UNITED STATES NUCLEAR REGULATORY COMMISSION
BOILING WATER REACTOR GENERIC FUNDAMENTALS EXAMINATION
MARCH 2020 – FORM A

DO NOT BEGIN THIS EXAMINATION UNTIL DIRECTED TO DO SO.

Please Print:

Name: _____

Docket No.: 55-_____

Facility: _____

Start Time: _____ Stop Time: _____

Instructions to Examinee:

This examination applies to a typical U.S. boiling water reactor (BWR) nuclear power plant. There are 50 multiple-choice test items to answer, each having equal point value. There are multiple forms of this examination, each containing the same test items in a random order. Answer all test items using the provided answer sheet, ensuring a single answer is marked for each test item. A score of at least 80 percent is required to pass this portion of the NRC operator licensing written examination. When you have completed the examination, sign your name under the statement at the bottom of this page. All examination materials will be collected 3 hours after the examination begins.

KNOWLEDGE AREA	NUMBER OF TEST ITEMS	PERCENT OF TOTAL	SCORE
COMPONENTS	22	44	
REACTOR THEORY	14	28	
THERMODYNAMICS	14	28	
TOTALS	50	100	

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

_____

Examinee Signature

RULES AND INSTRUCTIONS FOR THE
NRC GENERIC FUNDAMENTALS EXAMINATION

During the administration of this examination the following rules apply:

NOTE: The term "control rod" refers to the length of neutron absorber material that can be positioned by the operator to change core reactivity.

NOTE: Numerical answers are rounded to the nearest whole number unless otherwise indicated.

1. Print your name in the blank provided on the cover sheet of the examination.

2. Fill in your individual docket number.

3. Fill in the name of your facility.

4. Fill in your start and stop times at the appropriate times.

5. Two aids are provided for your use during the examination:

   (1) An Equations and Conversions Sheet contained within the examination copy, and

   (2) Steam tables and Mollier Diagram provided by your proctor.

6. Scrap paper will be provided for calculations.

7. Place your answers on the answer sheet provided. Credit will only be given for answers properly marked on this sheet. Follow the instructions for filling out the answer sheet.

8. Do not make assumptions regarding conditions that are not specified in the question unless they occur as a consequence of other conditions that are stated in the question. For example, you should not assume operator actions have been taken. Also, this examination tests knowledge of general fundamentals, therefore do not make assumptions based on specific plant procedures.

9. Cheating on the examination will result in the automatic forfeiture of this examination. Cheating could also result in severe penalties.

10. Restroom trips are limited. Only **one** examinee may leave the room at a time. In order to avoid the appearance or possibility of cheating, avoid all contact with anyone outside the examination room.

11. After you have completed the examination, sign the statement on the cover sheet indicating that the work is your own and you have neither given nor received any assistance in completing the examination. Either pencil or pen may be used.

12. Turn in your examination materials, answer sheet on top, followed by the examination copy and the examination aids, e.g., steam tables, handouts, and scrap paper.

13. After turning in your examination materials, leave the examination area as defined by the proctor. If after leaving you are found in the examination area while the examination is in progress, your examination may be forfeited.

GENERIC FUNDAMENTALS EXAMINATION
EQUATIONS AND CONVERSIONS SHEET

EQUATIONS

$\dot{Q} = \dot{m}c_p\Delta T$

$\dot{Q} = \dot{m}\Delta h$

$\dot{Q} = UA\Delta T$

$\dot{Q} \propto \dot{m}^3_{\text{Nat Circ}}$

$\Delta T \propto \dot{m}^2_{\text{Nat Circ}}$

$K_{eff} = 1/(1 - \rho)$

$\rho = (K_{eff} - 1)/K_{eff}$

$SUR = 26.06/\tau$

$\tau = \dfrac{\bar{\beta}_{eff} - \rho}{\lambda_{eff}\ \rho}$

$\rho = \dfrac{\ell^*}{\tau} + \dfrac{\bar{\beta}_{eff}}{1 + \lambda_{eff}\ \tau}$

$\ell^* = 1.0 \times 10^{-4}$ sec

$\lambda_{eff} = 0.1\ \text{sec}^{-1}$ (for $\rho > 0$)

$DRW \propto \varphi^2_{tip} / \varphi^2_{avg}$

$P = P_o e^{t/\tau}$

$P = P_o 10^{SUR(t)}$

$A = A_o e^{-\lambda t}$

$N = S/(1 - K_{eff})$

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

$1/M = CR_1/CR_x$

$A = \pi r^2$

$F = PA$

$\dot{m} = \rho A\vec{v}$

$\dot{W}_{Pump} = \dot{m}\Delta P\upsilon$

$P = I^2R$

$P = IE$

$P_A = \sqrt{3}IE$

$P_T = \sqrt{3}IEpf$

$P_R = \sqrt{3}IE\sin\theta$

Thermal Efficiency = Net Work Out/Energy In

$$\frac{g(z_2 - z_1)}{g_c} + \frac{(\vec{v}_2^2 - \vec{v}_1^2)}{2g_c} + \upsilon(P_2 - P_1) + (u_2 - u_1) + (q - w) = 0$$

$g = 32.2\ \text{ft/sec}^2$

$g_c = 32.2$ lbm-ft/lbf-sec^2

CONVERSIONS

1 MW = 3.41 x 10^6 Btu/hr

1 hp = 2.54 x 10^3 Btu/hr

1 Btu = 778 ft-lbf

°C = (5/9)(°F − 32)

°F = (9/5)(°C) + 32

1 kg = 2.21 lbm

1 ft^3_{water} = 7.48 gal

1 gal_{water} = 8.35 lbm

1 Curie = 3.7 x 10^{10} dps

QUESTION: 1

A reactor has been operating at 50 percent power for 1 week. If a reactor power increase to 100 percent is initiated, the xenon-135 concentration will initially…

A. decrease, and then build up to a higher equilibrium concentration.

B. increase, and then build up to a higher equilibrium concentration.

C. decrease, and then return to the same equilibrium concentration.

D. increase, and then return to the same equilibrium concentration.

QUESTION: 2

Refer to the drawing of a differential pressure (D/P) level detection system for a reactor vessel at normal operating temperature and pressure (see figure below).

A nuclear power plant uses several differential pressure detectors like the one below to provide multiple channels of reactor vessel water level indication. A hot channel was calibrated when the reactor vessel was at normal operating temperature. A cold channel was calibrated when the reactor vessel was at 160°F.

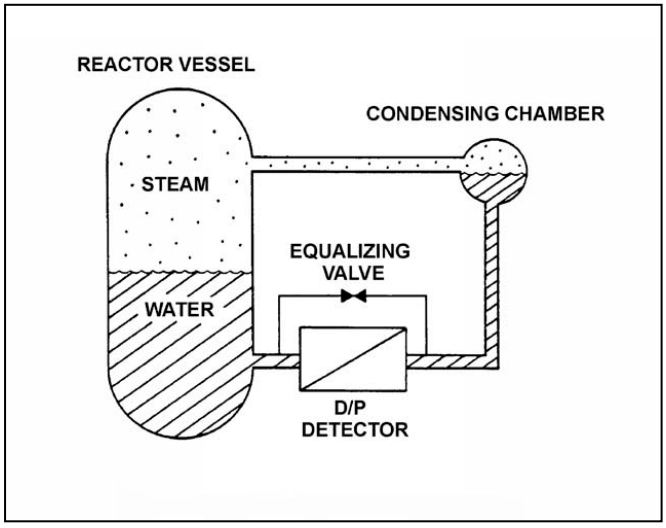
How will the level indications on the two channels compare when the reactor vessel is at normal operating temperature?

A. The cold channel will indicate higher than the hot channel, due to the difference in reference leg water density at the two calibration temperatures.

B. The cold channel will indicate lower than the hot channel, due to the difference in reference leg water density at the two calibration temperatures.

C. The cold channel will indicate higher than the hot channel, due to the difference in reactor vessel water density at the two calibration temperatures.

D. The cold channel will indicate lower than the hot channel, due to the difference in reactor vessel water density at the two calibration temperatures.



QUESTION: 3

Why are burnable poisons installed in a reactor?

A. To compensate for control rod burnout during a fuel cycle.

B. To flatten the radial thermal neutron flux distribution near the end of a fuel cycle.

C. To ensure a negative moderator temperature coefficient exists early in a fuel cycle.

D. To shield some of the reactor fuel from thermal neutron flux until later in a fuel cycle.

QUESTION: 4

Refer to the drawing of a horizontal pipe elbow (top view) in an operating water system (see figure below).

Three separate differential pressure flow detectors are connected to taps A, B, C, and D as follows:

Detector	Taps
X	A and D
Y	B and D
Z	C and D

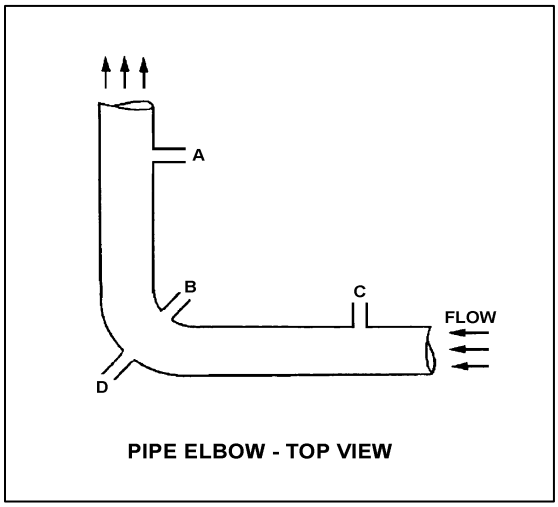
Assuming zero head loss in this section of pipe, how will the detectors be affected if tap D ruptures?

A. All detectors will fail low.

B. All detectors will fail high.

C. Two detectors will fail low and one will fail high.

D. Two detectors will fail high and one will fail low.



QUESTION: 5

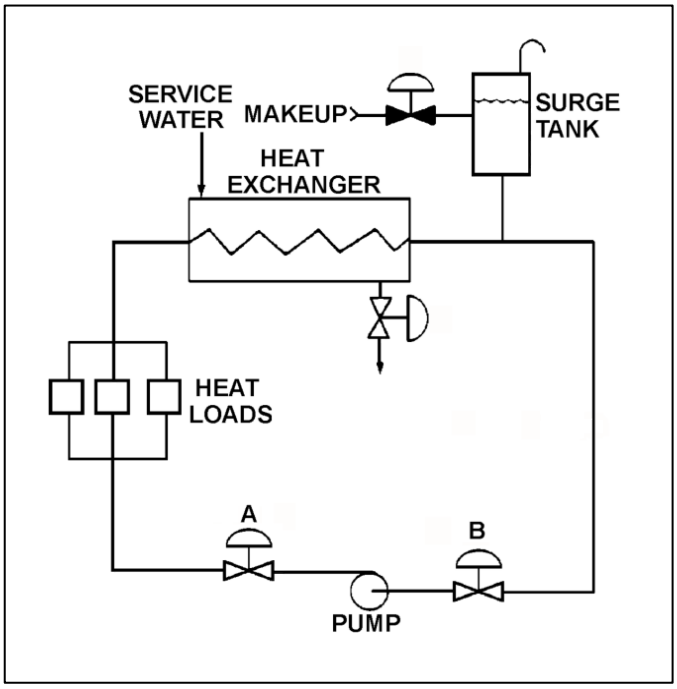
Refer to the drawing of an operating cooling water system (see figure below) in which valves A and B are identical. Valve A is one-half open and valve B is fully open. If valve A is opened fully, the differential pressure (D/P) across valve B will…

A. increase by the same amount as the absolute change in D/P across valve A.

B. increase by an amount less than the absolute change in D/P across valve A.

C. decrease by the same amount as the absolute change in D/P across valve A.

D. decrease by an amount less than the absolute change in D/P across valve A.



QUESTION: 6

A centrifugal pump is operating at rated conditions in an open system. If a system transient causes the pump to operate at runout, which one of the following indications will be present?

A. Increased pump discharge pressure.

B. Decreased pump motor current.

C. Increased pump vibration.

D. Decreased pump flow rate.

QUESTION: 7

A 480 VAC motor control center supplies a load through a breaker and a manual disconnect switch. Which one of the following sequences will provide the greatest level of personnel safety when de-energizing the load for maintenance, and when re-energizing the load after the maintenance is complete?

	DE-ENERGIZING	RE-ENERGIZING
A.	Open breaker first	Shut breaker first
B.	Open breaker first	Shut disconnect switch first
C.	Open disconnect switch first	Shut breaker first
D.	Open disconnect switch first	Shut disconnect switch first

QUESTION: 8

Which one of the following is a characteristic of a typical AC induction motor that causes starting current to be greater than running current?

A. The rotor's magnetic field induces an opposing voltage in the stator that is proportional to rotor speed.

B. After the motor starts, resistors are added to the electrical circuit to limit the running current.

C. A large amount of starting current is required to initially establish the rotating magnetic field.

D. The rotor does not develop maximum induced current flow until it has achieved synchronous speed.

QUESTION: 9

One minute after a reactor scram from steady-state 100 percent reactor power, the greatest rate of xenon-135 production will be from _____; and the greatest rate of xenon-135 removal will be caused by _____.

A. fission; xenon-135 decay

B. fission; neutron capture

C. iodine-135 decay; xenon-135 decay

D. iodine-135 decay; neutron capture

QUESTION: 10

Given:

- A reactor is operating at steady-state 50 percent power.
- The reactor core flow rate is 52 percent.

For the above reactor operating conditions, a correction factor is applied to adjust the steady-state _____ thermal limit to a _____ value. (MCPR = minimum critical power ratio; MAPLHGR = maximum average linear heat generation rate)

A. MCPR; greater

B. MCPR; smaller

C. MAPLHGR; greater

D. MAPLHGR; smaller

QUESTION: 11

Initially, a nuclear power plant is operating at steady-state 80 percent power. If a control system malfunction causes main generator load to rapidly increase to 90 percent, the steam voids in the two-phase flow in the reactor core will initially _____; which causes indicated reactor vessel water level (measured in the downcomer) to initially _____.

A. shrink; decrease

B. shrink; increase

C. expand; decrease

D. expand; increase

QUESTION: 12

An open vessel contains 1 lbm of water at 206°F and standard atmospheric pressure. If 12 Btu is added to the water, the water temperature will rise by about _____; and _____ of the water will vaporize.

A. 6°F; none

B. 6°F; some

C. 12°F; none

D. 12°F; some

QUESTION: 13

A typical alpha particle produces free electrons in a gas-filled radiation detector primarily by…

A. colliding with gas nuclei.

B. colliding with bound electrons.

C. electrostatic attraction of gas nuclei.

D. electrostatic attraction of bound electrons.

QUESTION: 14

When transferring a valve controller from the manual mode to the automatic mode, the automatic valve controller output signal should be _____ the manual valve controller output signal at the time of transfer.

A. equal to

B. greater than

C. less than

D. increasing with

QUESTION: 15

Given the following stable initial conditions for a reactor:

Power level = 1.0×10^{-8} percent
K_{eff} = 0.999
Core $\bar{\beta}_{eff}$ = 0.006

What will the stable reactor period be following an addition of positive 0.2 %ΔK/K reactivity to the reactor? (Assume the stable reactor period occurs before the reactor reaches the point of adding heat.)

A. 20 seconds

B. 50 seconds

C. 80 seconds

D. 110 seconds

QUESTION: 16

Refer to the drawing of a flyball-weight mechanical speed governor (see figure below).

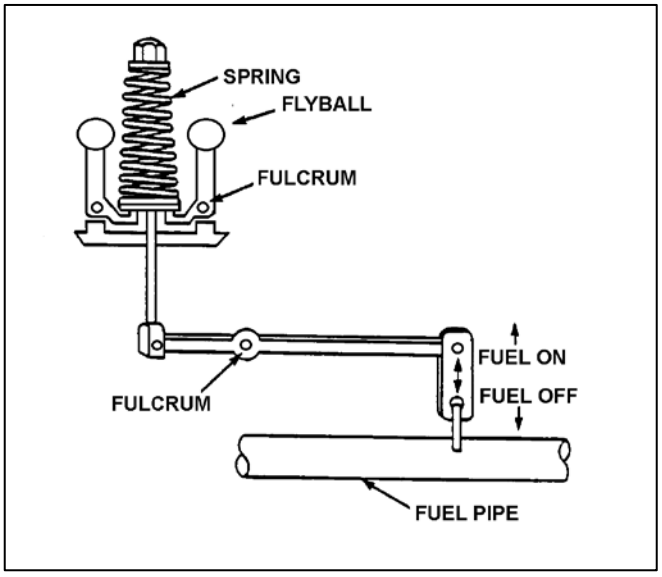
In the figure below, the purpose of the spring on the flyball mechanism is to _____ centrifugal force by driving the flyballs _____.

A. counteract; outward

B. aid; inward

C. counteract; inward

D. aid; outward



QUESTION: 17

A reactor is operating at steady-state 100 percent power when a single control rod fully inserts from the fully withdrawn position. After the initial transient, the operator returns the reactor to 100 percent power with the control rod still fully inserted.

Compared to the initial core axial neutron flux shape, the current core axial neutron flux shape will have a...

A. minor distortion, because the fully inserted control rod has nearly zero reactivity worth.

B. minor distortion, because the fully inserted control rod is an axially uniform poison.

C. major distortion, because the upper and lower core halves are tightly coupled in the vicinity of the control rod.

D. major distortion, because the power production will be drastically reduced in the vicinity of the control rod.

QUESTION: 18

In a reactor operating at full power, the fuel bundle with the greatest radial peaking factor <u>always</u> has the...

A. greatest power.

B. greatest critical power ratio.

C. smallest axial peaking factor.

D. smallest linear heat generation rate.

QUESTION: 19

The manufacturers of shell and U-tube heat exchangers recommend a maximum tube fluid velocity to limit the _____ of the tubes; and a minimum tube fluid velocity to limit the _____ of the tubes.

A. erosion; fouling

B. erosion; thermal contraction

C. thermal expansion; fouling

D. thermal expansion; thermal contraction

QUESTION: 20

Which one of the following describes the proper location for a relief valve that will be used to prevent exceeding the design pressure of a positive displacement pump and associated piping?

A. On the pump suction piping, upstream of the suction isolation valve.

B. On the pump suction piping, downstream of the suction isolation valve.

C. On the pump discharge piping, upstream of the discharge isolation valve.

D. On the pump discharge piping, downstream of the discharge isolation valve.

QUESTION: 21

Which one of the following will increase the heat transfer rate between two liquids in a heat exchanger? (Assume single-phase conditions and a constant specific heat for both liquids.)

A. The mass flow rate of the hotter liquid decreases by 10 percent.

B. The mass flow rate of the colder liquid decreases by 10 percent.

C. The inlet temperature of the hotter liquid increases by 20°F.

D. The inlet temperature of the colder liquid increases by 20°F.

QUESTION: 22

Refer to the drawing of a valve motor control circuit (see figure below) for a valve that is currently fully closed and has a 10-second stroke time.

Note: Limit switch (LS) contacts are shown open regardless of valve position, but relay contacts are shown open/closed according to the standard convention for control circuit drawings.

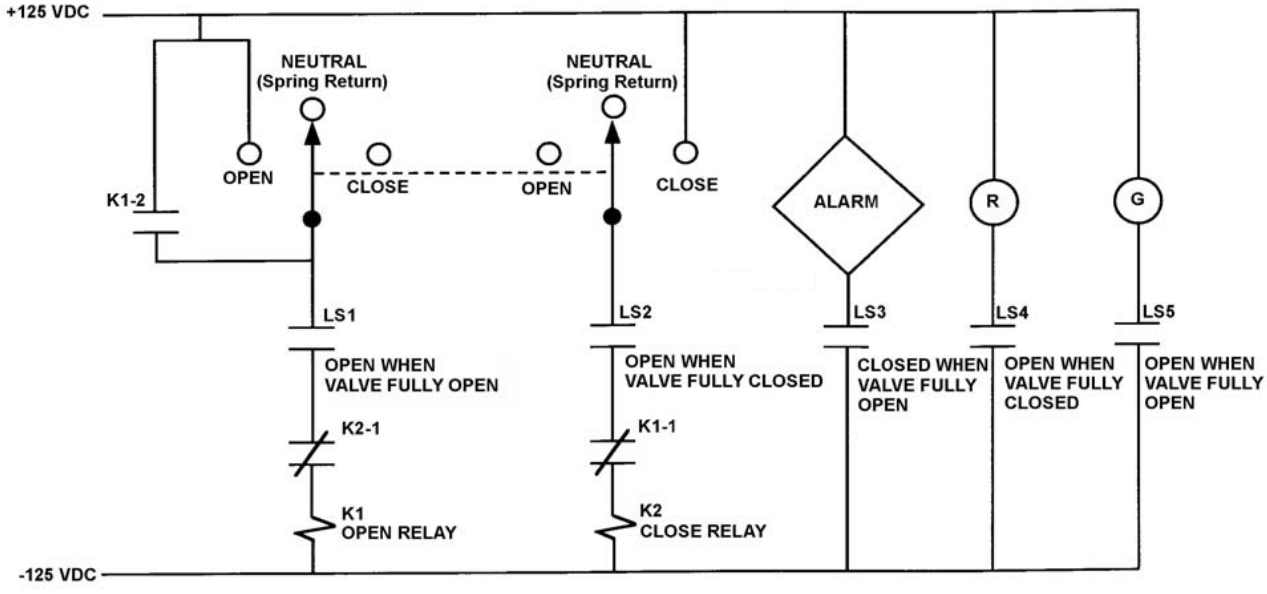
The operator takes the control switch to OPEN. Two seconds later, after verifying the valve is opening, the operator releases the control switch. Which one of the following describes the valve motor control circuit alarm response after the switch is released?

A. The alarm will actuate after approximately 8 seconds.

B. The alarm will not actuate until additional operator action is taken.

C. The alarm will continue to actuate for approximately 8 seconds.

D. The alarm will continue to actuate until additional operator action is taken.



VALVE MOTOR CONTROL CIRCUIT

QUESTION: 23

A main generator is supplying 300 MVAR with a 0.90 power factor. What is the approximate MW load on the main generator?

A. 145 MW

B. 270 MW

C. 484 MW

D. 619 MW

QUESTION: 24

Which one of the following will initially increase the critical power of a fuel bundle?

A. The subcooling of the coolant entering the fuel bundle decreases.

B. The local peaking factor of the fuel bundle increases.

C. The coolant flow rate through the fuel bundle increases.

D. The axial power peak shifts from the bottom to the top of the fuel bundle.

QUESTION: 25

Refer to the drawing of a water storage tank with an automatic level control system (see figure below). The makeup valve will fail closed if its actuator loses air pressure.

Given the following possible combinations of characteristics for the level sensor and controller:

	Level Sensor	Controller
1.	Direct-Acting	Direct-Acting
2.	Direct-Acting	Reverse-Acting
3.	Reverse-Acting	Direct-Acting
4.	Reverse-Acting	Reverse-Acting

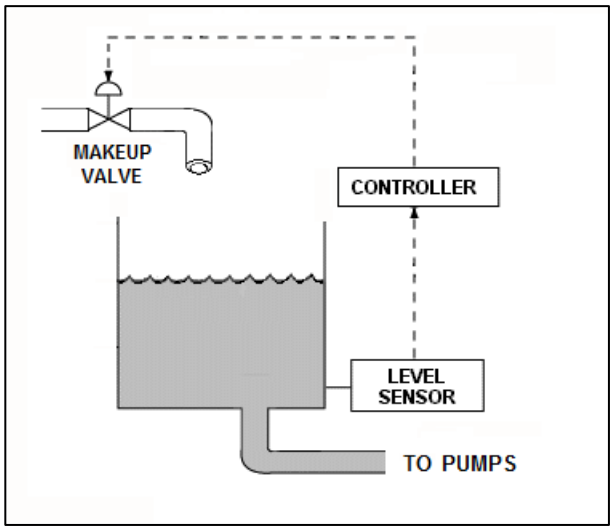
Which of the above combinations will work effectively with the makeup valve in the level control system to maintain the desired tank water level?

A. 1 only

B. 1 and 4

C. 2 only

D. 2 and 3



QUESTION: 26

The main reason for designing and operating a reactor with a flattened neutron flux distribution is to...

A. provide even burnup of control rods.

B. reduce neutron leakage from the core.

C. achieve a higher average power density.

D. provide more accurate nuclear power indication.

QUESTION: 27

Refer to the drawing of two water storage tanks with four differential pressure (D/P) level detectors (see figure below).

The tanks are identical and are being maintained at 2 psig overpressure, 60°F, and the same constant water level. The tanks are located within a sealed containment structure that is being maintained at standard atmospheric pressure. All level detectors have been calibrated and are producing the same level indication.

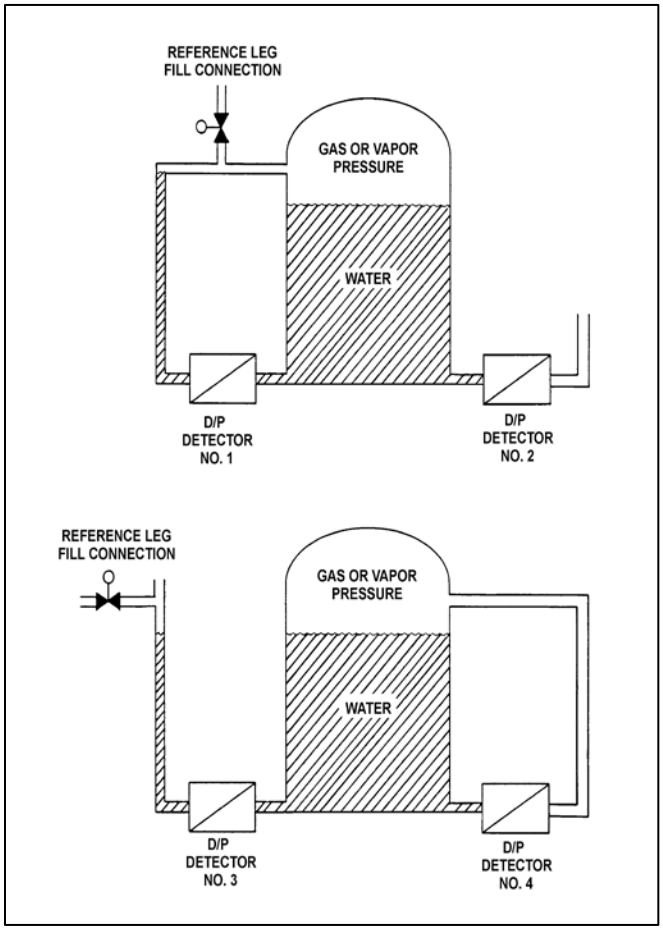
If a ventilation malfunction causes the containment structure pressure to decrease to 13 psia, which detectors will produce the lowest level indications?

A. 1 and 3

B. 2 and 4

C. 1 and 4

D. 2 and 3



QUESTION: 28

Initially, a nuclear power plant was operating at steady-state 85 percent reactor power when extraction steam to the feedwater heaters was isolated. With extraction steam still isolated, reactor power was returned to 85 percent and the plant was stabilized. Compared to the conditions just prior to the transient, the current main generator output (MW) is...

A. higher, because increased steam flow through the main turbine caused the main generator to pick up load.

B. lower, because decreased steam flow through the main turbine caused the main generator to reject load.

C. higher, because the steam cycle thermal efficiency has increased.

D. lower, because the steam cycle thermal efficiency has decreased.

QUESTION: 29

The nil-ductility transition temperature is the temperature above which...

A. a large compressive stress can result in brittle fracture.

B. a metal exhibits more ductile tendencies.

C. the probability of brittle fracture increases.

D. no appreciable deformation occurs prior to failure.

QUESTION: 30

There is a temperature limit on the water entering a demineralizer, because excessively hot water will...

A. decompose the resin beads.

B. increase the potential for channeling.

C. cause the filter element to swell and release the resin.

D. dislodge and wash the resin fines off the filter element.

QUESTION: 31

Refer to the drawing of a simple chromel-alumel thermocouple circuit (see figure below).

The thermocouple, thermocouple connection head, and reference junction panel are located inside a reactor building (RB) while the temperature instrument is located outside the RB. Thermocouple temperature indication is initially 440°F.

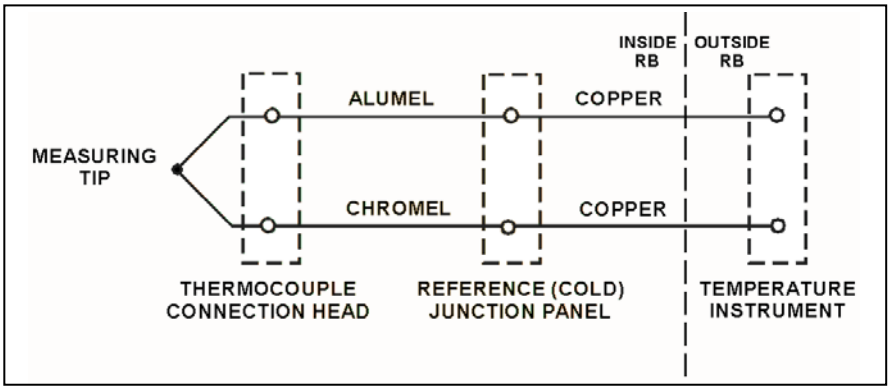
A steam leak inside the RB increases the temperatures of the thermocouple connection head and reference junction panel by 40°F, while the temperature at the measuring tip is unchanged. What is the resulting temperature indication?

A. 400°F

B. 440°F

C. 480°F

D. 520°F



QUESTION: 32

A reactor startup is in progress. A stable positive 30-second reactor period has been established, and no further reactivity changes occur. The reactor is...

A. critical.

B. supercritical.

C. subcritical.

D. prompt critical.

QUESTION: 33

Refer to the drawing of an operating lube oil heat exchanger (see figure below).

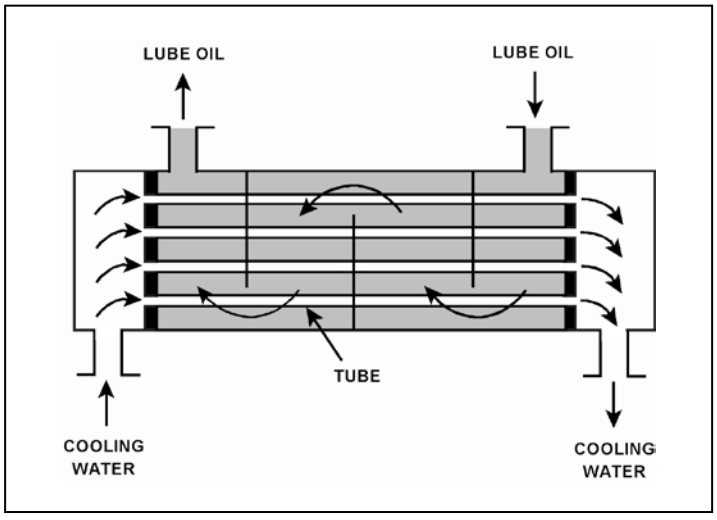
If mineral deposits accumulate on the outside of the cooling water tubes, the cooling water outlet temperature will _____; and the lube oil outlet temperature will _____. (Assume the lube oil and cooling water inlet temperatures and mass flow rates do <u>not</u> change.)

A. decrease; increase

B. decrease; decrease

C. increase; increase

D. increase; decrease



QUESTION: 34

Which one of the following explains why the condensation of turbine exhaust steam in a main condenser maintains a vacuum?

A. The enthalpy of the exhaust steam increases as it condenses.

B. The enthalpy of the exhaust steam decreases as it condenses.

C. The specific volume of the exhaust steam increases as it condenses.

D. The specific volume of the exhaust steam decreases as it condenses.

QUESTION: 35

A neutron is ‘thermal’ when...

A. its kinetic energy is in the 1 eV to 1,000 eV energy range.

B. it is in energy equilibrium with the moderating medium.

C. it is released from the fission of a U-235 atom.

D. its cross-section for absorption in the fuel undergoes a sudden decrease.

QUESTION: 36

Initially, a reactor is critical in the source range, when a fully-withdrawn control rod fully inserts into the core.

If no operator or automatic actions occur, the source range count rate will…

A. decrease to zero.

B. decrease to the count rate produced by the source neutron flux.

C. decrease to a count rate greater than that produced by the source neutron flux.

D. initially decrease, and then slowly increase and stabilize at the critical count rate.

QUESTION: 37

The power range nuclear instruments have just been adjusted to 100 percent based on a calculated heat balance. Which one of the following will result in indicated reactor power being lower than actual reactor power?

A. The feedwater temperature used in the heat balance calculation was 20°F lower than actual feedwater temperature.

B. The reactor recirculation pump heat input term was omitted from the heat balance calculation.

C. The ambient heat loss value used in the heat balance calculation was only half the actual ambient heat loss.

D. The feedwater flow rates used in the heat balance calculation were 10 percent higher than actual flow rates.

QUESTION: 38

Reactors A and B are identical except that reactor A is operating near the end of a fuel cycle (EOC) and reactor B is operating near the beginning of a fuel cycle (BOC). Both reactors are currently operating at steady-state 100 percent power. The total reactivity worth of the control rods is the same for both reactors.

Which reactor will have the greater K_{eff} value 5 minutes after a reactor scram, and why?

A. Reactor A, because the full insertion of all control rods will add less negative reactivity near the EOC.

B. Reactor A, because the xenon-135 negativity reactivity peak is greater after a scram near the EOC.

C. Reactor B, because the full insertion of all control rods will add less negative reactivity near the BOC.

D. Reactor B, because the xenon-135 negativity reactivity peak is greater after a scram near the BOC.

QUESTION: 39

Refer to the drawing of a pump with a recirculation line (see figure below).

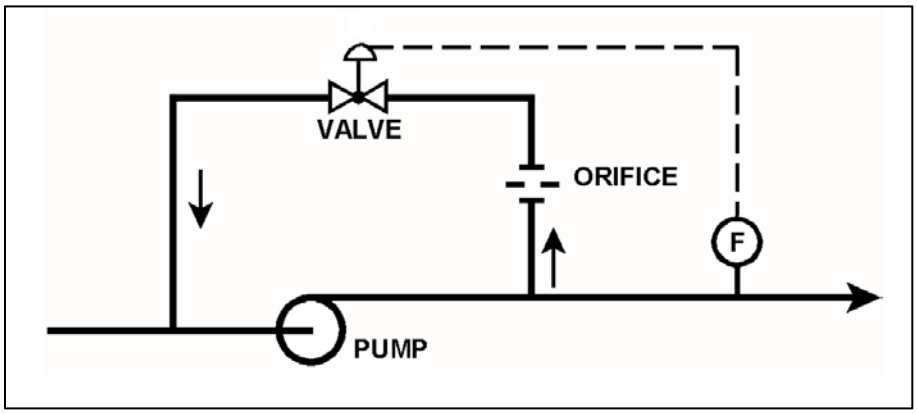
Which one of the following describes the effect on the pump if a complete flow blockage occurs in the pump discharge line just downstream of the flow transmitter?

A. The pump will overheat after a relatively short period of time, due to a loss of main flow only.

B. The pump will overheat after a relatively long period of time, due to a loss of main flow only.

C. The pump will overheat after a relatively short period of time, due to a loss of both main flow and recirculation flow.

D. The pump will overheat after a relatively long period of time, due to a loss of both main flow and recirculation flow.



QUESTION: 40

Refer to the drawing showing two operating points for the same centrifugal pump operating in a cooling water system (see figure below).

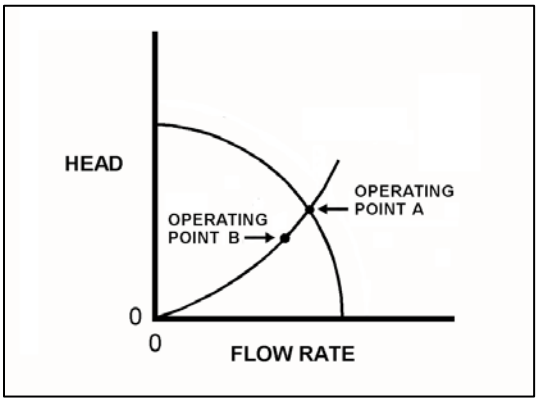
The pump's operating point can be shifted from point A to point B by…

A. increasing the speed of the pump.

B. decreasing the speed of the pump.

C. closing the pump discharge valve more.

D. opening the pump discharge valve more.



QUESTION: 41

If water containing positively-charged ionic impurities passes through a mixed-bed ion exchanger, the positively-charged ionic impurities will be removed by the _____ exchange resin, with the corresponding release of _____ ions into the water.

A. anion; negative

B. anion; positive

C. cation; negative

D. cation; positive

QUESTION: 42

Which one of the following is a characteristic of Doppler broadening?

A. As reactor coolant temperature increases, less moderator molecules will be present in the core to thermalize neutrons.

B. As reactor fuel temperature increases, neutrons from a wider energy spectrum will be captured in the fuel.

C. As moderator void percentage increases, neutrons will travel farther in the core before being absorbed or scattered.

D. As control rods are withdrawn, additional reactor fuel will be exposed and result in a power increase.

QUESTION: 43

A moderator temperature increase is more likely to add positive reactivity if a reactor is initially operating at a _____ moderator temperature; with the dominant effect being a reduction in neutron _____.

A. low; leakage from the core

B. low; capture by the moderator

C. high; leakage from the core

D. high; capture by the moderator

QUESTION: 44

Initially, a nuclear power plant was shut down with a K_{eff} of 0.92, and a stable source range count rate of 200 cps. Then, a reactor startup was initiated. All control rod motion was stopped when K_{eff} reached 0.995. The instant that control rod motion stopped, the source range count rate was 1,800 cps.

When the source range count rate stabilizes, the count rate will be approximately...

A. 1,800 cps

B. 3,200 cps

C. 3,400 cps

D. 5,000 cps

QUESTION: 45

Subcooled reactor coolant enters the bottom of a fuel assembly and exits the top of the fuel assembly as a saturated steam-water mixture with a quality of 10 percent. How does the value of the convective heat transfer coefficient change as the coolant travels upward through the fuel assembly?

A. Increases only

B. Increases, then decreases

C. Decreases only

D. Decreases, then increases

QUESTION: 46

Head loss is...

A. the reduction in discharge pressure experienced by a real pump due to slippage.

B. the reduction in discharge pressure experienced by a real pump due to mechanical friction.

C. the conversion of system fluid pressure and velocity to heat energy because of friction.

D. the change in static pressure in a piping system resulting from changes in elevation.

QUESTION: 47

A cooling water system uses a conventional relief valve (not pilot-operated) with a bench-tested setpoint of 45 psig. The relief valve discharges to a collection tank that is maintained at 5 psi above atmospheric pressure. At what system pressure will the relief valve begin to open?

A. 40 psig

B. 45 psig

C. 50 psig

D. 65 psig

QUESTION: 48

Refer to the drawing of a simple Rankine cycle shown on a Temperature-Entropy (T-S) diagram (see figure below). The order of the numbers on the diagram was randomly chosen.

Note: A simple Rankine cycle does not include condensate/feedwater heating, turbine exhaust moisture removal, or turbine exhaust reheat.

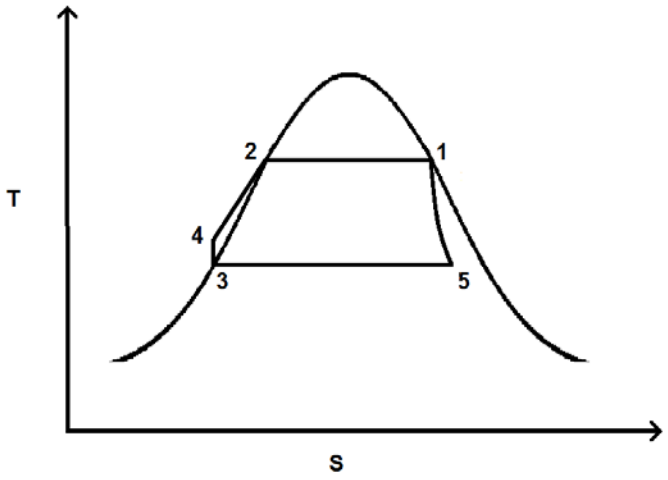
The point that represents the water in the main condenser hotwell is number _____; and the point that represents the steam at the outlet of a steam generator is number _____.

A. 3; 1

B. 3; 2

C. 5; 1

D. 5; 2



QUESTION: 49

During a loss of coolant accident, some fuel rods may experience stable film boiling. Which one of the following types of heat transfer from the fuel cladding will increase significantly when stable film boiling begins?

A. Forced convection

B. Natural convection

C. Conduction

D. Radiation

QUESTION: 50

A reactor is stable at the point of adding heat (POAH) with a reactor coolant temperature of 160°F. Control rods are about to be withdrawn a few notches to establish a small heatup rate.

When the control rods are withdrawn, reactor power initially will increase, and then...

A. stabilize until voiding begins to occur.

B. continue to increase until voiding begins to occur.

C. decrease and stabilize at a subcritical power level.

D. decrease and stabilize at the POAH.

***** FINAL ANSWER KEY *****

NRC GENERIC FUNDAMENTALS EXAMINATION
MARCH 2020 – BWR

FORM A				FORM B			
NO.	ANS.	NO.	ANS.	NO.	ANS.	NO.	ANS.
1	A	26	C	1	A	26	A
2	D	27	C	2	B	27	B
3	D	28	D	3	D	28	D
4	A	29	B	4	A	29	C
5	B	30	A	5	D	30	C
6	C	31	A	6	B	31	A
7	B	32	B	7	C	32	C
8	A	33	A	8	A	33	B
9	C	34	D	9	C	34	B
10	A	35	B	10	B	35	D
11	D	36	C	11	C	36	A
12	B	37	C	12	C	37	B
13	D	38	C	13	A	38	C
14	A	39	B	14	B	39	C
15	B	40	B	15	A	40	A
16	C	41	D	16	D	41	A
17	B	42	B	17	A	42	B
18	A	43	B	18	B	43	B
19	A	44	B	19	D	44	A
20	C	45	A	20	D	45	C
21	C	46	C	21	D	46	D
22	A	47	C	22	B	47	B
23	D	48	A	23	A	48	C
24	C	49	D	24	C	49	D
25	D	50	D	25	D	50	C