UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 5, 2026

Dr. Alan Cebula
Nuclear Reactor Facility Manager
Kansas State University
112 Ward Hall
Manhattan, KS 66506-5204

SUBJECT: EXAMINATION REPORT NO. 50-188/OL-26-01, KANSAS STATE UNIVERSITY

Dear Dr. Cebula:

During the week of February 9, 2026, the U.S. Nuclear Regulatory Commission (NRC) administered an operator licensing examination at your Kansas State University Nuclear Reactor Facility. The examination was conducted according to NUREG-1478, "Operator Licensing Examiner Standards for Research and Test Reactors," Revision 2. Examination questions and preliminary findings were discussed with those members of your staff identified in the enclosed report at the conclusion of the examination.

In accordance with Title 10 of the *Code of Federal Regulations,* Section 2.390, a copy of this letter and the enclosures will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC website at http://www.nrc.gov/reading-rm/adams.html. The NRC is forwarding the individual grades to you in a separate letter which will not be released publicly. Should you have any questions concerning this examination, please contact Amy Beasten at (301) 415-8341, or via email at Amy.Beasten@nrc.gov.

Sincerely,

Signed by Brown, Tony
on 03/05/26

Tony Brown, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Docket No. 50-188

Enclosures:
1. Examination Report No. 50-188/OL-26-01
2. Facility Comments and NRC Resolution
3. Written examination

cc: w/ enclosures to GovDelivery Subscribers

SUBJECT: EXAMINATION REPORT NO. 50-188/OL-26-01, KANSAS STATE UNIVERSITY
DATED: MARCH 5, 2026

DISTRIBUTION:
PUBLIC
MReisi-Fard, NRR
TBrown, NRR
JRady, NRR
AMiller, NRR
PBoyle, NRR
ABeasten, NRR
NStaples, NRR
NJones, NRR
RAlexander, RGN-IV

ADAMS Accession No.: ML26007A121 **NRR-079**

OFFICE	NRR/DANU/UNPO/CE	NRR/DANU/UNPO/OLA	NRR/DANU/UNPO/BC
NAME	ABeasten	NJones	TBrown
DATE	3/5/2026	3/5/2026	3/5/2026

OFFICIAL RECORD COPY

U. S. NUCLEAR REGULATORY COMMISSION
OPERATOR LICENSING INITIAL EXAMINATION REPORT

REPORT NO.: OL-26-01

FACILITY DOCKET NO.: 50-188

FACILITY LICENSE NO.: R-88

FACILITY: Kansas State University

EXAMINATION DATE(S): Week of February 9, 2026

SUBMITTED BY: Amy E. Beasten, Chief Examiner — February 13, 2026 Date

SUMMARY:
During the week of February 9, 2026, the NRC administered operator licensing examinations to four Reactor Operator (RO) candidates. One candidate failed the written exam and failed the operating test. One candidate failed Categories A and B of the written exam, resulting in an overall written exam failure, and failed the operating test. One candidate failed Category C of the written exam and failed the operating test. One candidate passed all applicable portions of the examination and test.

REPORT DETAILS

1. Examiner: Amy E. Beasten, PhD, Chief Examiner, NRC

2. Results:

	RO PASS/FAIL	SRO PASS/FAIL	TOTAL PASS/FAIL
Written	1/3	0/0	1/3
Operating Tests	1/3	0/0	1/3
Overall	1/3	0/0	1/3

3. Exit Meeting:
Amy E. Beasten, PhD, Chief Examiner, NRC
Alan Cebula, Reactor Facility Manager, KSU
Robert Seymour, Reactor Supervisor, KSU

Prior to administration of the written exam, adjustments were accepted based on facility comments. The comments provided corrections and additional clarity to questions/answers and identified where changes were appropriate based on current facility conditions. Upon completion of all operator licensing examinations, the NRC examiner met with facility staff representatives to discuss the results and observations. The NRC examiner discussed some apparent weaknesses among the expected level of knowledge for RO candidates. Examiner observations

included: weakness in Administrative Topics, including Technical Specification operating limits, Safety Limit, and Limiting Safety System Settings; federal radiation dose limits and personal dosimetry; and emergency event classification. The NRC examiner also noted weaknesses among facility systems and components, including nuclear instrumentation, radiation monitoring systems, and emergency power. At the conclusion of the meeting, the NRC examiners thanked the facility for their support in the administration of the examination.

FACILITY COMMENTS AND NRC RESOLUTION

QUESTION B.12 [1.0 point]
In accordance with KSU Emergency Plan Procedure 5, Fire, the Reactor Operator should take all of the following actions EXCEPT:

a. Secure the reactor.

b. Shutdown the exhaust fan.

c. Secure HVAC discharge.

d. Evacuate the facility by activating a fire alarm pull station.

Answer: d.
Reference: KSU Emergency Plan Procedure 5, Fire

Facility Comment B.12
Comment: During cooling mode operation, condensation may be produced by the HVAC system and is discussed as HVAC discharge also. A valve controls bulk discharge of HVAC condensation from a hold up tank. Securing the valve is not an action in Emergency Plan Procedure 5.

Recommendation: Both answers C and D acceptable

Reference(s):

NRC Resolution B.12
Per the version of Emergency Plan Procedure (EPP) 5, Fire, provided by the facility for examination development, there is a step that instructs operators to “Secure HVAC discharge, if safe to do so.” There is no mention of a specific valve, either in the question or in the answer option, but the procedure is clear that HVAC discharge should be secured. Therefore, the NRC has determined the justification for two correct answers is not supported and the NRC does NOT accept this change.

EPP 5. FIRE

In the event of a FIRE
- DO NOT RUSH IN, KEEP SAFE, STAY CALM, BE CAUTIOUS OF SMOKE
- Secure Reactor
- Shutdown Exhaust Fan
- Shutdown Cooling
- Secure HVAC discharge, if safe to do so
- Call Manhattan Fire Department (MFD) (911)
- Establish EOC outside of Ward Hall

QUESTION B.14 [1.0 point]
In accordance with KSU Technical Specifications, all of the following experiments would be allowed to be conducted while the reactor is operating EXCEPT:

a. The reactivity worth of a single experiment is $1.75.

b. Two related experiments in the reactor, each with a reactivity worth of $1.25, are irradiated simultaneously.

c. Three unrelated experiments with reactivity worths of $0.75, - $0.25, and $1.00 are irradiated simultaneously.

d. A single experiment, doubly encapsulated, containing 10 mg of TRISO fuel, with a reactivity worth of $2.00.

Answer: b.
Reference: KSU Technical Specifications 3.6.3

Facility Comment B.14
Comment: Technical Specifications 5.4.3 (6) limits the total inventory of iodine isotopes 131 through 135 in fueled experiments to 5 mCi (except as the fueled experiment is a standard TRIGA instrumented element). A fueled experiment involving 10 mg of TRISO fuel, could exceed the technical specification.

Recommendation: Both answers B and D acceptable

Reference(s): Attached Appendix: I-135 activation calculation

NRC Resolution B.14
The intent of the question was not to have the candidates perform I-131 through I-135 release calculations, or make any other related assumptions, as that is far beyond the scope of expected or required level of operator knowledge. As written, the NRC contends there is only one correct answer to this question. The NRC does not agree that the facility justification supports two correct answers. Therefore, the NRC has determined the justification for two correct answers is not supported and the NRC does NOT accept this change.

QUESTION C.03 [1.0 point, 0.25 each]
In accordance with the KSU Safety Analysis Report, match the detector type in Column A with the correct function in Column B. Options in Column B may be used once, more than once, or not at all.

Column A	**Column B**
a. Low-level Geiger Muller counter	1. Gamma and beta monitoring
b. Bonner Sphere	2. Air monitoring
c. Ion Chamber	3. Contamination monitoring
d. Rem Ball	4. Neutron monitoring

Answer: a. 3; b. 4; c. 1; d. 4
Reference: KSU SAR 7.7

Facility Comment C.03.a
Comment: A Geiger-Muller counter may be used to monitor gamma and beta radiation

Recommendation: Both answers 1 and 3 acceptable

Reference(s): Procedure No. 13 – General Radiation Detector Calibration and Efficiency Determination Steps 4 and 5.

NRC Resolution C.03
The NRC determined the justification for two correct answers is supported and the NRC accepts these changes.

QUESTION C.10 [1.0 point]
In accordance with the KSU Training manual, which ONE of the following statements best describes the purpose of the 2 cps interlock?

a. This interlock prevents the possibility of pulsing on a subcritical reactor.

b. This interlock prevents the possibility of starting the reactor up without a source.

c. This interlock ensures that there is a sufficient shutdown margin to safely start the reactor.

d. This interlock ensures that there is a credible and valid signal on the logarithmic channel prior to reactor startup.

Answer: b.
Reference: KSU Training Manual p. 16

Facility Comment C.10
Comment: The source interlock is also used to ensure a credible and valid signal is indicated on the logarithmic channel (NLW-1000) prior to reactor startup. The interlock ensures that a neutron detector is functioning during startup.

Recommendation: Both answers B and D acceptable

Reference(s): SAR 7.3.4 c. Interlocks (3)

NRC Resolution C.10
The NRC determined the justification for two correct answers is supported and the NRC accepts these changes.

U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

Kansas State University

Operator Licensing Examination

Week of February 9, 2026

Enclosure 3

U. S. NUCLEAR REGULATORY COMMISSION
NON-POWER REACTOR LICENSE EXAMINATION

FACILITY: Kansas State University

REACTOR TYPE: TRIGA

DATE ADMINISTERED: February 10, 2026

CANDIDATE: _____

INSTRUCTIONS TO CANDIDATE:
Answers are to be written on the Answer sheet provided. Attach all Answer sheets to the examination. Point values are indicated in parentheses for each question. A 70% in each category and a 70% overall are required to pass the examination. Examinations will be picked up three (3) hours after the examination starts.

CATEGORY VALUE	% OF TOTAL	CANDIDATE'S SCORE	% OF CATEGORY VALUE	CATEGORY
20.00	33.0	_____	_____	A. REACTOR THEORY, THERMODYNAMICS, AND FACILITY OPERATING CHARACTERISTICS
20.00	33.0	_____	_____	B. NORMAL AND EMERGENCY OPERATING PROCEDURES AND RADIOLOGICAL CONTROLS
20.00	33.0	_____	_____	C. FACILITY AND RADIATION MONITORING SYSTEMS
60.00		_____	_____%	TOTALS
		FINAL GRADE		

All work done on this examination is my own. I have neither given nor received aid.

_____
Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.

2. After the examination has been completed, you must sign the statement on the cover sheet indicating that the work is your own and you have neither received nor given assistance in completing the examination. This must be done after you complete the examination.

3. Restroom trips are to be limited and only one candidate at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.

4. Use black ink or dark pencil only to facilitate legible reproductions.

5. Print your name in the blank provided in the upper right-hand corner of the examination cover sheet and each Answer sheet.

6. Mark your Answers on the Answer sheet provided. Answers written on the line will be taken as the final answer. USE ONLY THE PAPER PROVIDED AND DO NOT WRITE ON THE BACK SIDE OF THE PAGE.

7. The point value for each question is indicated in [brackets] after the question.

8. If the intent of a question is unclear, ask questions of the examiner only.

9. When turning in your examination, assemble the completed examination with examination questions, examination aids and Answer sheets. In addition turn in all scrap paper.

10. Ensure all information you wish to have evaluated as part of your Answer is on your Answer sheet. Scrap paper will be disposed of immediately following the examination.

11. To pass the examination you must achieve a grade of 70 percent or greater in each category and a 70 percent overall.

12. There is a time limit of three (3) hours for completion of the examination.

Candidate Name:_____

Category A: Reactor Theory, Thermodynamics, & Facility Operating Characteristics

A N S W E R S H E E T

Multiple Choice (Circle your choice, or write on the line)
If you change your answer, write your selection on the line. Answers written on the line will be taken as the final answer.

A01 a b c d ___

A02 a b c d ___

A03 a b c d ___

A04 a _____ b _____ c _____ d _____ (0.50 each)

A05 a b c d ___

A06 a b c d ___

A07 a b c d ___

A08 a b c d ___

A09 a b c d ___

A10 a b c d ___

A11 a b c d ___

A12 a b c d ___

A13 a b c d ___

A14 a b c d ___

A15 a b c d ___

A16 a _____ b _____ c _____ d _____ (0.25 each)

A17 a b c d ___

A18 a b c d ___

A19 a b c d ___

(***** END OF CATEGORY A *****)

Candidate Name:_____

Category B: Normal/Emergency Operating Procedures and Radiological Controls

A N S W E R S H E E T

Multiple Choice (Circle your choice, or write on the line)
If you change your answer, write your selection on the line. Answers written on the line will be taken as the final answer.

B01 a b c d ___

B02 a _____ b _____ c _____ d _____ (0.25 each)

B03 a _____ b _____ c _____ d _____ (0.50 each)

B04 a b c d ___

B05 a b c d ___

B06 a b c d ___

B07 a b c d ___

B08 a b c d ___

B09 a _____ b _____ c _____ d _____ (0.25 each)

B10 a b c d ___

B11 a b c d ___

B12 a b c d ___

B13 a b c d ___

B14 a b c d ___

B15 a b c d ___

B16 a b c d ___

B17 a b c d ___

B18 a b c d ___

B19 a b c d ___

(***** END OF CATEGORY B *****)

Candidate Name:_____

Category C: Facility and Radiation Monitoring Systems

A N S W E R S H E E T

Multiple Choice (Circle your choice, or write on the line)
If you change your answer, write your selection on the line. Answers written on the line will be taken as the final answer.

C01 a b c d ___

C02 a b c d ___

C03 a _____ b _____ c _____ d _____ (0.25 each)

C04 a b c d ___

C05 a b c d ___

C06 a b c d ___

C07 a b c d ___

C08 a b c d ___

C09 a b c d ___

C10 a b c d ___

C11 a b c d ___

C12 a b c d ___

C13 a b c d ___

C14 a b c d ___

C15 a b c d ___

C16 a b c d ___

C17 a b c d ___

C18 a b c d ___

C19 a b c d ___

C20 a b c d ___

(***** END OF CATEGORY C *****)
(********** END OF EXAMINATION **********)

EQUATION SHEET

$$Q = \dot{m} c_P \Delta T = \dot{m} \Delta H = UA\Delta T$$

$$P_{\max} = \frac{(\beta - \rho)^2}{(2\alpha \ell)}$$

$$\lambda_{eff} = 0.1 \sec^{-1}$$

$$P = P_0 \, e^{t/T}$$

$$SCR = \frac{S}{-\rho} \cong \frac{S}{1 - K_{eff}}$$

$$\ell^* = 1 \times 10^{-4} \sec$$

$$CR_1 (1 - K_{eff_1}) = CR_2 (1 - K_{eff_2})$$

$$CR_1 (-\rho_1) = CR_2 (-\rho_2)$$

$$SUR = 26.06 \left[\frac{\lambda_{eff} \rho + \beta}{\overline{\beta} - \rho} \right]$$

$$P = \frac{\beta (1 - \rho)}{\beta - \rho} P_0$$

$$M = \frac{1}{1 - K_{eff}} = \frac{CR_2}{CR_1}$$

$$P = P_0 \, 10^{SUR(t)}$$

$$M = \frac{1 - K_{eff_1}}{1 - K_{eff\,2}}$$

$$SDM = \frac{1 - K_{eff}}{K_{eff}}$$

$$T = \frac{\ell^*}{\rho - \overline{\beta}}$$

$$T = \frac{\ell^*}{\rho} + \left[\frac{\overline{\beta} - \rho}{\lambda_{eff} \rho} \right]$$

$$T_{\frac{1}{2}} = \frac{0.693}{\lambda}$$

$$\Delta\rho = \frac{K_{eff_2} - K_{eff_1}}{K_{eff_1} K_{eff_2}}$$

$$\rho = \frac{K_{eff} - 1}{K_{eff}}$$

$$DR = DR_0 \, e^{-\lambda t}$$

$$DR_1 \, d_1^{\,2} = DR_2 d_2^{\,2}$$

$$DR = \frac{6 Ci \, E(n)}{R^2}$$

$$\frac{(\rho_2 - \beta)^2}{Peak_2} = \frac{(\rho_1 - \beta)^2}{Peak_1}$$

DR – Rem, Ci – curies, E – Mev, R – feet

1 Curie = 3.7 x 10^{10} dis/sec

1 Horsepower = 2.54 x 10^3 BTU/hr

1 BTU = 778 ft-lb

1 gal (H_2O) ≈ 8 lb

c_P = 1.0 BTU/hr/lb/°F

1 kg = 2.21 lb

1 Mw = 3.41 x 10^6 BTU/hr

°F = 9/5 °C + 32

°C = 5/9 (°F - 32)

c_p = 1 cal/sec/gm/°C

Category A: Reactor Theory, Thermodynamics, and Facility Operating Characteristics

QUESTION A.01 [1.0 point]
Which ONE of the following terms in the six-factor formula is MOST affected by control rod movement?

a. Thermal non-leakage probability (L_T)

b. Thermal utilization factor (f)

c. Reproduction factor (η)

d. Fast fission factor (ε)

QUESTION A.02 [1.0 point]
All of the following statements regarding moderator properties are true EXCEPT:

a. A good moderator has a large energy loss per collision.

b. A good moderator slows neutrons to reduce the amount of neutron leakage from the core.

c. A good moderator has a small absorption cross-section and a large scattering cross-section.

d. A good moderator has a large absorption cross-section and a small scattering cross-section.

QUESTION A.03 [1.0 point]
Which ONE of the following is the stable reactor period that will result in a power rise from 65% to 85% in 25 seconds?

a. 59.2 seconds

b. 67.1 seconds

c. 93.2 seconds

d. 107.3 seconds

QUESTION A.04 [2.0 point, 0.50 each]
Match the reaction type in Column A with the equation in Column B. Options in Column B may be used once, more than once, or not at all.

Column A	Column B
a. Alpha decay	1. $^{239}_{93}\mathrm{Np} \rightarrow ^{239}_{94}\mathrm{Pu} + \mathbf{X}$
b. Beta-plus decay	2. $^{13}_{7}\mathrm{N} \rightarrow ^{13}_{6}\mathrm{C} + \mathbf{X}$
c. Beta-minus decay	3. $^{7}_{4}\mathrm{Be} + \mathbf{X} \rightarrow ^{7}_{3}\mathrm{Li}$
d. Electron capture	4. $^{234}_{92}\mathrm{U} \rightarrow ^{230}_{90}\mathrm{Th} + \mathbf{X}$

QUESTION A.05 [1.0 point]
Which ONE of the following best describes the reason that, following a reactor scram from full licensed power, indicated reactor power does not immediately decay to zero?

a. Core neutron population is sustained by the delayed neutron precursors.

b. Core neutron population is sustained by spontaneous fission of U-235.

c. In-core nuclear instrumentation lags the prompt drop.

d. Core neutron population is sustained by neutrons from the installed neutron source.

QUESTION A.06 [1.0 point]
During a reactor startup, criticality occurred at a lower rod height than the previous startup. Which ONE of the following explanations could be the reason for the change?

a. Nuclear Instrumentation drift.

b. Moderator temperature was higher.

c. The startup source was inserted into the core.

d. An experiment with negative reactivity was added.

QUESTION A.07 [1.0 point]
Which ONE of the following statements best describes the mean free path?

a. The inverse of the macroscopic cross-section.

b. The inverse of the microscopic cross-section.

c. The probability of a neutron being absorbed per centimeter of travel.

d. The probability of a neutron interacting with a nucleus per centimeter of travel.

QUESTION A.08 [1.0 point]
What is the remaining power following the prompt drop in the reactor power when a rod worth of 0.58 ΔK/K is rapidly inserted into a critical reactor? Assume βeff = 0.0065

a. 1.75%

b. 2.69%

c. 10.3%

d. 17.5%

QUESTION A.09 [1.0 point]
Which ONE of the following statements best describes the importance of a negative temperature coefficient of reactivity?

a. As fuel temperature increases, moderator temperature increases rapidly through conduction heat transfer, adding negative reactivity.

b. An increase in reactor power causes an increase in fuel temperature which results in a negative reactivity addition, causing the power increase to slow or stop.

c. As fuel temperature increases, the concentration of fission product poisons in the fuel matrix increases, adding negative reactivity through increased neutron absorption.

d. As fuel temperature increases, U-235 in the fuel is consumed, causing Pu-239 to form which becomes additional sources of fission causing control rods to be withdrawn farther, adding negative reactivity.

QUESTION A.10 [1.0 point]
Which ONE of the following statements best describes why U-235 fissions with thermal neutrons?

a. The activation energy released by the absorption of a neutron is less than the critical energy for fission.

b. The binding energy released by the absorption of a neutron is less than the critical energy for fission.

c. The activation energy released by the absorption of a neutron is greater than the critical energy for fission.

d. The binding energy released by the absorption of a neutron is greater than the critical energy for fission.

QUESTION A.11 [1.0 point]
An experimenter inserts an experiment into the core, and the count rate increases from 65 cps to 170 cps. Given the initial K_{eff} of the reactor was 0.88, what is the worth of the experiment?

a. Δρ = + 0.07

b. Δρ = - 0.07

c. Δρ = + 0.09

d. Δρ = - 0.09

QUESTION A.12 [1.0 point]
What is the condition of the reactor when $k = \frac{1}{1-\beta_{eff}}$?

a. Prompt critical

b. Supercritical

c. Subcritical

d. Critical

QUESTION A.13 [1.0 point]
Which ONE of the following statements regarding fission product poisoning is true?

a. During normal reactor operation, Xe-135 is removed from the core only by radioactive decay.

b. Following a reactor shutdown, the concentration of Xe-135 reaches a peak based on the decay of I-135 in the core.

c. During normal reactor operation, Sm-149 is removed from the core by both radioactive decay and neutron absorption.

d. Following a reactor shutdown, the concentration of Sm-149 reaches a peak because some fission is still occurring in the core.

QUESTION A.14 [1.0 point]
As new fuel is being loaded into the core, the reactor operator is using a 1/M plot to monitor core loading. Which ONE of the following conditions could result in the reactor reaching critical mass at a value greater than the predicted critical mass?

a. The detector and source are too far from each other.

b. Too much time elapses between subsequent core loadings.

c. The detector is located so that core load starts away from the detector and subsequent loading proceeds towards the detector.

d. The detector is located so that core load starts at a point close to the detector and subsequent loadings move farther from the detector.

QUESTION A.15 [1.0 point]
The moderator temperature coefficient for a reactor is -0.00067 $\Delta k/k/°F$. What is the total reactivity change caused by a temperature increase of 19°F?

a. - 0.0113

b. - 0.0127

c. -0.1273

d. -0.1298

QUESTION A.16 [1.0 point, 0.25 each]
For each scenario in Column A, identify the direction in Column B that control rods would need to be moved at KSU to maintain constant reactor power. Answers in Column B may be used once, more than once, or not at all.

Column A	Column B
a. Buildup of Xe-135	1. Insert
b. Burnup of U-238	2. Withdraw
c. Removal of neutron source	3. No movement
d. Fuel temperature decrease	

QUESTION A.17 [1.0 point]
The average energy release per fission with a thermal neutron in U-235 is _____ with the majority of energy being released from _____.

a. 187 MeV; energy of fission neutrons

b. 187 MeV; kinetic energy of fission products

c. 200 MeV; energy of fission neutrons

d. 200 MeV; kinetic energy of fission products

QUESTION A.18 [1.0 point]
Which ONE of the following coefficients of reactivity is credited with immediately adding negative reactivity in response to a large prompt insertion of reactivity?

a. Moderator Temperature Coefficient

b. Fuel Temperature Coefficient

c. Pressure Coefficient

d. Void Coefficient

QUESTION A.19 [1.0 point]
The process in which a neutron strikes a nucleus leaving the nucleus in an excited state is referred to as:

a. Elastic scattering.

b. Inelastic scattering.

c. Photoelectric effect.

d. Neutron annihilation.

(***** END OF CATEGORY A *****)

Category B: Normal/Emergency Operating Procedures and Radiological Controls

QUESTION B.01 [1.0 point]
In accordance with the KSU Emergency Plan, which ONE of the following statements best describes the KSU Emergency Planning Zone?

a. The area encompassing all of Ward Hall and the adjacent Fenced Area.

b. The area defined as Room 109 (Control Room) and Room 110 (Reactor Bay).

c. The area directly affected by the emergency and may be extended, depending on the type of emergency.

d. The area beyond the area affected by the emergency which is needed to treat the situation.

QUESTION B.02 [1.0 point, 0.25 each]
In accordance with KSU Technical Specifications, match the surveillance activity in Column A with the required surveillance interval in Column B. Options in Column B may be used once, more than once, or not at all.

Column A	Column B
a. Control rod reactivity worth determination.	1. Semi-annual
b. Transient rod drive cylinder and air supply inspection.	2. Annual
c. Primary pool water temperature channel calibration.	3. Biennial
d. Reactor power level calorimetric calibration	

QUESTION B.03 [2.0 point, 0.5 each]
In accordance with 10 CFR 20, match the radiation readings from Column A with its corresponding radiation area classification in Column B. Assume all distances at 30 cm unless specified. Answers may be used once, more than once, or not at all.

Column A	Column B
a. 15 mR/hr	1. Unrestricted Area
b. 2 mR/hr	2. Radiation Area
c. 550 Rad/hr at 1 m	3. High Radiation Area
d. 5 R/hr	4. Very High Radiation Area

QUESTION B.04 [1.0 point]
A three-curie source emits an 8 MeV gamma 80% of the time. The source will be placed in the reactor storage room. How far from the source should a high radiation area sign be posted?

a. 3.40 feet

b. 10.7 feet

c. 33.9 feet

d. 38.2 feet

QUESTION B.05 [1.0 point]
In accordance with Procedure No. 1, Biennial Control Rod Inspection, which ONE of the following statements is true?

a. One or more fuel elements may need to be removed from the core to ensure negative reactivity in compliance with Technical Specifications.

b. One or more fuel elements may need to be removed from the core to ensure shutdown margin is in compliance with Technical Specifications.

c. If the reactor has been shut down for an extended amount of time, multiple control rods may be removed from the core at a time.

d. The shutdown margin must be less than $0.50 with control rods withdrawn.

QUESTION B.06 [1.0 point]
The radiation from an unshielded source is 175 mrem/hr. A lead sheet of 15 mm thickness is inserted and the radiation level drops to 5 mrem/hr. What is the half-value-layer (HVL) of lead?

a. 1.73 mm

b. 2.92 mm

c. 10.9 mm

d. 29.4 mm

QUESTION B.07 [1.0 point]
Which ONE of the following conditions would be a violation of 10 CFR Part 55?

a. Your last medical exam was 12 months ago.

b. Last quarter, you were the console operator for 6 hours.

c. Your last operating test was 14 months ago.

d. Your last written examination was 12 months ago.

QUESTION B.08 [1.0 point]
In accordance with Procedure No. 26, Fuel Handling Procedure, all of the following personnel are required to be present for fuel handling EXCEPT:

a. A licensed Reactor Operator

b. A licensed Senior Reactor Operator

c. A trained fuel handler

d. A representative member of the Reactor Safeguards Committee

QUESTION B.09 [1.0 point, 0.25 each]
In accordance with the KSU Emergency Plan, match the emergency event in Column A with the event classification in Column B. Options in Column B may be used once, more than once, or not at all.

Column A	Column B
a. An earthquake which causes visible cracks in the reactor tank.	1. Non-Classified Event
b. Increasing levels of I-131 detected in primary coolant samples.	2. Medical Incident
c. An individual falls in a contaminated area and requires transportation to an off-site hospital for treatment.	3. Unusual Event
d. Fire in the counting room that can be extinguished within ten minutes.	4. Alert

Category B: Normal/Emergency Operating Procedures and Radiological Controls

QUESTION B.10 [1.0 point]
In accordance with KSU Technical Specifications, all of the following conditions are permissible during operation EXCEPT:

a. Calculated reactivity with all control rods fully withdrawn is $3.75.

b. Continuous air radiation monitor is non-operational but the exhaust plenum radiation monitor is operating.

c. Water temperature at the exit of the reactor pool is 135°F with flow through the primary cleanup loop secured.

d. Period scram bypassed.

QUESTION B.11 [1.0 point]
In accordance with 10 CFR 20, which ONE of the following correctly defines the effective dose equivalent (EDE)?

a. The sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).

b. The sum of the products of the dose equivalent to the organ or tissue and the weighting factors applicable to each of the body organs or tissues that are irradiated.

c. The concentration of a given radionuclide in air which, if breathed by the reference man for a working year of 2,000 hours under conditions of light work, results in an intake of one ALI.

d. The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

QUESTION B.12 [1.0 point]
In accordance with KSU Emergency Plan Procedure 5, Fire, the Reactor Operator should take all of the following actions EXCEPT:

a. Secure the reactor.

b. Shutdown the exhaust fan.

c. Secure HVAC discharge.

d. Evacuate the facility by activating a fire alarm pull station.

Category B: Normal/Emergency Operating Procedures and Radiological Controls

QUESTION B.13 [1.0 point]
In accordance with KSU Procedure No. 15, Steady State Operation, which ONE of the following conditions must be met when operating?

a. A control rod drive that is determined to be drifting may continue to be withdrawn and adjusted to maintain constant power until the end of the current operation.

b. One startup channel capable of indicating power level of a minimum of 100 W must be operable.

c. The regulating rod must be between 200 and 1000 units while in automatic mode.

d. The primary cooling pump may remain in standby until primary coolant temperature at the reactor pool exit reaches 100°C.

QUESTION B.14 [1.0 point]
In accordance with KSU Technical Specifications, all of the following experiments would be allowed to be conducted while the reactor is operating EXCEPT:

a. The reactivity worth of a single experiment is $1.75.

b. Two related experiments in the reactor, each with a reactivity worth of $1.25, are irradiated simultaneously.

c. Three unrelated experiments with reactivity worths of $0.75, - $0.25, and $1.00 are irradiated simultaneously.

d. A single experiment, doubly encapsulated, containing 10 mg of TRISO fuel, with a reactivity worth of $2.00.

QUESTION B.15 [1.0 point]
Which ONE of the following changes would NOT require a 10 CFR 50.59 evaluation?

a. An administrative update to the Safety Analysis Report to correct spelling and formatting errors.

b. A modification to eliminate paper logbook requirements and move to digital log keeping.

c. Changing the console high power scram setpoint on the linear channel detector from 104% to 110%.

d. Moving the instrumented fuel element from the B ring to the E ring.

Category B: Normal/Emergency Operating Procedures and Radiological Controls

QUESTION B.16 [1.0 point]
The exposure rate for a point source is 250 mR/hr at a distance of 3 meters. What is the exposure rate at a distance of 7 meters?

a. 15 mR/h

b. 46 mR/hr

c. 98 mR/hr

d. 107 mR/hr

QUESTION B.17 [1.0 point]
In accordance with the KSU Emergency Plan, all of the following are responsibilities of the Emergency Organization Officer (EO) EXCEPT:

a. Guiding people to the Emergency Operations Center.

b. Relay messages between the Emergency Operations Center and other emergency personnel at the scene.

c. Declaring an Unusual Event or an Alert.

d. Ensuring proper dosimetry is worn and recorded.

QUESTION B.18 [1.0 point]
In accordance with Procedure 16, Pulsed Operation, which ONE of the following steps must be performed prior to initiating a pulse?

a. Calibration of the ionization chamber, even if the detector has not been moved since its previous calibration.

b. A functional performance check of the transient rod to ensure the transient rod drops 5-6 seconds after firing.

c. Establish criticality at 10 kW.

d. Obtain permission to perform the pulse from the Reactor Safeguards Committee.

QUESTION B.19 [1.0 point]
In accordance with Emergency Plan Procedure 9, Loss of Reactor Coolant, all of the following are methods of replacing water lost to a leak EXCEPT:

a. Adding makeup water from the deionizer.

b. Connecting a garden hose from the tap water next to the cleanup look

c. Adding makeup water from the bulk shield tank.

d. Using a fire hose to fill the primary tank.

(***** END OF CATEGORY B *****)

Category C: Facility and Radiation Monitoring Systems

QUESTION C.01 [1.0 point]
In accordance with the KSU Safety Analysis Report, which ONE of the following statements regarding the nuclear instrumentation during pulse operations is true?

a. The linear channel is disabled, and maximum pulse power is measured on a sub-channel of the percent power channel.

b. The percent power channel is disabled, and maximum pulse power is measured on a sub-channel of the linear channel.

c. Both the logarithmic and linear channels are disabled, and maximum pulse power is measured using a neutron sensitive measuring channel on the central thimble.

d. All three measuring channels function the same as in steady state mode.

QUESTION C.02 [1.0 point]
In accordance with the KSU Safety Analysis Report, all of the following would be indications of a loss of reactor coolant EXCEPT:

a. High sump level.

b. Low reactor tank level.

c. Increased radiation levels.

d. Low secondary surge tank level.

QUESTION C.03 [1.0 point, 0.25 each]
In accordance with the KSU Safety Analysis Report, match the detector type in Column A with the correct function in Column B. Options in Column B may be used once, more than once, or not at all.

Column A	**Column B**
a. Low-level Geiger Muller counter	1. Gamma and beta monitoring
b. Bonner Sphere	2. Air monitoring
c. Ion Chamber	3. Contamination monitoring
d. Rem Ball	4. Neutron monitoring

Category C: Facility and Radiation Monitoring Systems

QUESTION C.04 [1.0 point]
In accordance with the KSU Training Manual, which ONE of the following statements best describes the composition of the transient rod?

a. Boron carbide sealed in aluminum.

b. Boron carbide sealed in stainless steel.

c. Solid graphite impregnated with boron in an aluminum shell.

d. Solid graphite impregnated with boron in a stainless steel shell.

QUESTION C.05 [1.0 point]
In accordance with the KSU Safety Analysis Report, the reactor bay is maintained at a slight _____ differential pressure in order to _____.

a. negative; ensures all Ar-41 produced during operation is contained within the reactor bay to prevent uncontrolled radiological releases to the environment.

b. negative; ensures all Ar-41 produced during operation is released in a controlled manner to ensure personnel working within the reactor bay are adequately protected.

c. positive; ensures all Ar-41 produced during operation is contained within the reactor bay to prevent uncontrolled radiological releases to the environment.

d. positive; ensures all Ar-41 produced during operation is released in a controlled manner to ensure personnel working within the reactor bay are adequately protected.

QUESTION C.06 [1.0 point]
In accordance with the KSU Safety Analysis Report, which ONE of the following statements best describes the design of the wide-range log channel?

a. A proportional detector lined with B-10.

b. A compensated ion chamber.

c. A fission chamber lined with U_3O_8.

d. An uncompensated ion chamber.

Category C: Facility and Radiation Monitoring Systems

QUESTION C.07 [1.0 point]
In accordance with the KSU Technical Specifications, which ONE of the following statements best describes the reason for maintaining primary water temperature below 130° F?

a. To prevent submerged experiments and equipment from being damaged by excessive heat.

b. To prevent the Safety Limit from being violated.

c. To ensure the pool water does not reach boiling, which could damage the fuel.

d. To ensure the integrity of the demineralizer resin.

QUESTION C.08 [1.0 point]
In accordance with the KSU Safety Analysis Report, all of the following are gaseous radioactive effluents produced during normal operation EXCEPT:

a. H-3

b. N-16

c. Ar-41

d. Rn-222

QUESTION C.09 [1.0 point]
In accordance with the KSU Safety Analysis Report, which ONE of the following statements regarding the siphon break is true?

a. The siphon break is a series of valves which automatically open to introduce air into the primary coolant piping system to prevent siphoning of the coolant if there is a break in the primary coolant inlet pipe.

b. The siphon break is a series of valves which automatically close to prevent siphoning of the coolant if there is a break in the primary coolant inlet pipe.

c. The siphon break is a small hole in the primary coolant piping which allow air into the pipe if the coolant level drops below the break point.

d. The siphon break is a small hole in the primary coolant piping at which the garden hose can be connected for emergency pool fill in the event of a primary coolant line break.

Category C: Facility and Radiation Monitoring Systems

QUESTION C.10 [1.0 point]
In accordance with the KSU Training manual, which ONE of the following statements best describes the purpose of the 2 cps interlock?

a. This interlock prevents the possibility of pulsing on a subcritical reactor.

b. This interlock prevents the possibility of starting the reactor up without a source.

c. This interlock ensures that there is a sufficient shutdown margin to safely start the reactor.

d. This interlock ensures that there is a credible and valid signal on the logarithmic channel prior to reactor startup.

QUESTION C.11 [1.0 point]
In accordance with the KSU Training Manual, which ONE of the following best describes the KSU standard control rod limit switches?

a. Rod up, rod down, magnet down.

b. Rod up, rod down, magnet up.

c. Magnet up, magnet down, rod down.

d. Magnet up, magnet down, rod up.

QUESTION C.12 [1.0 point]
In accordance with the KSU Safety Analysis Report, which ONE of the following statements best describes the KSU standard control rod drives?

a. Two 2-phase electric servo motors in parallel driving a lead-screw nut combination

b. An electric motor actuated linear drive with a magnetic coupler.

c. A large compression spring with a ball nut and screw jack.

d. A gear reduction system, and an acme screw type drive.

Category C: Facility and Radiation Monitoring Systems

QUESTION C.13 [1.0 point]
In accordance with the KSU Technical Specifications, which ONE of the following actions would be considered a Channel CALIBRATION?

a. Adjustment of linear channel indications following performance of the thermal power calibration to correct for acceptable instrument drift.

b. Verifying proper operation of the linear channel using an external electronic signal.

c. Comparison of current linear channel indications with linear channel indications at the same power levels during previous reactor operations.

d. Comparison of linear channel indications with the power channel indications of reactor power.

QUESTION C.14 [1.0 point]
Which ONE of the following statements best describes how primary coolant temperature is measured?

a. A thermocouple detects changes in pool temperature by measuring the voltage difference between two wires of dissimilar metals.

b. A thermistor detects changes in pool temperature by using a thermally sensitive resistor that exhibits a continuous, small, incremental change in resistance correlated to variations in temperature.

c. A resistance temperature detector detects changes in pool temperature by measuring changes in resistance to the flow of electricity resulting from changes in temperature of the resistive metal element.

d. A semiconductor-based temperature sensor detects changes in pool temperature by utilizing two identical diodes with temperature-sensitive voltage vs current characteristics that are used to monitor changes in temperature.

QUESTION C.15 [1.0 point]
In accordance with the KSU Training Manual, which ONE of the following statements best describes what happens to the transient rod when a reactor scram is initiated?

a. The magnet on the transient rod will de-energize to automatically drive the connecting rod, piston, and transient rod into the reactor.

b. The magnet on the transient rod will de-energize to release the air pressure and drop the transient rod into the reactor.

c. The solenoid on the transient rod will de-energize to automatically drive the connecting rod, piston, and transient rod into the reactor.

.

d. The solenoid on the transient rod will de-energize to release the air pressure and drop the transient rod into the reactor.

Category C: Facility and Radiation Monitoring Systems

QUESTION C.16 [1.0 point]
In accordance with the KSU Safety Analysis Report, all of the following statements describe the spaces ONE of the following statements best describes the KSU central thimble?

a. An aluminum tube at the center of the core that is normally filled with water but may be voided to use as a beam line.

b. A stainless steel tube at the center of the core that is normally filled with water but may be voided to use as a beam line.

c. An aluminum tube at the center of the core that is always filled with an inert gas and capped with a lead plug.

d. A stainless steel tube at the center of the core that is always filled with an inert gas and capped with a lead plug.

QUESTION C.17 [1.0 point]
In accordance with KSU Technical Specifications, which ONE of the following statements best describes the reason for the control rod interlock function?

a. To prevent withdrawing the standard control rods in Pulse mode.

b. To prevent withdrawing the transient control rod in Steady State mode.

c. To prevent the transient rod from being withdrawn without air applied to it in any mode.

d. To prevent more than one standard control rod from being withdrawn at a time in Steady State mode.

QUESTION C.18 [1.0 point]
In accordance with the KSU Safety Analysis Report, all of the following receive power from a battery backup in the event of a loss of power to the facility EXCEPT:

a. Fire alarm system.

b. Evacuation alarm.

c. Nuclear Instrumentation.

d. Security system.

Category C: Facility and Radiation Monitoring Systems

QUESTION C.19 [1.0 point]
In accordance with the KSU Technical Specification Bases, which ONE of the following statements best describes the types of radiation detected by the air monitoring system (AMS)?

a. The AMS has maximum sensitivity to iodine.

b. The AMS has maximum sensitivity to particulate radiation.

c. The AMS has individual channels for detecting alpha, beta, and gamma radiation.

d. The AMS has individual channels for detecting radioactive particulate, iodine, and noble gas.

QUESTION C.20 [1.0 point]
In accordance with the KSU Safety Analysis Report, which ONE of the following statements best describes the protective functions of the logarithmic power monitor?

a. A high voltage scram and a high power scram only.

b. A high voltage scram, a high power scram, and a period scram

c. A high voltage scram, a period scram, and a rod withdrawal interlock.

d. A high voltage scram, a high power scram, and a rod withdrawal interlock.

(***** END OF CATEGORY C *****)
(********** END OF EXAMINATION **********)

Category A: Reactor Theory, Thermodynamics, and Facility Operating Characteristics

A.01
Answer: b.
Reference: Burn, *Introduction to Nuclear Reactor Operations*, Volume 3, p. 3-19

A.02
Answer: d.
Reference: DOE Fundamentals Handbook, Volume 1, Module 2, p 23-24.

A.03
Answer: c.
Reference: $P = P_0 e^{t/T}$
$T = t / (\ln(P/P_0))$
$T = 25/\ln(85/65)$
$T = 25/(\ln(0.268))$
$T = 93.2$ seconds

A.04
Answer: a. 4; b. 2; c. 1; d. 3
Reference: DOE Fundamentals Handbook, Volume 1, Module 1, p. 24-25

A.05
Answer: a.
Reference: Burn, *Introduction to Nuclear Reactor Operations*, Volume 3, p. 3-7

A.06
Answer: b.
Reference: Standard NRC question

A.07
Answer: a.
Reference: Burn, *Introduction to Nuclear Reactor Theory*, p. 2-43

A.08
Answer: a.
Reference: $\frac{P_1}{P_0} = \frac{\beta_{eff} \cdot (1-p)}{\beta_{eff} - p}$
$P_1/P_0 = (0.0065 \times (1+0.58)) / (0.0065+0.58)$
$P_1/P_0 = 0.0175$
$P_1/P_0 = 1.75\%$

A.09
Answer: b.
Reference: DOE Fundamentals Handbook, Volume 2, Module 3, p. 28

A.10
Answer: d.
Reference: DOE Fundamentals Handbook, Volume 1, Module 1, p. 51

A.11
Answer: c.
Reference: $CR_1 / CR_2 = (1 – K_{eff2}) / (1 – K_{eff1})$
$65 / 170 = (1 – K_{eff2}) / (1 – 0.88)$
$0.382 = (1 – K_{eff2}) / 0.12$
Therefore $K_{eff2} = 0.954$
$\Delta\rho = (K_{eff2} – K_{eff1}) / (K_{eff2} * K_{eff1})$
$\Delta\rho = (0.954 – 0.88) / (0.954 * 0.88)$
$\Delta\rho = + 0.09$

A.12
Answer: a.
Reference: LaMarsh, *Introduction to Nuclear Engineering*, Page 340-341
$(1-\beta)k = 1$ is a prompt critical condition. Rearranging this equation results in

$$k = \frac{1}{1-\beta}$$

A.13
Answer: b.
Reference: DOE Fundamentals Handbook, Volume 2, Module 3, p. 30-47

A.14
Answer: c.
Reference: Burn, *Introduction to Nuclear Reactor Operations,* Section 5.5, p. 5-18

A.15
Answer: b.
Reference: DOE Fundamentals Handbook, Volume 2, Module 3, p. 21,
$\Delta\rho = \alpha T * \Delta T$
$\Delta\rho = (-0.00067\ \Delta k/k\ /°F) * (19°F)$
$\Delta\rho = - 0.0127\ \Delta k/k$

A.16
Answer: a. 2 (Withdraw); b. 2 (Withdraw); c. 1 (Insert); d. 1 (Insert)
Reference: Burn, *Introduction to Nuclear Reactor Operations*, p. 7-17

A.17
Answer: d.
Reference: DOE Fundamentals Handbook, Volume 1, Module 1, page 61

A.18
Answer: b.
Reference: DOE Fundamentals Handbook, Volume 2, Module 3, p. 26

A.19
Answer: b.
Reference: Burn, *Introduction to Nuclear Reactor Operations*, Section 2.4.5, page 2-7-1

(***** END OF CATEGORY A *****)

Category B: Normal/Emergency Operating Procedures and Radiological Controls

B.01
Answer: b.
Reference: KSU Emergency Pla, 1.5.2

B.02
Answer: a. 3 (Biennial); b. 1 (Semi-annual); c. 2 (Annual); d. 2 (Annual)
Reference: KSU Technical Specifications 4.1.1, 4.3.2, and 4.4.2

B.03
Answer: a. 2 (Radiation Area); b. 1 (RA); c. 4 (VHRA); d. 3 (HRA)
Reference: 10 CFR 20.1003 and 20.1004

B.04
Answer: c.
Reference: I=6CEn=R/hr@ft.
6*3Ci x 8Mev x 80% = 115.2 R/hr @ $(1ft)^2$ =
115.2 R/hr = 0.1 R/hr @ D2
$\sqrt{}$1152 R/hr = 33.9 ft.

B.05
Answer: b.
Reference: KSU Procedure No. 1, Biennial Control Rod Inspection

B.06
Answer: b.
Reference: $DR = DR_0 * e^{-\mu X}$
Find μ:
$5 = 175 * e^{-\mu * 15}$
$0.0286 = e^{-\mu * 15}$
$\ln(0.0286) = \ln(e^{-\mu * 15})$
$-3.555 = -\mu * 15$
$\mu = 0.237$
If insertion of an HVL (thickness of lead), the original intensity will be reduced by half.
Find X:
$1 = 2 * e^{-0.237 * X}$
$0.5 = e^{-0.237 * X}$
$\ln(0.5) = \ln(e^{-0.237 * X})$
$-0.693 = -0.237 * X$
X= 2.92 mm

B.07
Answer: c.
Reference: 10 CFR Part 55

B.08
Answer: d.
Reference: KSU Procedure No. 26, Fuel Handling Procedure

Category B: Normal/Emergency Operating Procedures and Radiological Controls

B.09
Answer: a. 4 (Alert); b. 3 (Unusual Event); c. 2 (Medical Incident); d. 1 (Non-Classified)
Reference: KSU Emergency Plan Sections 5, 6, and 7

B.10
Answer: c.
Reference: KSU Technical Specifications 3.1.3, 3.3.3, 3.3.4, and 3.8.3

B.11
Answer: b.
Reference: 10 CFR 20.1003

B.12
Answer: d.
Reference: KSU Emergency Plan Procedure 5, Fire

B.13
Answer: c.
Reference: KSU Procedure 15, Steady State Operation

B.14
Answer: b.
Reference: KSU Technical Specifications 3.6.3

B.15
Answer: a.
Reference: 10 CFR 50.59; Standard NRC question

B.16
Answer: b.
Reference: $I_2 = I_1 D_1^2 / d_2^2$
$I_2 = (250\ mR/hr)(3m)^2 / (7m)^2$
$I_2 = 46\ mR$

B.17
Answer: c.
Reference: KSU Emergency Plan, 3.4

B.18
Answer: b.
Reference: Procedure 16, Pulsed Operation

B.19
Answer: d.
Reference: Emergency Plan Procedure 9, Loss of Reactor Coolant

(***** END OF CATEGORY B *****)

Category C: Facility and Radiation Monitoring Systems

C.01
Answer: a.
Reference: KSU SAR 7.1

C.02
Answer: d.
Reference: KSU SAR 5.2

C.03
Answer: a. 3 or 1 (based on facility comments); b. 4; c. 1; d. 4
Reference: KSU SAR 7.7

C.04
Answer: c.
Reference: KSU Training Manual p. 8

C.05
Answer: b.
Reference: KSU SAR 3.5.4 and KSU Technical Specifications 3.5.5

C.06
Answer: c.
Reference: KSU SAR 7.3.1

C.07
Answer: d.
Reference: KSU Technical Specifications 3.3.5

C.08
Answer: d.
Reference: KSU Safety Analysis Report 11.1.1

C.09
Answer: c.
Reference: KSU SAR 5.2

C.10
Answer: b. or d. (based on facility comments)
Reference: KSU Training Manual p. 16

C.11
Answer: c.
Reference: KSU Training Manual p. 22

C.12
Answer: b.
Reference: KSU SAR 7.3.4

C.13
Answer: a.
Reference: KSU Technical Specifications, 1.0 Definitions

Category C: Facility and Radiation Monitoring Systems

C.14
Answer: a.
Reference: Standard NRC question; KSU SAR 5.1

C.15
Answer: d.
Reference: KSU Training Manual p. 24

C.16
Answer: a.
Reference: KSU SAR 10.2.1

C.17
Answer: a.
Reference: KSU Technical Specifications 3.4.5

C.18
Answer: c.
Reference: KSU SAR 8.2

C.19
Answer: d.
Reference: KSU Technical Specifications 3.3.5

C.20
Answer: c.
Reference: KSU SAR 7.3.1

(***** END OF CATEGORY C *****)
(********** END OF EXAMINATION **********)