2027 ACVAA CERTIFYING EXAMINATION BLUEPRINT

Appendix K: Test Specifications from JTA

CONTENT WEIGHTING AT A GLANCE

The table below shows the approximate percentage of exam questions drawn from each content domain.

Domain		Weight
I.	Anatomy	7%
II.	Euthanasia	2%
III.	Pharmacology	17%
IV.	Physics	5%
V.	Physiology/Pathophysiology	18%
VI.	Research and Ethics	2%
VII.	Public Safety and Regulations	2%
VIII.	Case Management	22%
IX.	CPR	3%
X.	Equipment	10%
XI.	Monitoring	12%
Total		**100%**

DETAILED TEST SPECIFICATIONS

Outline of subject areas and representative examples within each content domain; examples illustrate scope but do not reflect the full range or depth of content that may appear on the examination.

I. Anatomy 7% of exam

A. Mammalian anatomy

1. anatomy relevant to anesthesia/analgesia techniques (e.g., respiratory, CV, epidural, musculoskeletal, neural, specific nerve blocks, unique features with respect to species)
2. anatomy of systems relevant to anesthesia/analgesia case management (e.g., comparative with respect to CV, respiratory, basic neural, renal, hepatic, gastrointestinal anatomy, blood flow patterns to brain)

B. Non-Mammalian anatomy (e.g., reptile, avian, fish)

1. basic (CV/respiratory) and unique comparative anatomy relevant to anesthesia/analgesia management (e.g., neurological, gastro)

II. Euthanasia 2% of exam

1. ethical considerations regarding euthanasia
2. euthanasia techniques across species (e.g., AVMA guidelines)

III. Pharmacology 17% of exam

A. Premedication Pharmacology (e.g., properties, mechanism of action, dynamics, kinetics, effects, side effects, admin, interactions, toxicity/antagonists)

1. phenothiazines/ butyrophenones
2. alpha-2 agonists
3. benzodiazepines

B. Injectable Pharmacology (e.g., properties, mechanism of action, dynamics, kinetics, effects, side effects, admin, interactions, toxicity)

1. barbiturates
2. dissociatives
3. propofol
4. neurosteroid anesthetics (e.g., alfaxalone)
5. etomidate

C. Inhalant Pharmacology (e.g., properties, mechanism of action, dynamics, kinetics, effects, side effects, admin, interactions, toxicity)

1. inhalation anesthetics (e.g., isoflurane, desflurane, sevoflurane)

D. Analgesic Pharmacology (e.g., properties, mechanism of action, dynamics, kinetics, effects, side effects, admin, interactions, toxicity/antagonists)

1. opiates and opioids
2. ultra-potent opioids
3. nonsteroidal anti-inflammatory drugs (including grapiprant and acetaminophen)
4. ancillary analgesics (e.g., Amantadine, CBD)

E. CV Drug Pharmacology (e.g., mechanism of action, effects, side effects, interactions, toxicity)

1. anticholinergics
2. antiarrhythmic drugs
3. inotropic drugs
4. vasopressors
5. antihypertensives

F. Local anesthetic Pharmacology (e.g. classification, mechanism of action, dynamics, kinetics, effects, side effects, admin, interactions, toxicity and treatment, additives)

1. local anesthetics

G. Miscellaneous Drug Pharmacology

1. gastrointestinal drugs (e.g., antiemetics, protectants)
2. ancillary drugs (e.g., corticosteroids, antibiotics, antihistamines, respiratory stimulants, diuretics, bronchodilators, insulin, anticonvulsants, mannitol, monoclonal antibodies, biologics, electrolytes)

3. behavioral modifying drugs (e.g., Amitriptyline, Trazodone, Reserpine, Gabapentin, SSR Inhibitors, Pregabalin)

H. Muscle Relaxant Pharmacology

1. neuromuscular blocking drugs, including reversal agents
2. other muscle relaxants (e.g., guaifenesin, dantrolene, methocarbamol)

J. Blood/ Colloid and Crystalloids Pharmacology (e.g., mechanism of action, kinetics, effects, side effects anticoagulants)

1. fluid types (e.g., synthetic colloids, blood products, crystalloid) and compartments

K. Drug interactions/Toxicology

1. drug interactions
2. drug toxicity (e.g. recognition, treatment, dose)

L. Pharmacodynamic/Kinetic Principles

1. principles of pharmacology (e.g., pharmacokinetics, pharmacodynamics, pharmacogenetics, receptor physiology, elimination, calculation of loading dose and infusion rate)

IV. Physics 5% of exam

A. Gas Properties

1. properties of gases (e.g., gas laws, solubilities)

B. Gas/Fluid Dynamics

1. fluid dynamics (e.g., laminar vs turbulent, Poiseuille's law, Starling's forces, Bernoulli equation)

C. Other Physics

1. electricity (e.g., Ohm's law, Coulomb's law)
2. temperature (e.g., specific heat, latent heat)

D. Application

1. application of physics with regard to equipment, physiology, and unit conversion (e.g., temperature, pressure, volume, weight, concentration, doppler, ultrasound)

V. Physiology/Pathophysiology 18% of exam

A. Acid-base/Electrolyte Physiology

1. Normal acid-base and electrolyte values
2. Henderson-Hasselbalch equation
3. acid-base balance interpretation (e.g., traditional, stewart, and semi-quantitative approaches)
4. acid-base compensation equations
5. pH influence on electrolyte concentration

B. Blood Physiology

1. blood types for core species
2. basic coagulation physiology
3. osmolarity
4. O2 and CO2 transport

C. Cardiovascular Physiology/ Pathophysiology

1. cardiovascular Physiology and Pathophysiology (e.g., Action potential, reflexes, impact of changes in O2/CO2, Vascular system, Sympathetic/parasympathetic impact)
2. concerns related to cardiac conditions/procedures

D. Endocrine Physiology/ Pathophysiology

1. endocrine physiology and pathophysiology (e.g., pathways and abnormalities , basic understanding of drugs associated with stabilization)

E. Hepatic Physiology/ Pathophysiology

1. hepatic physiology and pathophysiology (e.g., regulation of perfusion, concept of shunt, basic functions including metabolism)

F. Neurologic Physiology/ Pathophysiology

1. neurological physiology (central, peripheral) and pathophysiology (e.g., Related terminology/formulae, Neurotransmission, receptors, channels, BBB, Control of ICP, CBF, Reflexes)

G. Nociceptive Physiology

1. physiology of nociception (e.g., Nociceptive pathway, 5 steps, receptors, nerve fibers, peripheral and central nerve pathways, pain versus nociception, classification, sensitization, gate theory)

H. Renal Physiology/ Pathophysiology

1. renal physiology and pathophysiology (e.g., control of renal blood flow, GFR, renal portal system, prerenal, renal, postrenal disease)

I. Respiratory Physiology/ Pathophysiology

1. respiratory physiology and pathophysiology (e.g., alveolar gas equation, oxyHb dissociation curve, Control of ventilation, gas exchange/transport, V/Q relationships, shunting)

J. Other Physiology/ Pathophysiology

1. ancillary system physiology and pathophysiology (e.g., skin, musculoskeletal, gastrointestinal, reproductive)
2. inflammatory cascade (e.g., SIRS, sepsis)

VI. Research and Ethics 2% of exam

1. research methodology (e.g., design, collect, analyze, interpret, disseminate, evaluate and review, consult)
2. ethical/legal/economic considerations (e.g., with regard to teaching, research, clinical practice, anesthetic documentation)

VII. Public Safety and Regulations 2% of exam

A. Drug Regulations

1. animal drug residues
2. controlled substances management (e.g., DEA)

B. Anesthetic Equipment

1. management of inhaled gas exposure
2. infection control (e.g., equipment cleaning protocols, aseptic techniques, personal protective equipment)

C. Reporting

1. animal welfare and pharmacovigilance

D. Personnel

1. animal, staff, and personal safety consideration (e.g., animal hazards, safe drug handling, fire, radiation, compressed gases, magnetic fields, biohazards, drug misuse)

VIII. Case Management 22% of exam

A. Patient Assessment and Preparation

1. pertinent animal medical history (e.g., anesthetic history, medications and fasting status, husbandry, co-morbidity, rut)
2. physical exam (e.g., mm, CRT, pulse quality, hydration, heart rate and rhythm, respiratory rate and character, temperature, body weight)
3. considerations/recommendations for withholding food and water and pre-visit pharmaceuticals

B. Anesthetic Risk

1. animal status classifications (e.g., ASA) including limitations
2. disease/ procedural/ species factors that influence anesthetic risk
3. effect of individual signalment on anesthetic plans (e.g., age, weight, reproductive status, breed, body condition)

C. Handling/Restraint and Drug Admin Techniques

1. comparative normal animal behavior
2. situational factors impacting anesthesia (e.g., location, environmental factors, cost considerations, drug availability, equipment availability, personnel training)
3. safe animal handling techniques (e.g., manual, mechanical, or chemical restraint)
4. administration techniques for various species (e.g., drug combinations, remote delivery, IV, IO, TIVA)

D. Intubation Techniques/Management

1. basic and advanced intubation techniques (e.g., blind, manual, visual, tracheostomy, fiber optic, antegrade, retrograde, orotracheal, nasotracheal, air sac cannulation, pharyngostomy)
2. management of intubation complications

E. Complication Recognition and Management General Issues (e.g., Definition, consequences, assessment, differential diagnoses, treatments) -

1. neuromusculo-skeletal complications (e.g., MH, myopathy, neuropathies)
2. cardiovascular complications (e.g., abnormal heart rhythm, abnormal blood pressure, hemorrhage)
3. respiratory complications (e.g., hypoxemia, aspiration, brocho constriction), including oxygen supplementation (e.g., delivery method, oxygen toxicity, indications)

4. other complications (e.g., thermo-regulation abnormalities, anesthetic overdose, urinary retention, recovery excitement)

F. Complication Recognition and Management - Fluid/Acid-Base/Electrolyte/Blood

1. acid-base disturbances (e.g., differentials, treatment)
2. consequences of electrolyte abnormalities and therapeutic options
3. fluid indications, administration, and complications (e.g., volume maintenance and replacement, transfusions, transfusion reactions, hypoalbuminemia, edema, electrolyte disturbances, rates, calculations, selection, routes, delivery systems)
4. blood typing and cross-matching (e.g., indications, techniques, interpretation)

G. Analgesia/Pain Recognition and Management

1. pain assessment (e.g., pain scales, evoked response)
2. pain treatment (e.g., multimodal analgesia, preemptive analgesia, complementary therapies, complications, treatment of chronic pain)

H. Locoregional Techniques in Various Species

1. indications for a particular block
2. contraindications for a particular block
3. methods for performing a particular block (e.g., preparation, positioning, guided v. blind, advanced v. basic, equipment, catheters)

I. Procedure Specific Anesthetic Management

1. anesthetic considerations related to endoscopy (e.g., bronchoscopy, laparoscopy, thoracoscopy)
2. procedural differences with regard to anesthetic management (e.g., laparotomy, airway surgery, interventional radiography procedures)
3. procedural factors impacting anesthesia (e.g., laser, MRI, positioning, anticipated duration)
4. interpretation of diagnostic imaging relevant to anesthetic management (e.g., radiograph, ultrasonography including echocardiography)
5. interpretation of advanced diagnostic imaging relevant to anesthetic management (e.g., MRI, CT)

J. Disease Related Anesthetic Management

1. disease conditions related to organ systems (e.g., endocrinopathies, CV, GI, hepatic, musculoskeletal, neuro, obstetric, ophthalmic, urogenital, respiratory)

K. Species Specific Anesthetic Management

1. species/breed differences with regard to anesthetic management (e.g., llama, avian)

IX. CPR 3% of exam

1. CPCR (e.g., techniques, devices, guidelines, species differences)

X. Equipment 10% of exam

A. Standard Anesthetic Machine

1. anesthesia machine (e.g., components, gas supply, trouble-shooting, pressure zones, principles of function, safety systems, leak testing, anesthetic scavenging systems)
2. medical gas sources (e.g., tanks- color coding and size, safety systems, liquid, concentrators, regulators, pipeline supply, machine supply interface, manifold, troubleshooting, safety, transport)
3. methods for delivering inhalant anesthetics (e.g., VIC, VOC, open drop, liquid injection, measured flow, classification)
4. precision and electronic vaporizers (e.g., principles of function, components, TC)
5. anesthetic breathing systems (e.g., CO2 absorbents, rebreathing v. non-rebreathing, classifications, troubleshooting, leak testing, component orientation, principles of function, humidification, warming, filtration, TC)
6. anesthesia ventilators (e.g., classifications, use, principles of function, troubleshooting, indications, adverse effects)
7. ventilator modes and strategies

B. Ancillary Anesthetic Equipment

1. airway management equipment (e.g., laryngoscope, endotracheal tubes, supraglottic airway devices, tracheostomy tubes, intubation aids, endobronchial blockers, dual lumen tubes)
2. ancillary respiratory support devices (e.g., ambu bag, oxygen demand valve, insufflation, nasal cannulation, hi-flow oxygen, CPAP helmet, nebulizers)
3. point of care Ultrasound operation and image optimization (e.g., transducer selection, transducer manipulation, troubleshooting/artifacts)
4. catheters (e.g., types, uses, and insertion techniques)
5. needles (e.g., Tuohy, Quincke, Sprotte, insulated, hypodermic)

6. peripheral nerve locators/stimulators (i.e., use, principles of function)

7. supportive care equipment (e.g., perioperative heat support, IV pumps, suction, positioning aids, large animal recovery equipment)

8. defibrillators and pacing equipment (e.g., principles of function, safety, indications, complications)

XI. Monitoring 12% of exam

A. Anesthesia

1. anesthesia depth (e.g., species, methods, signs)

2. body temperature (e.g., location, technique, comparative normal ranges, prevention and management of abnormalities, physiological effects of abnormalities)

3. anesthetic gas analysis (e.g., expected values, limitations, sources of error, principles of function/technology, applications, calibration)

4. other gas analysis (e.g., air, oxygen, methane)

5. neuromuscular monitoring (e.g., train of four, accelerometry, placement for species, effects of drugs, troubleshooting, effects of co-morbidities)

B. Cardiovascular

1. ECG (e.g. lead placement, interpretation)

2. factors that influence interpretation and accuracy of direct blood pressure measurement (e.g., aneroid manometer, transducer, mechanism)

3. factors that influence interpretation and accuracy of indirect blood pressure measurement (e.g., Doppler, oscillometric -- cuff size, placement, mechanism)

4. wave form interpretation (e.g., arterial, central venous, pulmonary arterial pressures, dynamic volume indices)

5. other monitoring (e.g., esophageal stethoscope)

C. Respiratory

1. factors that influence interpretation and accuracy of pulse oximetry (e.g., probe placement location, indications, principle of operation, normal values)

2. respiratory monitoring (e.g., compliance, minute volume monitoring, spirometry, plethysmography)

3. factors that influence interpretation and accuracy of capnography/capnometry (e.g., mainstream v. sidestream, waveform interpretation, normal values, limitations, principles of function/technology, applications, calibration)

D. Lab Tests

1. blood gas analysis (e.g., sources of error, handling techniques, value derivation, alpha stat vs. pH stat, limitations)

2. co-oximetry (e.g., indications, interpretations, normal values)

3. hematology (e.g., indications, interpretations, normal values)

4. serum chemistry/electrolytes (e.g., indications, interpretations, normal values)

5. assessment of coagulation and platelet function (e.g., PT, aPTT, D-Dimer, platelet function tests, TEG, ROTEM)

6. ancillary techniques for monitoring (e.g., urine output, glucose, lactate)

7. urinalysis (e.g., components, normal values, specific gravity)