. An arterial line shows a slurred upstroke, absent dicrotic notch, and the fast-flush test returns slowly without oscillation. Consequence for interpretation?
A. Mean pressure is unaffected but diastolic is overestimated
B. Overdamped (air bubble, clot, kink, excess tubing) — systolic pressure underestimated
C. Underdamped (catheter whip) — systolic pressure overestimated
D. Normal — transducer calibration issue only

39. A post-CABG patient with a temporary ventricular pacing wire shows intermittent giant 'a' waves on the CVP tracing. Mechanism?
A. Atrial fibrillation with lost a waves
B. Cardiac tamponade equalizing diastolic pressures
C. Atrial contraction against a closed tricuspid valve — AV dissociation from ventricular pacing
D. Tricuspid regurgitation generating large v waves

40. With a PA catheter balloon inflated in a branch pulmonary artery, the wedge tracing approximates which pressure, and why?
A. Right atrial pressure — the balloon occludes venous return
B. LV end-diastolic pressure measured directly
C. Pulmonary artery systolic pressure — balloon traps systolic waves
D. Left atrial pressure — a static column of blood connects the occluded PA branch to the pulmonary veins

41. A 14-year-old under sevoflurane with succinylcholine develops temp 39.8°C, EtCO2 75, HR 150, and masseter rigidity. The FIRST drug you should push?
A. Acetaminophen 15 mg/kg PR
B. Procainamide for the tachycardia
C. Dantrolene 2.5 mg/kg IV, repeated until signs abate
D. Sodium bicarbonate 1 mEq/kg

42. During an evolving MH crisis, which action is CONTRAINDICATED?
A. Hyperventilating with 100% O2 at high flow
B. Treating the tachyarrhythmia with verapamil
C. Giving dantrolene 2.5 mg/kg and repeating
D. Cooling the patient once temperature exceeds 39°C

43. Ten minutes after cefazolin, a patient becomes hypotensive (BP 60/30) and bronchospastic with urticaria. FIRST-line drug?
A. Epinephrine — titrated IV boluses (10–100 mcg) or IM 0.3–0.5 mg, plus fluids and stopping the drug
B. Diphenhydramine 50 mg IV
C. Hydrocortisone 200 mg IV
D. Albuterol nebulizer alone

44. A pre-eclamptic patient on a magnesium infusion has absent deep tendon reflexes and RR 8. Next step?
A. Increase the magnesium infusion — seizure prophylaxis is inadequate
B. Give dantrolene
C. Stop the magnesium infusion and give calcium gluconate 1 g IV; prepare to support ventilation
D. Give labetalol for her blood pressure

45. A 28-week pregnant patient becomes hypotensive (BP 78/45, HR 110) while supine at the start of a laparotomy. First action?
A. Tilt the table left / manually displace the uterus to relieve aortocaval compression
B. Give a fluid bolus first
C. Convert to general anesthesia
D. Give ephedrine 10 mg IV

46. You are intubating a 4-year-old for tonsillectomy and plan an uncuffed tube (per your practice). Correct size?
A. 5.0 mm (4 + age/4)
B. 6.5 mm
C. 7.0 mm
D. 3.5 mm

47. A pulseless 2-year-old (10 kg) in asystole needs IV epinephrine. Correct dose?
A. 1 mg (adult dose)
B. 0.01 mg/kg q15 min only
C. 1 mcg/kg (10 mcg)
D. 10 mcg/kg = 0.1 mg

48. During RSI for a full-stomach emergency, your assistant presses on the cricoid cartilage before you ask. What is this maneuver doing?
A. Preventing tracheal collapse
B. Occluding the esophagus to reduce passive regurgitation (evidence debated — apply gently, release only on your instruction)
C. Improving the laryngoscopic view
D. Relaxing the lower esophageal sphincter

49. After three laryngoscopy attempts, a patient for an elective non-urgent case cannot be intubated, but mask ventilation is adequate. Per the ASA difficult airway algorithm, best next step?
A. Awaken the patient (or use a supraglottic airway as a bridge), given adequate ventilation and elective status
B. Proceed with mask anesthesia for the entire case
C. Immediate surgical airway
D. Attempt again with the same blade — fourth time is common

50. A patient with T2DM on metformin (eGFR 55, no recent contrast) asks what to do about the medication before elective surgery tomorrow. You advise:
A. Stop metformin permanently and start insulin bridging
B. Take metformin on the day of surgery as usual — single-dose risk is negligible absent renal impairment or recent contrast
C. Hold metformin for 72 hours before and after surgery
D. Take a double dose the night before

Answer Key & Explanations

1. B — 1200 psi × 0.33 ≈ 396 L; 396 L ÷ 6 L/min ≈ 66 min. Always do this math before transport.

2. **C** — Variable-bypass vaporizers deliver a higher vol% at altitude, but the partial pressure delivered (what drives anesthetic effect) is roughly preserved — clinical depth similar.

3. **B** — Desflurane boils near room temperature; its near-atmospheric SVP makes ordinary variable-bypass control impossible — hence the heated, pressurized, temperature-compensated vaporizer.

4. **C** — A stuck expiratory valve lets exhaled CO_2-rich gas rejoin the inspired limb → rebreathing, elevated inspired CO_2, distorted waveform.

5. **A** — Ventilator mechanics intact + flat capnograph = sampling/disconnection problem, not the lungs. PE would show an abrupt but not zero $EtCO_2$ with hemodynamic change.

6. **D** — Expiratory obstruction (bronchospasm, kink) slows emptying → prolonged upslope. Auscultate for wheeze; treat with bronchodilators, deepen anesthesia.

7. **A** — The blood/gas solubility difference between N_2O and N_2 drives net gas transfer into any air-filled compliant space — pneumothorax, bowel obstruction, middle ear, intraocular bubble.

8. **B** — Gay-Lussac: $P \propto$ absolute T. 273 K → 293 K is a ~7% rise. (Boyle is P-V; this is P-T.)

9. **C** — Clear liquids = water, pulp-free juice, black coffee/tea. Milk has fat and gastric-emptying kinetics of a solid/meal → 6-hour rule → delay.

10. **C** — Ketamine's sympathomimetic effect maintains SVR/BP; propofol and thiopental cause vasodilation. (Caveat: in catecholamine-depleted myocardium even ketamine can drop BP — have vasopressors drawn up.)

11. **D** — Etomidate is the hemodynamically stable choice in critical AS; trade-offs are 11β-hydroxylase inhibition (transient adrenal suppression) and myoclonus.

12. **D** — Denervation upregulates extrajunctional ACh receptors (peaks 48 h – months after injury) → succinylcholine causes life-threatening hyperkalemia. Use a high-dose aminosteroid NDMB.

13. **C** — Deep rocuronium block reverses only with sugammadex (encapsulating γ-cyclodextrin); neostigmine is ineffective at TOF 0/4 and too slow here.

14. **A** — Cholinesterase inhibition raises ACh everywhere: nicotinic (reversal) AND muscarinic (bradycardia, salivation, GI motility). Pair with glycopyrrolate or atropine.

15. **A** — Remifentanil is hydrolyzed by nonspecific plasma/tissue esterases; its context-sensitive half-time does not grow with infusion duration. Plan for postop analgesia before it wears off.

16. **D** — Plain lidocaine 4–5 mg/kg → ~315 mg → ~31 mL of 1%. With epinephrine ~7 mg/kg; newer ASRA data support more, but classic testing uses 4.5/7.

17. **B** — Perioral numbness, tinnitus, agitation = LAST prodrome. Stop injection immediately; seizure/cardiovascular collapse can follow within minutes.

18. **A** — Lipid emulsion is first-line for LAST. Avoid large epinephrine boluses (>1 mcg/kg) and vasopressin (worsen recovery); propofol is not a substitute.

19. **B** — Lower pKa near 7.4 → greater unionized fraction at tissue pH → faster membrane penetration and onset. Bupivacaine (pKa 8.1) is slower despite its potency.

20. **D** — Bupivacaine's cardiolipin binding and slow Na-channel unbinding make cardiotoxicity outlast the seizure phase — the rationale for lipid emulsion and prolonged resuscitation. Ropivacaine/levobupivacaine are safer.

21. **D** — MAC falls ~6% per decade after 40 and with opioids/benzodiazepines. Expect roughly half the young-adult requirement.

22. **B** — Chronic amphetamine/cocaine use increases MAC (acute intoxication lowers it). Also raises MAC: hyperthermia, chronic alcohol, red hair.

23. **D** — Ketamine produces bronchodilation (sympathetic + direct relaxation); give an antisialagogue. Propofol is acceptable if hemodynamics allow but ketamine is the classic asthmatic answer.

24. **A** — α2-agonist sedation preserves respiration and provides analgesia, but amnesia is poor — add small midazolam doses if recall matters; watch for bradycardia/hypotension.

25. **D** — When PaCO2 is elevated, hypoventilation alone accounts for hypoxemia (normal A-a gradient). Distinguish from V/Q/shunt, which show elevated A-a.

26. **B** — Alkalosis and hypocapnia shift the curve left ($\downarrow$P50): loading in lungs is easier but unloading at tissues is impaired — a real concern with aggressive hyperventilation.

27. **C** — Acidosis right-shifts the curve (Bohr effect) = $\uparrow$P50 = $\downarrow$affinity = easier unloading. Same direction: hyperthermia, $\uparrow$2,3-DPG, altitude.

28. **A** — Zone 1 (PA > Ppa > Ppv) has no perfusion $\rightarrow$ ventilated but unperfused alveoli = alveolar dead space; high PEEP or low cardiac output recruits it.

29. **D** — Dead space (anatomic ~2 mL/kg + equipment) must be cleared each breath; enlarging it means a bigger fraction of VT is wasted on CO2-free gas $\rightarrow$ PaCO2 rises unless VT increases.

30. **B** — Age, obesity, smoking, and supine GA positioning all raise closing volume; when it exceeds FRC, tidal breaths repeatedly close airways $\rightarrow$ hypoxemia refractory to CO2 control.

31. **C** — Frank-Starling: $\uparrow$preload $\rightarrow$ $\uparrow$SV only until the plateau. Past that point, extra volume raises wall stress and oxygen demand without raising SV.

32. **B** — Oculocardiac reflex: ophthalmic division of V afferent $\rightarrow$ ciliary ganglion $\rightarrow$ vagus efferent. Removing the stimulus is first; atropine/glycopyrrolate second.

33. **D** — Block above T4 knocks out cardiac sympathetic accelerators; unopposed vagus $\rightarrow$ bradycardia. Treat with ephedrine/epinephrine ± atropine; support BP with vasopressor + fluids.

34. **C** — $CaO_2 = (1.34 \times Hb \times SaO_2) + (0.003 \times PaO_2)$. At Hb 5 the bound component is ~6.7 mL/dL; dissolved O2 adds little — treat with transfusion, not higher FiO2.

35. **C** — Conventional pulse oximetry cannot distinguish CO-Hb from O2Hb; standard ABG PaO2 measures dissolved gas, not CO-Hb. Co-oximetry is required; treat with 100% O2 (± hyperbaric).

36. **A** — Benzocaine/prilocaine/sulfonamides oxidize Hb $\rightarrow$ Met-Hb absorbs both pulse-ox wavelengths equally $\rightarrow$ fixed ~85% reading. Methylene blue restores the Fe^{3+} to Fe^{2+}.

37. **A** — Cuff width should be ~40% of limb circumference. Too narrow (common in obesity) → overestimation; too wide → slight underestimation.

38. **B** — Overdamping blunts systolic and elevates diastolic slightly (mean preserved); check for air/clot, kinks, excess tubing length. Fast-flush: overdamped = slurred return, underdamped = multiple oscillations.

39. **C** — Cannon a waves = right atrium contracts against a closed tricuspid valve (junctional rhythm, AV block, ventricular pacing). AF abolishes a waves; TR gives giant v waves.

40. **D** — PCWP ≈ LA pressure (normal 8–12 mmHg), because flow has stopped and the column equilibrates back to the left atrium. Ventricularized wedge suggests malposition.

41. **C** — Dantrolene 2.5 mg/kg IV is first-line, repeat until rigidity/hypercarbia resolve (often 10+ mg/kg). Simultaneously: stop triggers, 100% O2 high flow, cool, treat hyperkalemia.

42. **B** — Calcium channel blockers + dantrolene → severe hyperkalemia/collapse. Other MH steps: stop triggers, call MHAUS (1-800-644-9737), treat hyperkalemia with CaCl2/insulin-D50, monitor for arrhythmia and recrudescence.

43. **A** — Anaphylaxis: remove trigger, epinephrine first (IM for intact circulation; IV titrated when anesthetized), aggressive fluids. Antihistamines/steroids are adjuncts, never first-line.

44. **C** — Mg toxicity sequence: DTR loss → respiratory depression → cardiac arrest. Antidote is calcium gluconate. MgSO4 is an anticonvulsant, not an antihypertensive, and potentiates NDMBs.

45. **A** — Supine aortocaval compression by the gravid uterus cuts venous return; left uterine displacement is first (vasopressor/fluids as needed after).

46. **A** — Uncuffed ETT = 4 + age/4 → 5.0 mm at age 4; cuffed = 3.5 + age/4 → 4.5–5.0. Have half-sizes above and below ready.

47. **D** — Pediatric arrest epinephrine: 0.01 mg/kg = 10 mcg/kg (max 1 mg) IV/IO q3–5 min → 0.1 mg for a 10-kg child.

48. **B** — Sellick maneuver compresses the esophagus against the vertebral body to limit passive regurgitation. Evidence is contested; know both intent and controversy for boards.

49. **A** — Can-ventilate + can't-intubate + elective → wake the patient or place an LMA. Surgical airway is reserved for cannot-ventilate-cannot-intubate emergencies.

50. **B** — Current guidance: metformin may be continued day-of-surgery when renal function is adequate (no recent contrast, eGFR acceptable); blanket 48–72 h holds are outdated. Follow institutional policy.