UNITED STATES NUCLEAR REGULATORY COMMISSION
GENERIC FUNDAMENTALS EXAMINATION
MARCH 2021 BWR – 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

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

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

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

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

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

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

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

$SUR = 26.06/\tau$

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

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

$\ell^* = 1.0 \times 10^{-4}$ 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 = 3.41×10^6 Btu/hr

1 hp = 2.54×10^3 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 = 3.7×10^{10} dps

QUESTION: 1

Refer to the drawing of a flow control valve and valve actuator in a control loop (see figure below).

In addition to the components in the figure, the control loop includes the following:

- Sensor
- Controller
- Valve positioner

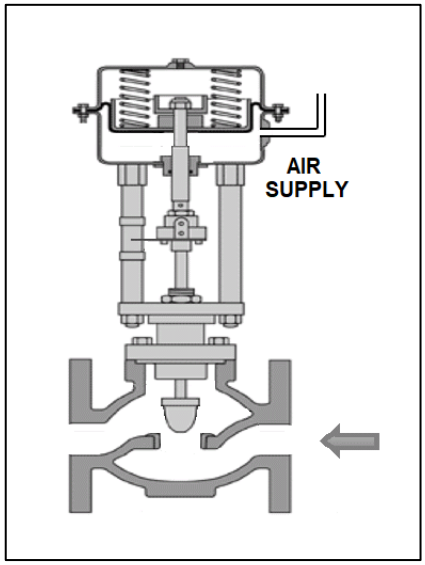
Currently, the flow control valve is 50 percent open, the position demanded by the controller. If the air supply line to the valve actuator shears off, the valve positioner will…

A. override the valve actuator, and lock the valve in its current position.

B. override the valve actuator, and move the valve to the demanded position.

C. increase the flow rate of air to the sheared air supply line, with no effect on valve position.

D. decrease the flow rate of air to the sheared air supply line, with no effect on valve position.



QUESTION: 2

A reactor is shut down near the end of a fuel cycle with the shutdown cooling system in service. The initial reactor vessel water temperature is 100°F. In this condition, the reactor is overmoderated.

Then, a heatup and pressurization is performed to bring the reactor to normal operating temperature and pressure. The reactor remains subcritical.

During the heatup, K_{eff} will…

A. increase continuously.

B. decrease continuously.

C. initially increase, and then decrease.

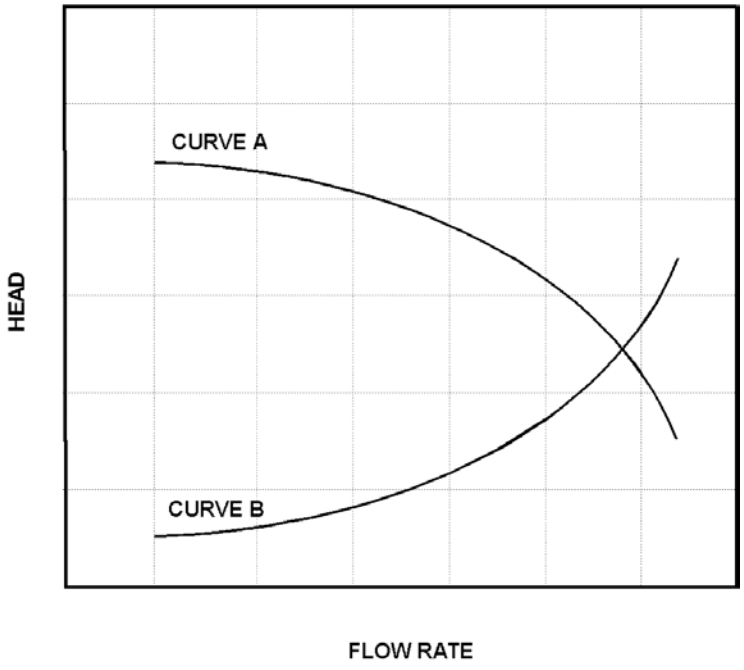
D. initially decrease, and then increase.

QUESTION: 3

Refer to the graph that represents the head-capacity characteristics for a single-speed centrifugal cooling water pump (see figure below).

Which one of the following lists a pair of parameters that could be represented by curves A and B? (Note: NPSH is net positive suction head.)

	Curve A	Curve B
A.	Pump Head	Available NPSH
B.	Available NPSH	Required NPSH
C.	Required NPSH	System Head Loss
D.	System Head Loss	Pump Head



QUESTION: 4

The discharge valve for a radial-flow centrifugal cooling water pump is closed in preparation for starting the pump.

After the pump is started, the following stable pump pressures are observed:

Pump discharge pressure = 30 psig
Pump suction pressure = 10 psig

With the discharge valve still closed, if the pump speed is doubled, which one of the following will be the new pump discharge pressure?

A. 80 psig

B. 90 psig

C. 120 psig

D. 130 psig

QUESTION: 5

A closed water tank is pressurized with nitrogen. A differential pressure detector is used to measure the tank water level.

To achieve the most accurate water level measurement, the low pressure side of the detector should sense which one of the following?

A. The pressure at the midline of the tank.

B. The pressure of the atmosphere surrounding the tank.

C. The pressure of a column of water external to the tank.

D. The pressure of the gas space at the top of the tank.

QUESTION: 6

Refer to the drawing of an operating cooling water system (see figure below).

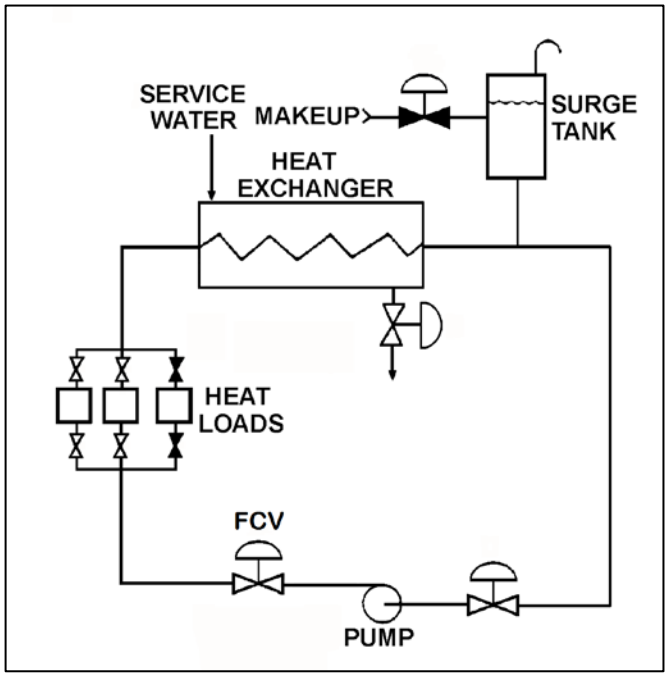
The centrifugal pump is operating with the flow control valve (FCV) fully open. If the system flow rate is decreased by partially closing the FCV, the pump differential pressure will _____; and the heat exchanger cooling water differential pressure will _____.

A. decrease; decrease

B. decrease; increase

C. increase; decrease

D. increase; increase



QUESTION: 7

The effective multiplication factor (K_{eff}) describes the ratio of the number of fission neutrons at the end of one generation to the number of fission neutrons at the _____ of the _____ generation.

A. beginning; next

B. beginning; previous

C. end; next

D. end; previous

QUESTION: 8

In a reactor operating at full power, the fuel bundle with the lowest power <u>always</u> has the smallest...

A. critical power ratio.

B. radial peaking factor.

C. axial peaking factor.

D. critical heat flux.

QUESTION: 9

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

Given:

- The cooling water inlet temperature is constant.
- The lube oil inlet temperature is constant.
- The lube oil mass flow rate is constant.

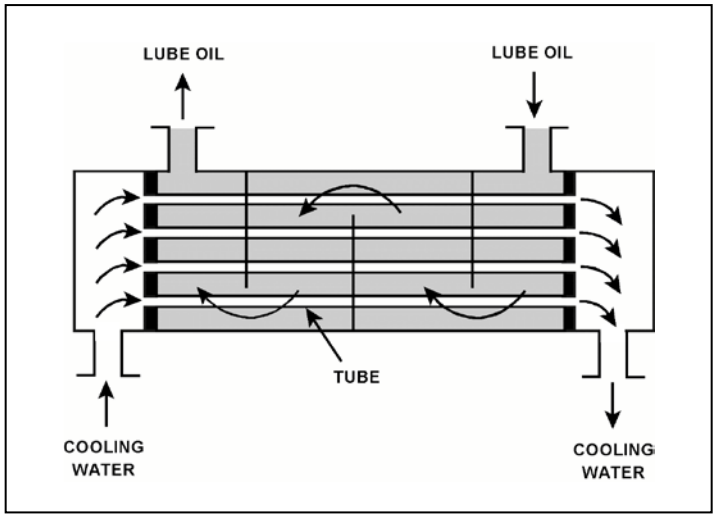
If the cooling water mass flow rate increases, the lube oil outlet temperature will _____; and the cooling water outlet temperature will _____.

A. decrease; decrease

B. decrease; increase

C. increase; decrease

D. increase; increase



QUESTION: 10

Which one of the following types of radiation detectors uses a gas volume for radiation detection, and will typically produce the weakest output signal if all of the detectors are placed in the same gamma radiation field?

A. Geiger-Mueller

B. Ion chamber

C. Proportional counter

D. Scintillation

QUESTION: 11

During a local inspection of a manually-operated 12-inch gate valve, the valve stem is observed to extend outward from the valve handwheel by 1 inch. The entire external valve stem is threaded, except for a 1-inch section that becomes smooth just before the valve stem enters the packing gland.

Which one of the following describes the position of the gate valve?

A. The valve is fully open, or nearly fully open.

B. The valve is fully closed, or nearly fully closed.

C. The valve may be in any position, because it is a rising stem gate valve.

D. The valve may be in any position, because it is a non-rising stem gate valve.

QUESTION: 12

For which of the following ideal processes, if any, is the steam inlet enthalpy equal to the steam outlet enthalpy? (Assume horizontal flow in each process.)

(A) Dry saturated steam flowing through a pressure reducing valve.
(B) Dry saturated steam flowing through a fixed convergent nozzle.

A. (A) only

B. (B) only

C. Both (A) and (B)

D. Neither (A) nor (B)

QUESTION: 13

Which one of the following control rods, when repositioned by two notches, will have the greatest effect on the axial neutron flux shape?

A. Deep rod near the center of the core.

B. Deep rod near the edge of the core.

C. Shallow rod near the center of the core.

D. Shallow rod near the edge of the core.

QUESTION: 14

Given the following information for a water relief valve:

- The relief valve discharges to standard atmospheric pressure.
- The relief valve will be fully open at 200 psig inlet pressure.
- At 200 psig inlet pressure, the relief valve flow rate is 98 gpm.
- The water passing through the relief valve remains subcooled at all times.

What will the approximate relief valve discharge flow rate be if inlet pressure reaches 300 psig?

A. 98 gpm

B. 120 gpm

C. 147 gpm

D. 221 gpm

QUESTION: 15

Refer to the drawing of K_{eff} versus core age (see figure below).

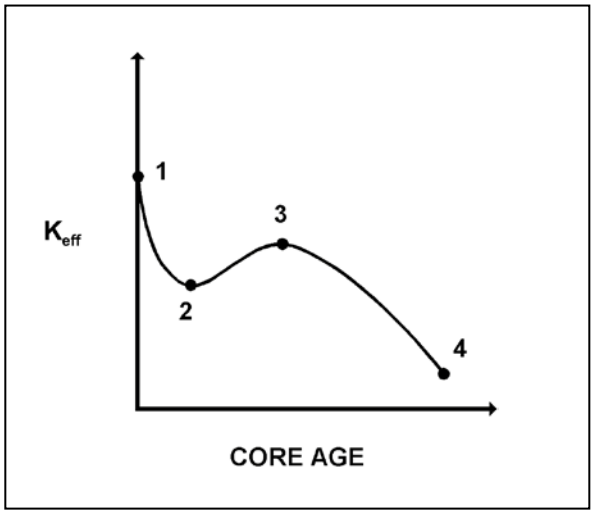
The major cause for the change in K_{eff} from point 2 to point 3 is the...

A. depletion of fuel.

B. depletion of control rods.

C. burnout of burnable poisons.

D. burnout of fission product poisons.



QUESTION: 16

A reactor startup is in progress. Control rod withdrawal was stopped several minutes ago to assess criticality. Which one of the following is a combination of indications that together support a declaration that the reactor has reached criticality?

A. Period is stable at positive 200 seconds; source range count rate is stable.

B. Period is stable at infinity; source range count rate is stable.

C. Period is stable at positive 200 seconds; source range count rate is slowly increasing.

D. Period is stable at infinity; source range count rate is slowly increasing.

QUESTION: 17

Initially, a reactor is critical at 1.0×10^{-8} percent power near the middle of a fuel cycle.

Consider the effects of prompt and delayed neutrons on reactor control for the following two cases:

Case 1: Positive 1.0×10^{-2} $\Delta K/K$ is instantly added to the reactor.
Case 2: Positive 1.0×10^{-3} $\Delta K/K$ is instantly added to the reactor.

For Case 1, the rate of power change is determined primarily by the average lifetime of the _____ neutrons; and for Case 2, the rate of power change is determined primarily by the average lifetime of the _____ neutrons. (Consider only the power changes that occur below the point of adding heat.)

A. prompt; delayed

B. prompt; prompt

C. delayed; delayed

D. delayed; prompt

QUESTION: 18

The following remote indications are observed for a normally-open 480 VAC load supply breaker.

Red indicating light is on.
Green indicating light is off.
Load voltage indicates 0 VAC.
Line voltage indicates 480 VAC.

What is the condition of the breaker?

A. Open and racked in.

B. Closed and racked in.

C. Open and racked to the TEST position.

D. Closed and racked to the TEST position.

QUESTION: 19

Refer to the drawing of an operating cooling water system (see figure below) that is transferring heat between low pressure (LP) and high pressure (HP) water systems.

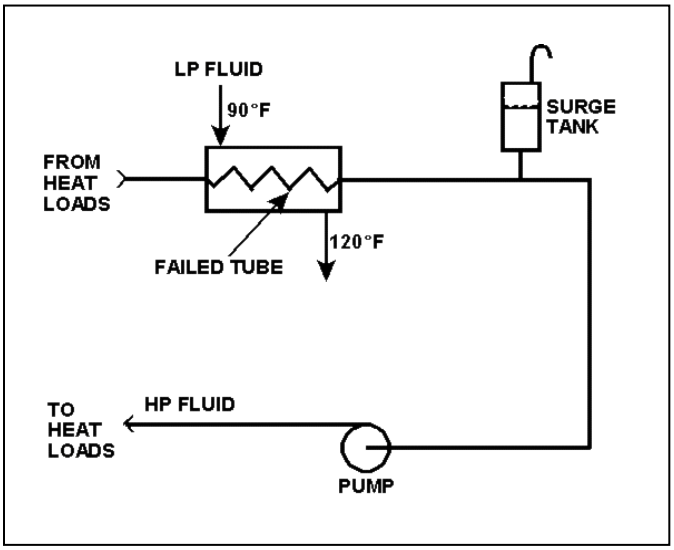
Which one of the following effects initially will occur as a result of a tube failure in the heat exchanger?

A. Level in the surge tank will increase.

B. HP fluid pump flow rate will decrease.

C. HP fluid heat exchanger differential temperature will increase.

D. LP fluid heat exchanger outlet temperature will increase.



QUESTION: 20

A reactor scram occurred one hour ago following several months of operation at 100 percent power. Reactor vessel pressure is being maintained at 800 psia, and the source range count rate is currently 400 cps. If no operator action is taken, how will the source range count rate respond during the next 24 hours? (Assume a constant source neutron flux.)

A. The count rate will remain about the same.

B. The count rate will decrease for the entire period.

C. The count rate will decrease initially, and then increase.

D. The count rate will increase initially, and then decrease.

QUESTION: 21

Which one of the following will minimize the possibility of water hammer?

A. Draining the discharge line of a centrifugal pump prior to starting the pump.

B. Draining condensate out of a steam line before initiating flow.

C. Starting a centrifugal pump with its discharge valve fully open.

D. Starting a positive displacement pump with its discharge valve partially closed.

QUESTION: 22

A nuclear power plant is operating at steady-state 100 percent power. By the time the main turbine exhaust passes through the upper half of the main condenser tube bundles, all of the exhaust steam has condensed. As the condensate passes through the lower half of the tube bundles, the condensate temperature will…

A. decrease, because the main condenser pressure is slightly greater in the lower half of the tube bundles.

B. decrease, because the cooling water temperature is less than the condensate temperature in the lower half of the tube bundles.

C. remain the same, because the saturation temperatures for the upper and lower halves of the tube bundles are the same.

D. remain the same, because the condensate and cooling water temperatures in the lower half of the tube bundles are the same.

QUESTION: 23

Dry saturated steam at 900 psia enters an ideal high pressure (HP) turbine and exhausts at 240 psia. How much heat, if any, must be added to the HP turbine exhaust to produce dry saturated steam at 240 psia?

A. 0 Btu/lbm

B. 11 Btu/lbm

C. 111 Btu/lbm

D. 155 Btu/lbm

QUESTION: 24

Refer to the drawing of four air-operated valves (see figure below). The valve actuators may be shown with or without air pressure applied.

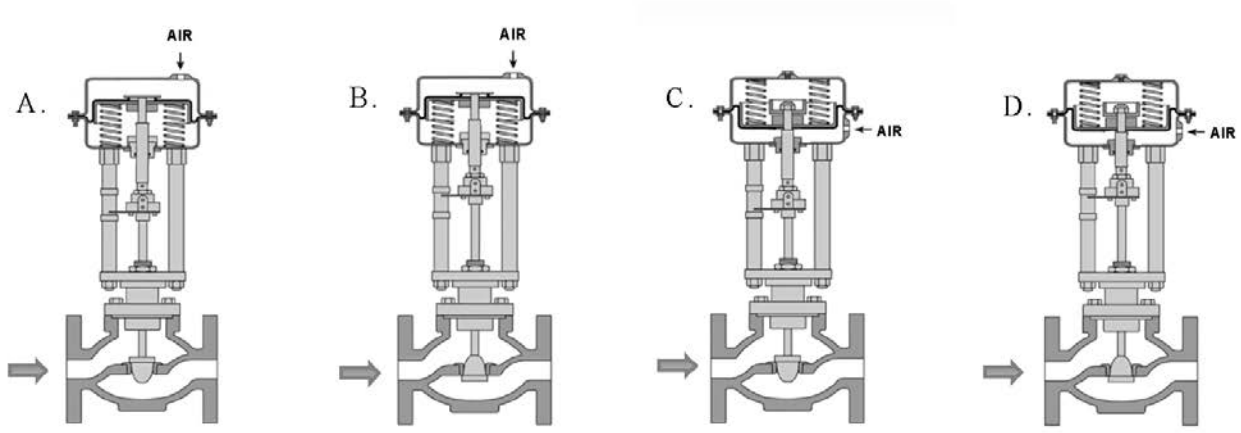
Which valves are currently shown in their failed (i.e., no air pressure applied to the actuator) positions?

A. A and B

B. B and C

C. C and D

D. D and A



QUESTION: 25

A loss-of-coolant accident resulted in a reactor scram. The source range monitors (SRMs) were fully inserted, and are currently located in a voided section of the core.

If the SRMs are subsequently repositioned below the core water level, the SRM count rate will…

A. decrease, due to decreased neutron migration length.

B. decrease, due to decreased thermal neutron flux.

C. increase, due to increased neutron migration length.

D. increase, due to increased thermal neutron flux.

QUESTION: 26

Which one of the following is a characteristic of subcooled nucleate boiling, but <u>not</u> saturated nucleate boiling?

A. $T_{Cladding}$ equals T_{Sat}

B. $T_{Cladding}$ is greater than T_{Sat}

C. $T_{Bulk\ Coolant}$ equals T_{Sat}

D. $T_{Bulk\ Coolant}$ is less than T_{Sat}

QUESTION: 27

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 will increase initially, 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.

QUESTION: 28

A pump is needed to supply fuel oil from a day tank to a diesel engine fuel injection system. The pump must maintain a nearly constant flow rate with a minimum of discharge pressure fluctuations as system pressure varies between 200 psig and 1,900 psig.

Which one of the following types of pumps would be most suitable for this application?

A. Axial-flow centrifugal

B. Radial-flow centrifugal

C. Rotary positive displacement

D. Reciprocating positive displacement

QUESTION: 29

A main generator is about to be connected to an infinite power grid by closing a generator output breaker. Which one of the following conditions will cause the main generator to immediately become a reactive load on the grid when the generator output breaker is closed?

A. The synchroscope is turning slowly in the clockwise direction.

B. The synchroscope is turning slowly in the counterclockwise direction.

C. The voltage on the generator side of the output breaker is slightly lower than grid voltage.

D. The voltage on the generator side of the output breaker is slightly higher than grid voltage.

QUESTION: 30

The temperature of the water in a small outside storage tank is controlled by a set of heaters submerged in the tank. The heaters will energize at a water temperature of 40°F and deenergize at 48°F. When energized, the heaters produce a constant thermal output.

Which one of the following types of control is used in the heater control circuit to produce these characteristics?

A. Bistable

B. Proportional

C. Proportional plus integral

D. Proportional plus derivative

QUESTION: 31

Initially, a nuclear power plant is operating at steady-state 60 percent power when a main steam line break occurs. The break releases 5 percent of rated main steam mass flow rate.

Given the following:

- No operator or automatic protective actions occur.
- Automatic pressure control returns reactor pressure to its initial value.
- Feedwater injection temperature returns to its initial value.
- The break continues to release 5 percent of rated main steam mass flow rate.

Compared to the initial operating conditions, current reactor power is approximately _____; and current turbine power is approximately _____.

A. the same; 5 percent lower

B. the same; the same

C. 5 percent higher; 5 percent lower

D. 5 percent higher; the same

QUESTION: 32

Refer to the drawing of a bellows-type pressure detector (see figure below).

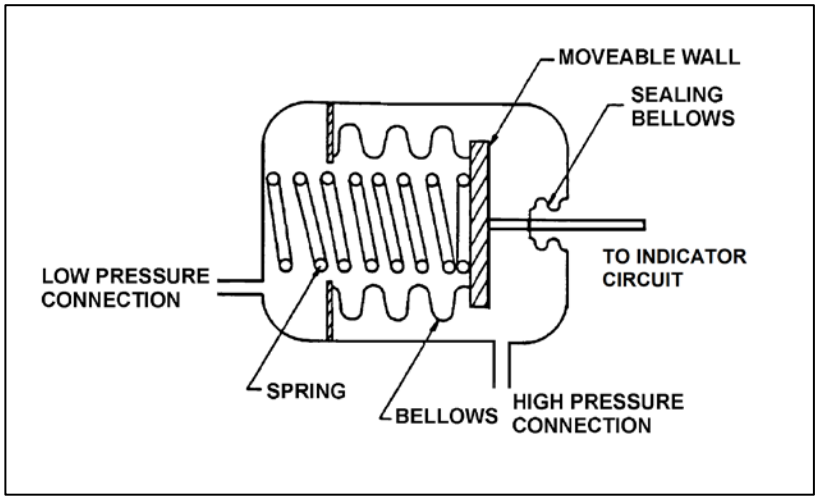
The bellows-type pressure detector is being used to measure reactor vessel pressure. The low-pressure side of the detector is vented to containment atmosphere. An increase in the reactor vessel pressure indication will be caused by either a _____; or a containment pressure _____.

A. broken spring; decrease

B. broken spring; increase

C. ruptured bellows; decrease

D. ruptured bellows; increase



QUESTION: 33

Initially, a reactor is operating at 50 percent power with equilibrium xenon-135. Then, power level is increased to 75 percent over a one-hour period, and no subsequent operator actions are taken.

Considering only the reactivity effects of xenon-135 changes, which one of the following describes reactor power 6 hours after the power change?

A. Greater than 75 percent, and decreasing slowly.

B. Greater than 75 percent, and increasing slowly.

C. Lower than 75 percent, and decreasing slowly.

D. Lower than 75 percent, and increasing slowly.

QUESTION: 34

A reactor is operating at 85 percent power with control rod X-Y inserted 20 percent. Which one of the following will cause the differential rod worth of control rod X-Y to become more negative? (Assume that control rod X-Y remains 20 percent inserted for each case.)

A. Core Xe-135 builds up in the lower half of the core.

B. An adjacent control rod is fully withdrawn from the core.

C. Reactor vessel pressure drifts from 900 psig to 880 psig.

D. Fuel temperature increases as fission product gases accumulate in nearby fuel rods.

QUESTION: 35

Which one of the following operations is most likely to cause significant pellet-cladding interaction?

A. Increasing reactor power from 20 percent to 50 percent near the beginning of a fuel cycle.

B. Increasing reactor power from 20 percent to 50 percent near the end of a fuel cycle.

C. Increasing reactor power from 70 percent to 100 percent near the beginning of a fuel cycle.

D. Increasing reactor power from 70 percent to 100 percent near the end of a fuel cycle.

QUESTION: 36

The power range nuclear instruments were adjusted to indicate 100 percent based on a heat balance calculation. Which one of the following would cause indicated reactor power to be higher than actual reactor power?

A. The steam pressure used in the heat balance calculation was 50 psi higher than actual steam pressure.

B. The ambient heat loss value used in the heat balance calculation was twice the actual ambient heat loss.

C. The feedwater flow rate used in the heat balance calculation was 10 percent lower than actual feedwater flow rate.

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

QUESTION: 37

A reactor startup is being performed by adding equal amounts of positive reactivity and waiting for source range count rate to stabilize. As the reactor approaches criticality, the numerical change in stable count rate resulting from each reactivity addition will _____; and the time required for the count rate to stabilize after each reactivity addition will _____.

A. increase; remain the same

B. increase; increase

C. remain the same; remain the same

D. remain the same; increase

QUESTION: 38

A main generator is operating in parallel with an infinite power grid, with generator VARs currently at zero. If the generator field current increases, generator VARs will become _____; and the generator power factor will become _____.

A. positive (VARs out); leading

B. negative (VARs in); leading

C. positive (VARs out); lagging

D. negative (VARs in); lagging

QUESTION: 39

A condensate demineralizer differential pressure (D/P) gauge indicates 4.0 psid at 50 percent flow rate. Over the next two days plant power changes have caused condensate flow rate to vary between 25 and 100 percent.

Which one of the following combinations of condensate flow rate and demineralizer D/P, observed during the power changes, indicates an increase in the accumulation of insoluble corrosion products in the demineralizer?

	Condensate Flow Rate (%)	Demineralizer D/P (psid)
A.	100%	15.0
B.	75%	9.0
C.	60%	5.0
D.	25%	2.0

QUESTION: 40

Which one of the following will produce a ground fault in an energized AC motor?

A. A conductive path from one stator winding to a different stator winding.

B. A conductive path from one stator winding to the motor housing.

C. A conductive path between the motor housing and a technician’s hand.

D. A conductive path between the motor housing and its steel foundation.

QUESTION: 41

Which one of the following lists the moderator temperature coefficient (MTC), fuel temperature coefficient (FTC), and void coefficient (VC) from most negative to least negative (left to right) for a reactor at 50 percent power in the middle of a fuel cycle?

A. FTC, VC, MTC

B. FTC, MTC, VC

C. VC, FTC, MTC

D. VC, MTC, FTC

QUESTION: 42

Because of a thermocouple temperature display failure, the millivolt output of a thermocouple circuit is being converted to a temperature value using conversion tables. The tables are based on a thermocouple reference junction temperature of 32°F. The actual reference junction is located in a panel that is currently at 80°F.

The temperature value taken from the conversion tables is 120°F.

What adjustment must be made to the temperature value taken from the conversion tables to calculate the actual temperature at the measuring tip of the thermocouple?

A. Add 48°F.

B. Subtract 48°F.

C. Add 88°F.

D. Subtract 88°F.

QUESTION: 43

Water containing dissolved sodium (Na+) and chloride (Cl-) ionic impurities is passing through an ion exchanger that contains only cation exchange resin. How are the ionic impurities being affected as the water flows through the ion exchanger?

A. Sodium ions are being exchanged, but the chloride ions are unaffected.

B. Chloride ions are being exchanged, but the sodium ions are unaffected.

C. Sodium ions are being exchanged, and chloride ions are being removed by filtration.

D. Chloride ions are being exchanged, and sodium ions are being removed by filtration.

QUESTION: 44

Reactors A and B are operating at steady-state 100 percent power. The reactors are identical, except that reactor A uses the standard core orifice design, while reactor B uses equal-sized flow openings for all fuel bundles. Both reactors have the same power distribution and total core mass flow rate.

Compared to the center fuel bundle in reactor A, the center fuel bundle in reactor B has the _____ exit steam quality; and the _____ critical power.

A. lower; lower

B. lower; higher

C. higher; lower

D. higher; higher

QUESTION: 45

DELETED

QUESTION: 46

Initially, a nuclear power plant was operating at steady-state 85 percent reactor power when the extraction steam to a high pressure feedwater heater became isolated. With the feedwater heater still isolated, the operators stabilized the plant at 85 percent reactor power.

Compared to the initial main generator megawatt output, the current main generator megawatt output is…

A. lower, because the steam cycle thermal efficiency is lower.

B. lower, because the steam mass flow rate through the main turbine is lower.

C. higher, because the steam cycle thermal efficiency is higher.

D. higher, because the steam mass flow rate through the main turbine is higher.

QUESTION: 47

Prolonged exposure of a reactor vessel (RV) to a fast neutron flux will cause the RV nil-ductility transition temperature to...

A. decrease, due to the propagation of existing flaws in the RV wall.

B. increase, due to the propagation of existing flaws in the RV wall.

C. decrease, due to changes in the material properties of the RV wall.

D. increase, due to changes in the material properties of the RV wall.

QUESTION: 48

Which one of the following is a characteristic of a prompt neutron?

A. Expelled with an average kinetic energy of about 2.0 MeV.

B. Usually emitted by the excited nucleus of a fission product.

C. Accounts for less than one percent of all fission neutrons.

D. Requires about 0.5 seconds to become a thermal neutron.

QUESTION: 49

Radial-flow centrifugal pumps A and B are identical, except that pump A uses a single-suction impeller while pump B uses a double-suction impeller. Both pumps are pumping water at the same inlet temperature, inlet pressure, and flow rate.

Compared to pump A, double-suction pump B has the _____ impeller axial thrust; and the _____ required net positive suction head.

A. greater; greater

B. greater; smaller

C. smaller; greater

D. smaller; smaller

QUESTION: 50

Which one of the following is the state of water at 20 psia and 250°F?

A. Subcooled liquid

B. Saturated liquid

C. Mixture of saturated liquid and vapor

D. Superheated vapor

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

NRC GENERIC FUNDAMENTALS EXAMINATION
MARCH 2021 – BWR

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