2015 International Mock Board Exam Coalition

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| Canada | University of GuelphGuelph, ON | 3/6/15 |
| Pacific Northwest  | University of WashingtonSeattle, WA | 3/7/15 |
| West Coast (Southern CA) | City of Hope/Beckman Research InstituteDuarte, CA | 3/28/15 |
| Southeast (GA) | Yerkes National Primate Research CenterAtlanta, GA | 4/3/15 |
| Northeast (NY) | Tri-Institutional Training ProgramNew York, NY | 4/17/15 |
| Northeast (CT) | Yale UniversityNew Haven, CT | 4/18/15 |
| West Coast (Northern CA) | University of California at DavisDavis, CA | 4/18/15 |
| Caribbean / Latin America | Caribbean Primate Research CenterUniversity of Puerto Rico, San Juan, PR | 4/22/15 |
| Midwest (MI) | University of MichiganAnn Arbor, MI | 4/30/15 |
| Mid-Atlantic | Fort DetrickFort Detrick, MD | 5/5/15 |
| Midwest (WI) | Wisconsin National Primate Research CenterMadison, WI | 5/9/15 |
| Southeast (NC) | NCSU Veterinary SchoolRaleigh, NC | 5/16/15 |
| Midwest (IN) | Indiana UniversityIndianapolis, IN | 5/28/15 |
| Midwest (CO) | Colorado State UniversityFort Collins, CO | 5/29/15 |
| Asia | Singapore | 6/6/15 |
| Europe | Trinity College DublinDublin, Ireland (mock ECLAM exam) | 10/30/15 |

Practical Section – 120 Questions

**Questions Only – 29 Pages**

***This examination is meant to be used as a study tool when preparing for the ACLAM or ECLAM Certifying Examinations. The material presented in this mock examination follows the ACLAM role delineation document, but is not necessarily reflective of the ACLAM or ECLAM Certifying Examinations.***

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1. Identify species of this reptile which is commonly used to teach physiology and anatomy, and is also used as a research model for respiratory physiology because of their apparent resistance to anoxia.

1. Chrysemys picta
2. Terrapene carolina
3. Gopherus polyphemus
4. Trachemys scripta elegans
5. Aspidoscelis sexlineata

2. What grade of tuberculin skin test score is this most likely to be?

1. Grade 0
2. Grade 1
3. Grade 2 or 3
4. Grade 4 or 5

3. In *Oryctolagus cuniculus*, what concurrent pathology has been reported to accompany this lesion?

1. Mammary dysplasia
2. Adrenal gland enlargement
3. Buphthalmia
4. Renal cortical cysts
5. Ovarian cysts

4. This is an example of what type of breeding scheme:

1. Recombinant inbred
2. Recombinant congenic
3. Congenic inbred
4. Segregating inbred

5. What is an indication for use of this equipment in the rodent housing facility?

1. Measuring ATP
2. Measuring ultrasound
3. Measuring ammonia
4. Measuring hydration

6. The tool depicted in the image is used for:

1. Collecting sperm samples in mice
2. Cerebrospinal fluid collection in mice
3. Embryo transfer in mice
4. Cryopreservation of sperm

7. A group of rhesus involved in an organ transplantation study has severe aplastic anemia. The following sample was obtained from one of the affected individuals. Please select the most likely etiological agent.

a. Adenovirus

b. Filovirus

c. Arenavirus

d. Flavavirus

e. Parvovirus

8. Proper husbandry and care of which of the following species requires providing this material as it plays a key role in the digestive process?

a. *Ictidomys tridecemlineatus*

b. *Oncorhynchus mykiss*

c. *Columba livia*

d. *Xenopus tropicalis*

e. *Carrasius auratus*

9. This egg was found during a fecal exam in a 6 month old pig.  What clinical sign is typically seen in pigs infected with this parasite?

a.   No clinical signs

b.   Coughing

c.   Stranguria

d.   Pruritis

e.   Hemorrhagic diarrhea

10. The items shown are most commonly used for laboratory rabbits for what purpose?

* 1. Enrichment
	2. Weight-training
	3. Optical-testing
	4. Color differentiation testing

11. It has recently been recommended that this genotyping/identification technique be performed on mice up to what post-natal day (PND) of age?

1. PND 2
2. PND 7
3. PND 14
4. PND 17
5. PND 21

12. The following species is categorized by CITES on which appendix?

1. Not listed
2. Appendix I
3. Appendix II
4. Appendix III

13. Identify the following instrument and its most likely use:

1. Stylet; to aide in intubation of the neonatal trachea
2. Acupuncture needle; to enhance analgesia by stimulating the release of endogenous opioids
3. Trochar; to implant small pellets subcutaneously
4. Peripheral nerve stimulator; to measure the degree of neuromuscular blockade

14. A colony of breeding rabbits at your facility began to develop ulcerations with exudation and crusting on the nares and prepuce, as seen in the picture below. You suspect that the lesions are caused by the spirochete, *Treponema paraluioscuniculi.* Which of the following diagnostic tools is recommended for confirming this diagnosis?

* 1. Bacterial culture of lesions
	2. Polymerase chain reaction from oral swabs
	3. Visualization of organisms using electron microscopy
	4. Wet mounts examined by dark-field microscopy

15. What is the following imaging modality and what is it measuring?

* 1. In vivo bioluminescent imaging; measuring luciferase-expressing cells by a specialised CCD camera
	2. In vivo bioluminescent imaging; light source is used to excite the fluorescence and captured by a specialised CCD camera
	3. In vivo fluorescence imaging; measuring luciferase-expressing cells by a specialised CCD camera
	4. In vivo fluorescence imaging; light source is used to excite luciferase-expressing cells and captured by a specialised camera

16. How often should the species below be fed to promote growth during the juvenile phase?

1. Daily
2. 2-3 times a week
3. Once a week
4. Every other two weeks

17. The following organisms were found in Boa constrictor used in a research study. What represents the correct categorization of the organism pictured below:

a. Nematode

b. Cestode

c. Arthropod

d. Trematode

e. Filarid

18. Your institution has an investigator that does research on the animals shown above. Your rabbit cages are square, 2.5 ft x 2.5 ft and 18 inches tall. They each have a sliding panel so that animals may be housed in pairs. An IACUC member is concerned as one of the grey rabbit’s ears are bent over when they sit up in these cages, although the white rabbits sit up without touching the top. You must do which of the following?

* 1. Provide cages of greater height for the larger rabbit to sit up unobstructed.
	2. The height of your cages is 2 inches greater than described in The Guide, so the cages are fine.
	3. The height is fine for the majority of the rabbits, so the investigator needs an IACUC variance for the one larger rabbit.
	4. The cages are shorter than that described in The Guide, and thus new cages are needed for all the rabbits.

19. In the image below, what is the likely cause for the white tail discoloration?

1. low humidity
2. fight wounds
3. ethylene chloride application
4. latent infection with Myocoptes musculinus

20. The pictured animal weighing 90g requires what minimum floor area?

1. 76in2
2. 13in2
3. 16in2
4. 17in2

21. Which of the species shown above is covered by the Animal Welfare Act?

1. A
2. B
3. C
4. D

22. According to the 2013 AVMA Guidelines on Euthanasia, which method is preferred for euthanizing the pictured species:

a. penetrating captive bolt

b. immersion in buffered tricaine methansulfonate

c. CO2 inhalation

d. immersion in an isoflurane water bath

e. decapitation

23. Which of the following is true about this assay?

1. Measures mechanical hypersensitivity (grams force)
2. Repeat testing affects the latency for paw withdrawal
3. A cut-off point to prevent tissue damage is not needed
4. Allows for independent testing of both sides of the body
5. Increases the number of animals required for a given experiment

24. This disinfectant would provide effective sanitization after contamination with which hamster pathogen?

1. *Clostridium difficile*
2. *Mycobacterium avium*
3. Hamster parvovirus
4. LCMV

25. What is the mode of action and scheduling with respect to the Controlled Substance Act of the following?

a. Non-narcotic analgesic and thus is not scheduled

b. Centrally acting opioid agent that binds to μ-opioid receptor; not a scheduled drug

c. Centrally acting opioid agent that binds to κ opioid receptor; Schedule IV, Controlled Substance Act

d. Centrally acting opioid agent that binds to μ-opioid receptor; Schedule IV, Controlled Substance Act

* 1. Centrally acting opioid agent that binds to κ opioid receptor; not a scheduled drug

26. The figure below represents a metabolic cage to house cats. According to the Animal Welfare Act Regulations, how is the minimum space requirement calculated?

1. C x D
2. (C x D) + (A x B)
3. (C x D) – (E x F)
4. (C x D) + (A x B) + (E x F)
5. (C x D) + (A x B) – (E x F)

27. The instrument shown in this picture was used to assess which stage in a rat?

 a. Ovulation

 b. Copulation

 c. Estrous

 d. Pregnancy

28. A rhesus macaque is observed with the following posture is observed by remote camera. Which of the following is most likely to be true?

* 1. The animal will drink water when you enter the room.
	2. The animal will lie down when you enter the room.
	3. The animal will press its hand to its head when you enter the room.
	4. The animal will sit up straight or stand when you enter the room.
	5. The animal will self-groom when you enter the room.

29. The photograph below is taken from a section of ileum obtained from a hamster with diarrhea. The section is stained with Warthin-Starry strain. What is the most likely etiology?

a. *Citrobacter rodentium*

 b. *Salmonella enterica* Typhimurium

 c. *Brachyspira hyodysenteriae*

 d. *Lawsonia intracellularis*

 e. Circovirus

30. The following non-human primate has an interbirth interval of what length?

* 1. 375 days
	2. 197 days
	3. 1691 days
	4. 127 days

31. Which of the following is true regarding the pictured piece of equipment?

* 1. It is a flexible film isolator used to house gnotobiotic animals under positive pressure ventilation.
	2. It is more expensive and more difficult to modify than stainless steel isolators but more commonly used in gnotobiotic research as they aren’t as heavy
	3. Cannot be damaged by organic chemical or sharp objects.
	4. It is commonly used for biohazardous materials rather than rigid stainless steel isolators as they can operate under negative pressure

32. The figure below is a thermograph. The mouse on the left is housed in an individually ventilated cage. The mouse on the right was housed in an individually ventilated cage with a fixed shelter. Which of the following most correctly describes these images?

1. The animal on the left is housed in a colder environment than the one on the right.
2. The animal on the left is under greater cold-stress than the animal on the right.
3. The animal on the left is housed in a warmer environment than the one on the right.
4. The animal on the left has reduced ability to hear and smell compared to the animal on the right.
5. There is no different between the two animals.

33. What does the equipment depicted below measure?

 a. Depression

 b. Memory

 c. Avoidance

 d. Mechanical allodynia

 e. Rotational behavior

34. Which of the following is **FALSE** regarding the following condition in a female guinea pig?

1. Clinical signs include alopecia and abdominal distention
2. The condition is usually unilateral
3. Testosterone administration is reported as an experimental cause
4. Incidence of this condition is >75% in older guinea pigs

35. This organism causes icterus, gallbladder distension, splenomegaly, and watery blood in pigs. What is the organism pictured below?

1. Babesia suis
2. Hemobartonella suis
3. Eperythrozoon suis
4. Eimeria suis

36. The following photo demonstrates:

1. Mouse cages need to be cleaned on Day 7 if low bedding conditions are present
2. Mouse cages with high bedding conditions do not need to be changed for at least 17 days
3. Mouse bedding levels impact stress levels of mice
4. The level of bedding provided for mice impacts the appearance of caging, with less bedding condition appearing dirtier earlier than medium or high bedding
5. None of the above

37. Which of the following images of Syphacia spp. shows a nonviable egg?

 a. A

 b. B

 c. C

 d. D

38. What is the gestation period of the species pictured?

1. 11-13 days
2. 15-18 days
3. 20-23 days
4. 25-27 days
5. 30-33 days

39. Which of the following statements best characterizes the biosafety cabinet depicted in the image?

* 1. Product protection; a minimum of 75 linear feet per minute face velocity; suitable for work with radionuclides
	2. Product protection; a minimum of 100 linear feet per minute face velocity; not suitable for work with volatile toxic chemicals
	3. Product and operator protection; a minimum of 75 linear feet per minute face velocity; suitable for work with radionuclides
	4. Operator protection; a minimum of 75 linear feet per minute face velocity; suitable for work with radionuclides
	5. Product and operator protection; a minimum of 100 linear feet per minute face velocity; suitable for work with volatile toxic chemicals

40. The following contrast agent can be used for the pictured imaging modality:

* 1. Technetium-99 (Tc-99)
	2. Fludeoxyglucose (FDG)
	3. Isovue-370 (Iopamidol)
	4. Luciferase

41. A 3-year-old male pigtailed macaque (*Macaca nemestrina*) housed in an outdoor compound in Arizona presented with respiratory distress and was euthanized. Histology of the lung is shown above. What is the name of the organism seen in this slide?

1. *Candida albicans*
2. *Mycoplasma pneumonia*
3. *Coccidioides immitis*
4. *Histoplasma capsulatum*
5. *Cryptococcus neoformans*

42. What is depicted in the following image and for what types of studies is it useful?

1. the avian chorioallantoic membrane; implantation studies.
2. the avian chorioallantoic membrane; toxicity studies
3. the avian inner intraembryonic membrane; implantation studies
4. the avian inner intraembryonic membrane; toxicity studies

43. What husbandry and management recommendations would you make for the 3 week old, Suffolk lamb pictured?

1. Remove the lamb from the dam; this is likely a bacterial infection that may cause mastitis.
2. No additional precautions are necessary.
3. Gloves and dedicated clothing should be worn when handling the animal or any feed, bedding, or waste that has been in contact with this animal.
4. These lesions are most likely papillomatosis, a zoonotic disease, and a warning sign should be posted on the animal housing room.

44. Identify the piece of equipment below:

1. Transfer port connection
2. Transfer sleeve
3. High-efficiency particulate air filter for supply and exhaust air
4. Supply sterilizing cylinder

45. What is the species and structure indicated by the white arrows:

1. *Mesocricetus auratus* and cecum
2. *Cavia porcellus* and ileum
3. *Oryctolagus cuniculus* and sacculus rotundus
4. *Mustela putorius furo* and cecum
5. *Felis cattus* and ileocecal junction

46. Which of the following methods is an unacceptable method of euthanasia for the species depicted below?

1. Inhaled CO2 overdose followed by cervical dislocation
2. Decapitation using a guillotine
3. IP injection of Ethanol
4. Focused beam microwave irradiation
5. Injectable barbiturates and neuromuscular blocking agents

47. What is this device?

1. Sociability apparatus
2. Shock threshold sensitivity apparatus
3. Step-down passive avoidance apparatus
4. Tail flick assay device
5. Hot plate apparatus

48. For which one of the nonhuman primate species listed below must the seasonal cycle be considered when managing a breeding colony?

 a. A

 b. B

 c. C

 d. D

49. The piece of equipment pictured below can be used for all of the following procedures EXCEPT:

1. Changing cages
2. Conducting minor animal procedure
3. Conducting procedure associated with injectable anesthesia
4. Conducting procedure associated with gaseous anesthesia
5. None of the above

50. What is an effective treatment for nonhuman primates infected with this parasite?

 a. Ketoconazole

 b. Nifurtimax

 c. Benznidazole

 d. No reported effective treatment

51. The pathology seen in the lungs would be consistent with what disease of rats.

1. *Mycoplasma pulmonis*
2. Rat Cornoavirus
3. Rat Cardiovirus
4. *Pneumocystis spp*.

52. What statistical test is most likely the most appropriate for the data set presented below?

1. F tests
2. One-way analysis of variance (ANOVA)
3. Two-way ANOVA
4. Kruskal-Wallis test
5. Student T-test

53. The infectious agent shown in this image (A. Giemsa stain; B. Wet mount with Nomarski's phase interference) from the brain of *Danio rerio* is most likely:

1. *Pseudocapillaria tomentosa*
2. *Pseudoloma neurophilia*
3. *Mycobacterium marirum*
4. *Piscinoodinium pillulare*
5. *Flavobacterium columnare*

54. Which of the following statements is **TRUE** regarding the method of euthanasia displayed below in frogs such as *Lithobates pipiens*?

1. This may be used only in unconscious animals as a secondary method of euthanasia
2. This method may be used only after ensuring the absence of respirations and heartbeat by either palpation or auscultation
3. This is prohibited as either a primary or secondary form of euthanasia
4. This may be used as a primary method of euthanasia in awake animals only by skilled individuals
5. The above method shown is incorrect as the preferred entry site is within the oral cavity

55. Cells isolated from the animal above are commonly used to:

 a. Propagate LCMV

 b. Test efficacy of compounds used to treat diabetes mellitus

 c. Produce recombinant proteins

 d. Generate orthotopic tumours

56. What is the minimum space requirement of a primary enclosure for the pictured animals?

1. 60 square inches
2. 101 square inches
3. 121 square inches
4. 180 square inches

57. The pictured apparatus may be used to determine which of the following respiratory parameters in *Mus musculus*?

1. Lung compliance
2. Minute ventilation
3. PaCO2
4. Total lung capacity

58. An investigator asks for your help because one of his highly valued transgenic mouse lines has a very low breeding rate. The picture above represents what you are observing during physical examinations of the mice. What do you recommend to this investigator?

1. The mice appear normal so the investigator should send several male and female mice to necropsy for a complete evaluation
2. Some of the mice appear to have vaginal septa which can be surgically removed to provide breeding performance that is identical to nonseptate females
3. The mice have vaginal plugs indicating normal breeding is occurring
4. Some of the mice appear to have vaginal septa. This is a hereditary condition that is polygenic and transmitted by affected females, as well as unaffected females and males

59. What identification number is assigned to this packaging if the material inside is an infectious agent that is capable of causing life-threatening or fatal disease in healthy humans?

 a. UN 3373

 b. UN 2814

 c. UN2900

 d. UN 2810

60. This rabbit had clear nasal discharge that became thick and mucoid. It was anorexic, pyrexic, lethargic and dyspneic. It adopted the stance shown in the picture. What would be the most likely cause?

1. Clostridial enterotoxemia
2. Coccidiosis
3. Pasteurella multocida, inner ear infection
4. Fracture of the spine

61. With regard to the husbandry and care of the pictured animal, what is the largest concern?

* 1. The animal will need to be sedated frequently for procedures, so dietary supplementation will be needed.
	2. The animal may develop skin lesions that will need to be treated clinically.
	3. The animal will need to be exempted for social housing, which means that extra enrichment will need to be provided.
	4. The study will need to be halted if the jacket becomes damaged or soiled.
	5. Caging change will be need to be coordinated with the study schedule, because the animal will need to be moved into the tether cage the same day the study is started.

62. What is an effective approach to preventing the condition below?

1. Class II type A2 biosafety cabinets
2. Depopulation of immune compromised mice
3. Microisolation cages
4. Tunnel washer (≥180°F) and autoclaved individually ventilated cages

63. What is the suspected etiology of this condition seen in a hamster?

1. Eimeria
2. Coronavirus
3. Adenovirus
4. Cryptosporidium
5. Rotavirus

64. Which of the following is the most likely explanation for the appearance of the bird shown in the image below?

1. Aggression
2. Heat stress
3. Defensiveness
4. Pain
5. Respiratory distress

65. In the image below from a rabbit, what is the name of the structure indicated by the letter “b” which may be inadvertently entered during urinary bladder catheterization?

1. vesicular gland
2. proprostate
3. prostate
4. bulbourethral gland
5. preputial gland

66. Which of the following pathologic findings is commonly seen in mice that have recovered from the disease shown in the picture?

1. Bone marrow necrosis
2. Lymphocytic choriomeningitis
3. Chronic hyperplastic typhlocolitis
4. Splenic fibrosis

67. This rodent species is commonly used as a model to investigate the effects of which of the following infectious agent in humans?

* 1. Arboviruses (Yellow fever)
	2. Trypanosoma cruzi
	3. Leishmania
	4. Yersinia pestis
	5. Paramyxoviruses (respiratory syncytial virus)

68. What is the best method for detecting the organism below in the rat?

1. Urine filtration
2. Fecal floatation
3. Cecal scrape
4. Perineal tape test

69. Which of the following training aids can be used for teaching endotracheal intubation?

1. Photo A - MD PVC rat model
2. Photo B - Mimolette rat model
3. Photo C - Koken rat model
4. Photo D - Curvet rat model

70. The image on the left depicts a fundus of a mouse homozygous for the rd1 mutation. What is an affected mouse strain and common manifestations in such mice?

1. C3H and all substrains; vessel attenuation, retinal degeneration
2. DBA/2; vessel attenuation, retinal degeneration
3. BALB/c; vessel attenuation, corneal dystrophy
4. C57BL/6; vessel attenuation, corneal dystrophy

71. For which rat strain is this spontaneous lesion the most common?

* 1. Sprague Dawley
	2. Wistar-Furth
	3. Brattleboro
	4. Fisher 344

72. The following images are from a 129S4/SvJae mouse upon necropsy. What’s your diagnosis?

1. Acidophilic macrophage pneumonia
2. Amyloidosis
3. Reye’s-like syndrome
4. Pneumocystis sp.

73. This technique represents which of Russell & Burch’s “Three R’s” for surgical mouse embryo transfer?

1. Replacement
2. Refinement
3. Reduction
4. Regulation

74. Of the following partial logos, which one is affiliated with the Office of Laboratory Animal Welfare?

 **a. A**

 **b. B**

 **c. C**

 **d. D**

75. What procedure is being performed here and which structure is best examined using this technique?

1. Slit lamp biomicroscopy/Adnexal structures and cornea
2. Slit lamp biomicroscopy/Anterior vitreous
3. Direct ophthalmoscopy/Fundus
4. Indirect ophthalmoscopy/Fundus

76. The pictured animal displays which of the following captive breeding behaviors?

1. Eusocial, one breeding queen with several non-reproductive workers participating in cooperative brood care
2. Harem breeding, one male for every 4-6 females
3. Monogamous, one male, one female pairings
4. Promiscuous, females and males mate multiple times with multiple mates with no cooperative brood care

77. This piece of equipment is used to

1. Wash cage racks with multiple sanitation levels
2. Isolate biohazardous agents in class 3
3. Quarantine, contain or house different species in the same area
4. Air shower for entrance into containment facilities
5. Primate enrichment arena

78. Which of the following has been shown to occur in mice and/or rats by the euthanasia method portrayed below?

 a. Nociceptive responses beginning at CO2 levels of 15%

 b. Respiratory alkalosis

 c. Decreased corticosterone levels during long exposures to low CO2

 d. Lower in vitro fertilization rates as compared to cervical dislocation

 e. Decreased exposure times needed for neonates

79. According to the 2013 AVMA Guidelines for the Euthanasia of Animals, the following are acceptable without conditions methods of euthanasia for this species **except**?

1. Injected barbiturates
2. Inhaled anesthetics
3. Topical buffered tricaine methanesulfonate
4. Topical buffered benzocaine hydrochloride

80. How would you evaluate the following picture of a rat using the rat grimace scale?

1. Moderate orbital tightening and moderate nose/cheek flattening.
2. No orbital tightening and no nose/cheek flattening.
3. Obvious orbital tightening and moderate nose/cheek flattening
4. Moderate orbital tightening and no nose/cheek flattening

81. The picture breeding scheme pictured above is used to produce what type of mice?

1. **Coisogenic**
2. **Conplastic**
3. **Consomic**
4. **Congenic**

82. What does this sign indicate?

 a. biological hazard

 b. chemical hazard

 c. explosive hazard

 d. radioactive hazard

83. At one week with static caging, this effect, likely due to ammonia levels, occurred in mice in which bedding substrate?

1. Irradiated corncob
2. Aspen wood chips
3. Reclaimed wood pulp
4. Recycled newspaper

84. The investigator pictured below was awarded the Nobel prize for studies involving the invertebrate shown and for which significant scientific breakthrough?

1. Modulation of the cell cycle and programmed cell death
2. Signal transduction in the nervous system
3. Organization of individual and social behavior patterns
4. Genetic mutation and screening for genes in metazoan development
5. Sensitive detection of endotoxin

85. Which one of the following testing apparatuses is used to evaluate anxiety related behavior in rodents in a novel environment?

1. A
2. B
3. C
4. D
5. E

86. These spherical structures are a normal finding on urinalysis in which laboratory animal species?

1. *Oryctolagus cuniculus*
2. *Sus scrofa*
3. *Felis catus*
4. *Macaca mulatta*
5. *Mustela putorius furo*

87. The most common site of the condition seen in the guinea pig shown above is:

* 1. The right ventricle
	2. The left ventricle
	3. The right atrium
	4. The left atrium
	5. The epicardium

88. Which of the following is **TRUE** regarding the disease depicted in mice?

a. It occurs frequently in C57BL, BALB/c and SJL mice

b. It occurs with high frequency in BALB/cByJ mice at a young age

c. It is a common pathologic lesion at necropsy

d. It is associated with a missense mutation in the Abcc6 gene in BALB/c mice

e. Lesions are most often found at the level of the right atrium

89. This equipment is required to protect personnel from what hazard?

1. Exposure to ABSL2 infectious agents
2. Contact with temperatures greater than 180F
3. Exposure to noise levels exceeding 85 dBA
4. Muscle injury associated with lifting more than 50 pounds

90. Which condition is most commonly associated with the electrocardiogram changes seen below?

1. 3rd degree atrioventricular block
2. Atrial fibrillation
3. 1st degree atrioventricular block
4. Myocardial infarction
5. Ventricular septal defect

91. According to the Animal Welfare Regulations, which of the following statements is correct regarding the animal pictured below?

* 1. If the animal’s primary enclosure is a sheltered unit, auxiliary ventilation must be supplied if the ambient temperature exceeds 85 degrees F for more than 4 hours
	2. Only animals that are acclimated, as determined by the IACUC, to the prevailing weather conditions may be kept in outdoor facilities
	3. If the animal’s primary enclosure is an indoor housing facility, the ambient temperature must not fall below 45 degrees F or rise above 85 degrees for more than 4 consecutive hours
	4. In outdoor enclosures, the animals must safely provide heat to prevent the ambient temperature from falling below 50 degrees F, except as directed by the attending veterinarian

92. The pictured animal is a natural model for what human disease?

1. craniofacial hypoplasia
2. obstructive sleep apnea
3. cutaneous hyperplasia
4. early onset cataracts

93. For rat IVC racks sanitized semiannually, this effect resulted in what by as early as day 5 after cage change, when sanitation frequency and procedure was assessed?

1. Ammonia levels < 20 ppm
2. Ammonia levels > 20 ppm
3. Condensation in the cage
4. Respiratory problems in the rats

94. What material is this bottle stopper most likely made out of?

* 1. Siliconized rubber
	2. Synthetic neoprene
	3. Polysulfone
	4. Borosilicate

95. When using the device pictured below, which of the following considerations is correct?

1. Habituation is never required as there is minimal impact on the animal’s normal behavior
2. Animals may be individually housed with IACUC approval
3. When used for more than 12 consecutive hours, the device must be removed and the animal allowed at least one continuous hour of unrestrained activity daily
4. Animals will always have increased urinary cortisol when the device is being used
5. Behavioral assessments are not a reliable method of assessing that an animal has adapted to the device

96. These gross and histologic lesions in the heart of a guinea pig are indicative of what nutritional imbalance?

1. Hypovitaminosis C
2. Hypervitaminosis D
3. Folic acid deficiency
4. Hypovitaminosis E
5. Choline deficiency

97. All work involving inoculation of Hantavirus-containing samples into the depicted species must be conducted at which Animal Biosafety Level?

a. ABSL 1

b. ABSL 2

c. ABSL 3

d. ABSL 4

98. Which of the following methods is unconditionally acceptable to euthanize the mice depicted here?

1. CO2 narcosis
2. Hypothermia
3. Decapitation
4. Inhaled agents
5. Injectable barbiturates

99. This must be used to order which of the following drugs:

 a. Buprenorphine

 b. Tramadol

 c. Ketamine

 d. Fentanyl

 e. Chloral hydrate

100. The species depicted in the picture has been a useful animal model for numerous human diseases. Which of the following statements is **NOT CORRECT** about this species?

1. Prone to develop obesity when fed with a high-energy diet.
2. An appropriate model to study circadian mechanisms that are involved in mood and anxiety disorders in humans
3. They are easy to breed and maintain in captivity
4. Most important reservoir host of zoonotic cutaneous leishmaniasis

101. What type of virus is responsible for the development of these lesions in fish?

1. Iridovirus
2. Adenovirus
3. Filovirus
4. Pox virus

102. The following depicts a common live food source for what species?

 a. *Danio rerio*

 b. *Macaca mulatta*

 c. *Xenopus laevis*

 d. *Heterocephalus glaber*

103. What disinfection procedure would be most appropriate for this disease in a Danio rerio colony maintained on a recirculating life-support system? (A) H and E stain of swim bladder. (B) Acid-fast stain of swim bladder bifurcation?

1. Weekly tank cleaning by scrubbing with autoclaved scouring pads and siphoning of debris.
2. Addition of kanamycin into the recirculating tank system for 3 days followed by a complete water change over 3 days. Repeat treatment.
3. Quarantine of life-support system and cessation of breeding for 3 months.
4. Culling of all fish in life-support system, discarding all disposable equipment, and disinfection of the water system and surfaces with bleach for 3 days. Repeat treatment.

104. This species is considered a valid animal model for which human lentiviral disease?

1. Epstein-Barr Virus (EBV)
2. Human Immunodeficiency Virus (HIV)
3. Human foamy virus (HFV)
4. Kaposi’s Sarcoma-associated Herpes virus (KSHV)

105. The pictured device is used for which one of the following tests:

1. Detection of environmental bacterial contamination
2. Antibiotic sensitivity testing
3. ATP detection
4. Bacterial endotoxin testing

106. What is the most common clinical sign in *Callithrix jacchus* infected with the RNA virus that caused these lesions on the tongue of *Macaca mulatta*?

1. None
2. Dyspnea
3. Ulcerative dermatitis
4. Polyuria
5. Diarrhea

107. These images depict devices used to model what human condition in rodents?

a. learned helplessness

b. depression

c. despair

d. fear

108. Which of the following is **true** regarding the pictured environmental enrichment for primates?

1. This is an example of manipulanda enrichment
2. Time spent on this behavior is reduced in captive research macaques compared to their wild counterparts
3. The picture above shows a macaque interacting with an “Astroturf” board
4. Primates spend about the same amount of time interacting when given one of these items versus when given in combination with other enrichment items

109. A Principal Investigator requires placing a macaque in the pictured restraint device for more than 12 hours for a study. Which of the following statements is **false** regarding environment enhancement plans for macaques?

1. The macaque must be provided the opportunity daily for unrestrained activity for at least one continuous hour during the period of restraint
2. The attending veterinarian may exempt an individual macaque from participating in the environment enhancement plan because of its health or condition or in consideration of its well-being
3. The IACUC Committee at the research facilities may exempt an individual macaque from participating in the environment enhancement plan for scientific reasons set forth in the research proposal
4. Once attending veterinarian exempts an individual macaque from participating in the environment enhancement plan, the exemption need not be reviewed if the basis for the exemption is a permanent condition
5. Once the IACUC committee exempts an individual macaque from participating in the environment enhancement plan, the basis of the exemption in the approved proposal need not be reviewed for 2 years

110. A baboon in your facility presented with weight loss, water diarrhoea, inappetance and apparent abdominal pain. Its fecal sample was collected and fecal flotation performed. Identify the egg shown in the picture below.

1. Anatrichosoma cynomolgi
2. Trichuris trichiura
3. Ascaris lumbricoides
4. Strongyloides cebus
5. Enterobius vermicularis

111. A gram stain of the causative agent of this disease would show:

1. Slender, gram-positive rods
2. Gram-positive cocci
3. Small, gram-negative rods
4. Gram-negative cocci
5. Pleomorphic, gram-negative coccobacilli

112. One of your investigators is planning on capturing the pictured animals and keeping them in flight cages in the Mexican desert for no more than 20 hours, in order to complete a privately funded study involving behavioral testing. As a member of the IACUC at Great Eastern University, which regulations must you consider?

1. Animal Welfare Act holding of regulated species for greater than 12 hours makes this a Study Area
2. Animal Welfare Act holding of regulated species for less than 24 hours does not make this a Study Area
3. Animal Welfare Act does not have to be considered as these are wild-caught bats.
4. Animal Welfare Act does not have to be considered as these are wild-caught bats on a privately funded study.

113. According to the 8th edition of the *Guide*, what is the appropriate space recommendation and housing density for adults of the pictured species?

1. 1.5 L of water per frog
2. 2 L of water per frog
3. 2.5 L of water per frog
4. 5 L of water per frog

114. The following condition was found in numerous mice in an institution. Choose the **LESS** likely etiological agent that may cause this condition:

a. *Citrobacter rodentium*

b. Coronavirus

c. Rotavirus

d. Reovirus

e. Polyoma virus

115. The equipment in this image is used to perform which one of the following tests:

1. Bacteriology testing
2. Environmental testing
3. PCR testing
4. Serology testing
5. Parasite testing

116. Once surgically implanted into a mouse, the device pictured below can be used for **all but which** of the following purposes:

1. Monitoring animal activity
2. Determining systemic blood pressure
3. Measuring core body temperature
4. Blood sampling
5. Recording ECG

117. The use of this material with circle breathing circuits is intended to remove which of the following?

1. Moisture
2. Carbon dioxide
3. Nitrogen
4. Waste anesthetic gases

118. Which of the following bedding types results is **least** effective at controlling ammonia in mouse cages.

 **a. A**

 **b. B**

 **c. C**

 **d. D**

119. Which of the following statements is **false** regarding the organism depicted in the image below with Ziehl-Neelsen acid-fast stain?

1. HIV infection is a serious risk factor for development of active disease in humans
2. It can be spread to humans by consumption of non-pasteurized milk and milk products, by handling of infected carcasses and by inhalation
3. An attenuated live vaccine is available and used in other countries but is not used in the United States for immunization
4. BSL-2 practices and procedures, containment equipment, and facilities are required for non-aerosol-producing manipulations of clinical specimens
5. Animal studies using guinea pigs or mice requires Animal Biosafety Level – 3 (ABSL-3)

120. For which disease is this non-human primate an important animal model?

1. Atherosclerosis
2. Malaria
3. Tuberculosis
4. Hypertension
5. Osteoporosis

**END OF EXAM!!!!!!!!!!!!!!!!!!!!!!!!**