UNITED STATES NUCLEAR REGULATORY COMMISSION
BOILING WATER REACTOR GENERIC FUNDAMENTALS EXAMINATION
SEPTEMBER 2004--FORM A

Please Print

Name: _____

Facility: _____

Docket No.: _____

Start Time: _____ Stop Time: _____

INSTRUCTIONS TO APPLICANT

Answer all the test items using the answer sheet provided, ensuring a single answer is marked for each test item. Each test item has equal point value. A score of at least 80% is required to pass this portion of the NRC operator licensing written examination. All examination papers will be collected 3.0 hours after the examination starts. This examination applies to a typical boiling water reactor (BWR) nuclear power plant.

SECTION	QUESTIONS	% OF TOTAL	SCORE
COMPONENTS	1 - 22		
REACTOR THEORY	23 - 36		
THERMODYNAMICS	37 - 50		
TOTALS	50		

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

_____
Applicant's Signature

RULES AND GUIDELINES FOR THE NRC
GENERIC FUNDAMENTALS EXAMINATION

During the administration of this examination the following rules apply:

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

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

2. Fill in the name of your facility.

3. Fill in your individual docket number.

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

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 provided by your proctor.

6. 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.

7. Scrap paper will be provided for calculations.

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

9. 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 of the examination room.

10. 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.

11. Turn in your examination materials, answer sheet on top, followed by the examination booklet, then examination aids - steam table booklets, handouts, and scrap paper used during the examination.

12. 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 HANDOUT SHEET

EQUATIONS

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

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

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

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

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

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

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

$SUR = 26.06/\tau$

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

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

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

$\lambda_{eff} = 0.1\ \text{sec}^{-1}$ (for small positive ρ)

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

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

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

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

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

$CR_1(1 - K_{eff1}) = CR_2(1 - K_{eff2})$

$1/M = CR_1/CR_X$

$A = \pi r^2$

$F = PA$

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

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

$E = IR$

Eff. = Net Work Out/Energy In

$\upsilon(P_2 - P_1) + \dfrac{(\vec{v}_2^{\,2} - \vec{v}_1^{\,2})}{2g_c} + \dfrac{g(z_2 - z_1)}{g_c} = 0$

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

CONVERSIONS

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1 Mw	= 3.41×10^6 Btu/hr	1 Curie	= 3.7×10^{10} dps
1 hp	= 2.54×10^3 Btu/hr	1 kg	= 2.21 lbm
1 Btu	= 778 ft-lbf	1 gal_{water}	= 8.35 lbm
°C	= (5/9)(°F - 32)	1 ft^3_{water}	= 7.48 gal
°F	= (9/5)(°C) + 32		

QUESTION: 1

Refer to the drawing of a typical safety valve (see figure below).

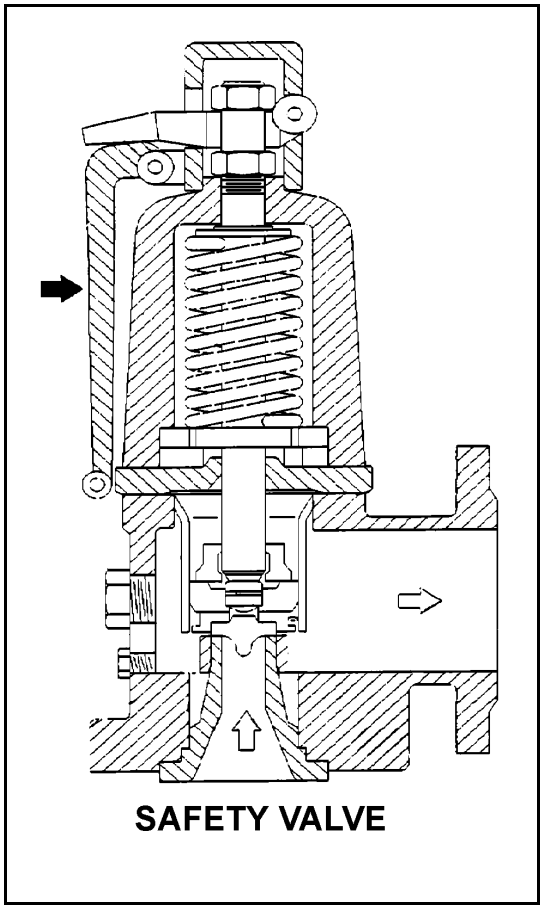
The component indicated by the solid arrow is used when necessary to manually...

A. rachet open the safety valve.

B. pop open the safety valve.

C. gag shut the safety valve.

D. determine the position of the safety valve.



QUESTION: 2

A vertical safety valve with a 2-inch diameter disk has a compressed spring applying 2,400 lbf to the top of the valve disk in opposition to system pressure. Which one of the following is the approximate system pressure at which the safety valve will open?

A. 95 psig

B. 191 psig

C. 382 psig

D. 764 psig

QUESTION: 3

Which one of the following types of similarly sized valves in an operating water system produces the least frictional head loss when fully open?

A. Ball

B. Globe

C. Butterfly

D. Swing check

QUESTION: 4

Refer to the drawing of a reactor vessel and differential pressure (D/P) level detector that was recently calibrated at normal operating conditions (see figure below). Assume that the associated reactor vessel level instrument does not use density compensation.

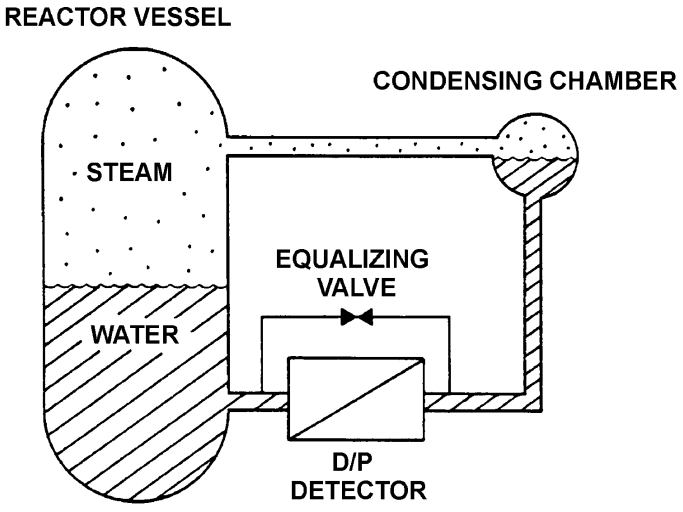
With the nuclear power plant shut down at reduced reactor vessel temperature and pressure, the reactor vessel level instrument will indicate _____ than actual water level; the D/P currently sensed by the D/P detector is_____ than the D/P for the same reactor vessel water level at normal operating conditions.

A. higher; smaller

B. higher; larger

C. lower; smaller

D. lower; larger



REACTOR VESSEL DIFFERENTIAL PRESSURE LEVEL DETECTOR

QUESTION: 5

A properly calibrated 0 to 100 psia diaphragm pressure detector is connected to a pressurized system; the low pressure side of the detector is vented to the atmosphere. The detector is currently producing a system pressure indication of 75 psia.

If the detector diaphragm ruptures, indicated pressure will be approximately...

A. 0 psia.

B. 15 psia.

C. 60 psia.

D. 90 psia.

QUESTION: 6

A bourdon-tube pressure detector was indicating 50% of scale when it was suddenly exposed to a high-pressure transient that caused permanent strain to the bourdon tube. The detector remained intact and actual pressure was restored to its original value.

During the pressure transient, the affected pressure indication initially went off-scale high. After the original pressure was restored, the indication was...

A. unpredictable.

B. less than 50% of scale.

C. 50% of scale.

D. greater than 50% of scale.

QUESTION: 7

Fission chamber detectors are used to monitor reactor power/neutron level in a shutdown reactor as well as a reactor operating at full power (and all power levels in between). At what power levels and why is it necessary to compensate the output of the detectors for gamma interactions with the fission chambers?

A. At all power levels, because gamma interactions produce larger detector pulses than neutron interactions.

B. At all power levels, because gamma interactions produce smaller detector pulses than neutron interactions.

C. Only when shutdown or at low power levels, because gamma flux is <u>not</u> proportional to reactor power at low power levels.

D. Only when operating at high power levels, because gamma flux is <u>not</u> proportional to reactor power at high power levels.

QUESTION: 8

Refer to the drawing of a water storage tank with an automatic level control system (see figure below).

Given:

- The drain valve fails closed on loss of controller output signal.
- The level sensor output signal changes directly with tank water level.

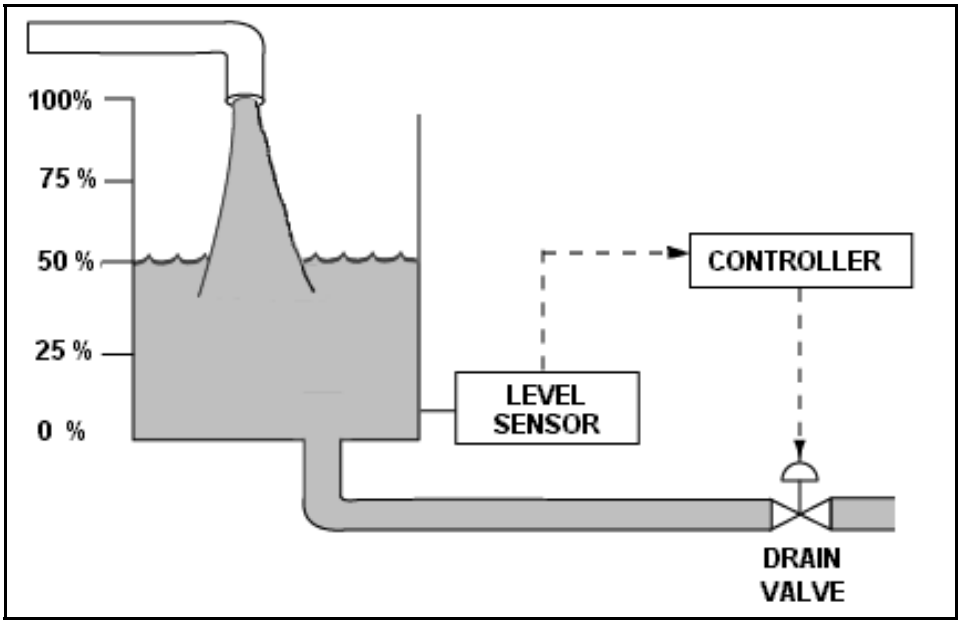
For proper automatic control of tank water level, the controller must be _____; and the control loop must be _____.

A. direct-acting; open

B. direct-acting; closed

C. reverse-acting; open

D. reverse-acting; closed



QUESTION: 9

Which one of the following describes a characteristic of pneumatic valve positioners?

A. They can provide automatic and manual demand signals to valve controllers and valve actuators.

B. They can increase or decrease air pressure to valve actuators to obtain the proper valve response.

C. They can either supply or receive air to/from valve controllers, depending on the direction of valve travel.

D. They can increase air pressure to valve actuators above existing main air header pressure.

QUESTION: 10

Which one of the following describes gas binding of a centrifugal pump?

A. Pump capacity is reduced due to the presence of steam or air in the pump impeller.

B. Pump capacity is reduced due to windage losses between the pump impeller and pump casing.

C. Pump motor current increases due to the compression of gases in the pump volute.

D. Pump motor current increases due to the high head requirements for pumping a fluid saturated with dissolved gases.

QUESTION: 11

A multi-speed centrifugal pump is operating at 3,600 rpm with a flow rate of 3,000 gpm. Which one of the following approximates the new flow rate if the speed is decreased to 3,000 rpm?

A. 1,000 gpm

B. 1,500 gpm

C. 2,000 gpm

D. 2,500 gpm

QUESTION: 12

Refer to the drawing of a cooling water system and the associated centrifugal pump operating curve (see figure below). Pumps A and B are identical single-speed centrifugal pumps and initially only pump A is operating.

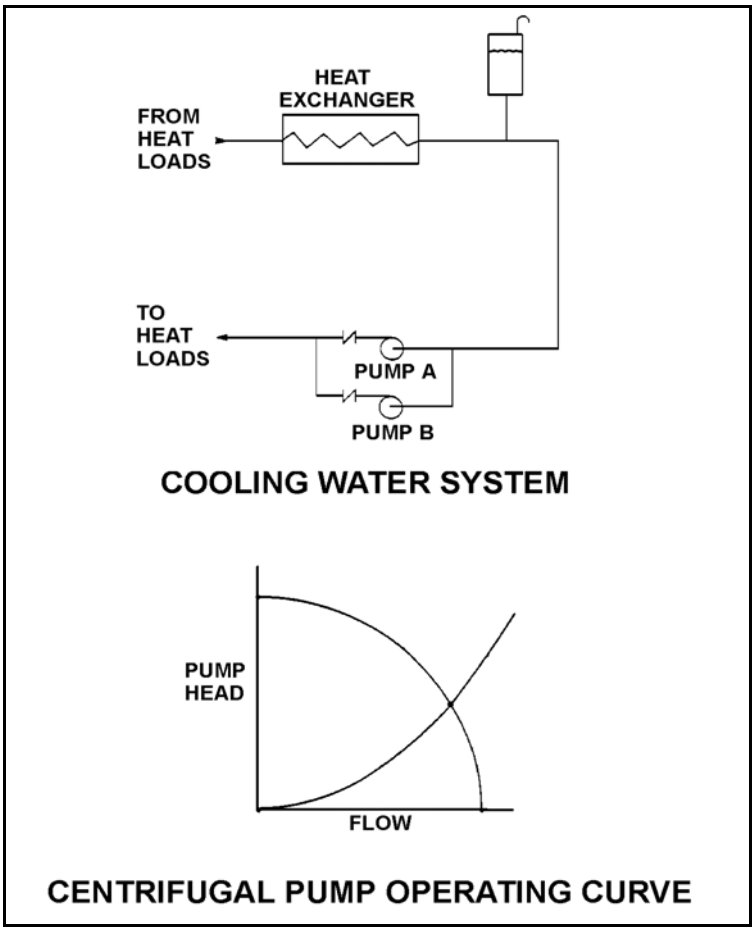
Pump B is then started. After the system stabilizes, system flow rate will be...

A. the same as the initial flow rate.

B. less than twice the initial flow rate.

C. twice the initial flow rate.

D. more than twice the initial flow rate.



QUESTION: 13

Refer to the drawing of an elevated centrifugal pump taking suction from the bottom of an open storage tank containing water at 66°F (see figure below). Assume standard atmospheric pressure.

The pump requires 4.0 ft-lbf/lbm of net positive suction head (NPSH). Assume that pump suction fluid velocity head loss is negligible.

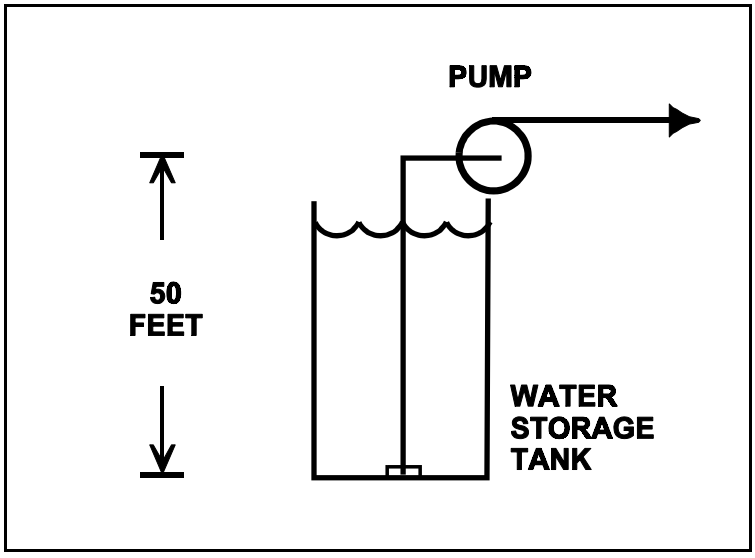
If tank water level is allowed to decrease continuously, at what approximate water level will the pump begin to cavitate?

A. 34 feet

B. 29 feet

C. 21 feet

D. 16 feet



QUESTION: 14

The number of starts for an electric motor in a given period of time should be limited because overheating of the _____ can occur due to the _____ counter electromotive force produced at low rotor speeds.

A. windings; high

B. windings; low

C. commutator and/or slip rings; high

D. commutator and/or slip rings; low

QUESTION: 15

A main generator is operating and connected to an infinite power grid. Elevated main generator winding temperature requires a reduction in reactive load from 200 MVAR (out) to 150 MVAR (out). To accomplish the reactive load reduction, the operator must _____ the generator field current; when generator reactive load equals 150 MVAR (out) the generator power factor will be _____than the initial power factor.

A. increase; larger

B. increase; smaller

C. decrease; larger

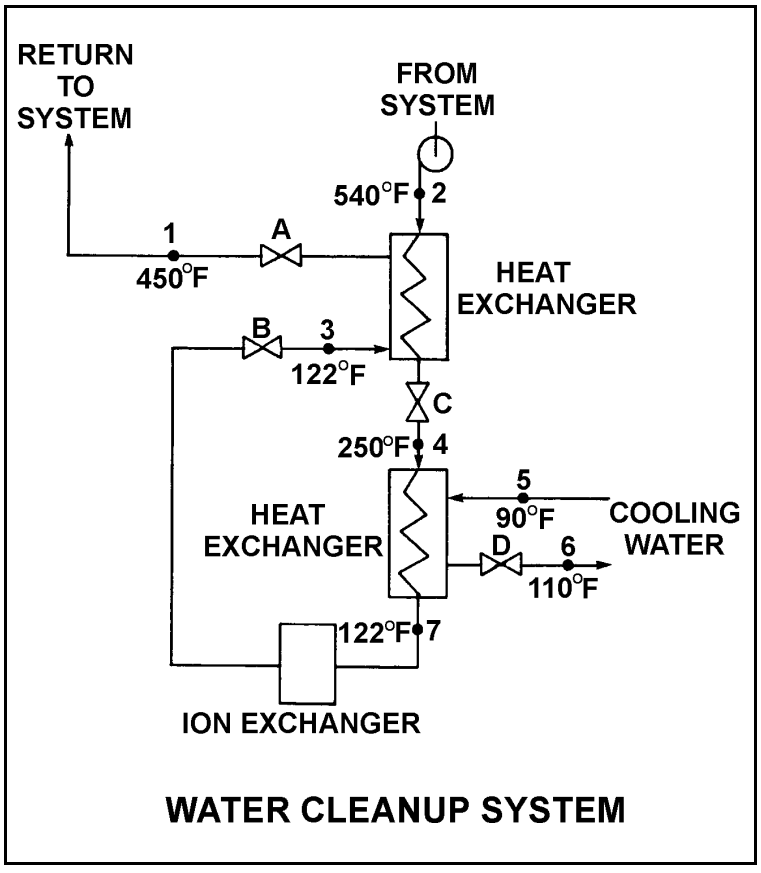
D. decrease; smaller

QUESTION: 16

Refer to the drawing of an operating water cleanup system (see figure below). Valves A, B, and D are fully open and valve C is 50% open.

If valve C is opened to 100%, how will the temperatures at points 3 and 6 be affected?

	Point 3	Point 6
A.	Decrease	Decrease
B.	Decrease	Increase
C.	Increase	Decrease
D.	Increase	Increase



QUESTION: 17

Steam has been admitted to a main condenser for 25 minutes with no cooling water during a condenser startup. Initiating full cooling water flow rate at this time will...

A. reduce the stress on the condenser shell by rapidly cooling the shell.

B. reduce the stress on the condenser tubes by rapidly cooling the tubes.

C. induce large thermal stresses on the condenser shell.

D. induce large thermal stresses on the junctions between the condenser tubes and the tubesheet.

QUESTION: 18

A main turbine-generator is operating at 80% load with the following initial steady-state temperatures for the main turbine lube oil heat exchanger:

$T_{oil\ in} = 174°F$
$T_{oil\ out} = 114°F$
$T_{water\ in} = 85°F$
$T_{water\ out} = 115°F$

After six months of main turbine-generator operation, the following final steady-state lube oil heat exchanger temperatures are observed:

$T_{oil\ in} = 179°F$
$T_{oil\ out} = 119°F$
$T_{water\ in} = 85°F$
$T_{water\ out} = 115°F$

Assume that the final cooling water and lube oil flow rates are the same as the initial flow rates, and that the specific heat values for the cooling water and lube oil do not change.

Which one of the following could be responsible for the differences between the initial and final heat exchanger steady-state temperatures?

A. The heat exchanger tubes have become fouled with scale.

B. The temperature of the cooling water source has increased.

C. The final main turbine-generator load is higher than the initial load.

D. The final main turbine-generator load is lower than the initial load.

QUESTION: 19

As the operating time of a demineralizer increases, the differential pressure across the demineralizer...

A. decreases due to resin breakdown.

B. decreases due to resin bead surface erosion.

C. increases due to trapping of suspended solids.

D. increases due to depletion of ion exchange sites.

QUESTION: 20

Which one of the following is an indication of resin exhaustion in a demineralizer:

A. An increase in the conductivity of the effluent

B. An increase in suspended solids in the effluent

C. A decrease in the flow rate through the demineralizer

D. An increase in the differential pressure across the demineralizer

QUESTION: 21

Given the following indications for an open 4160 Vac breaker:

All phase overcurrent trip flags are reset.
The control power fuses indicate blown.
The line-side voltmeter indicates 4160 Vac.
The load-side voltmeter indicates 0 volts.

Assuming no operator actions were taken since the breaker opened, which one of the following could have caused the breaker to open?

A. A ground fault caused an automatic breaker trip.

B. A loss of control power caused an automatic breaker trip.

C. An operator tripped the breaker manually at the breaker cabinet.

D. An operator tripped the breaker manually from a remote location.

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 follow the standard convention for control circuit drawings.)

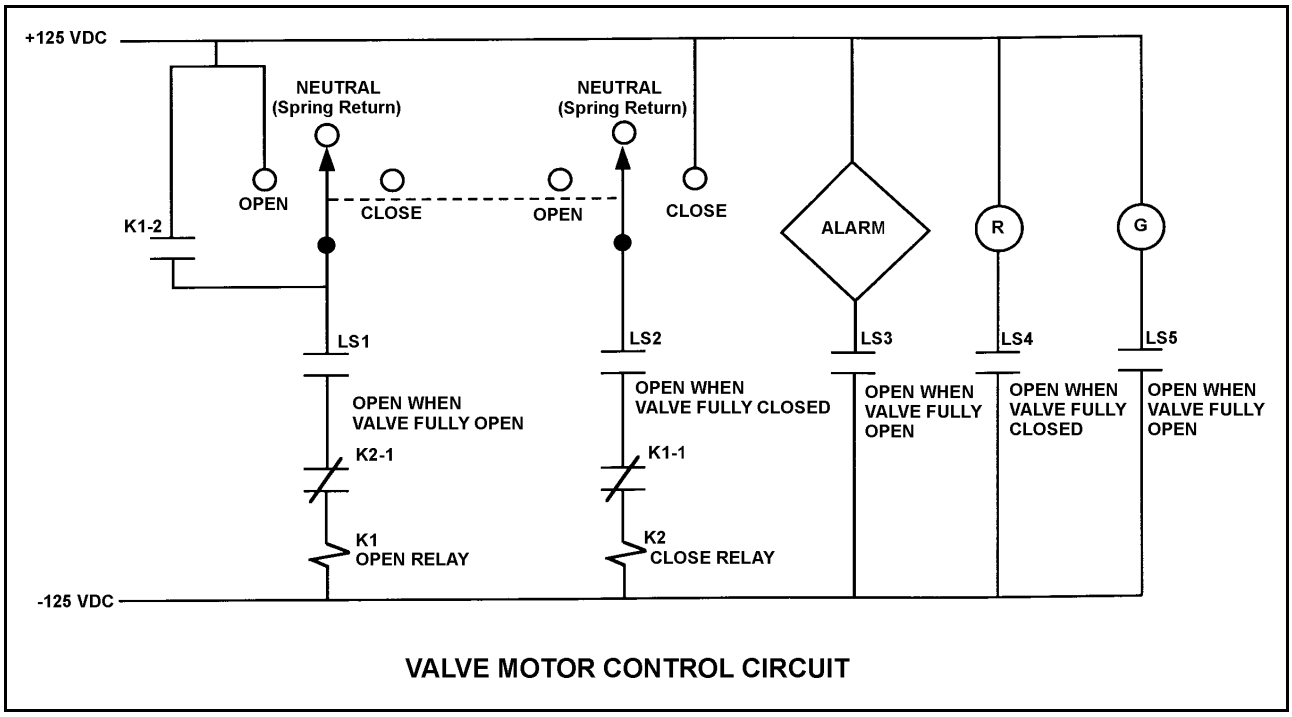
The operator takes the control switch to "Open" momentarily and the valve begins to open. Five seconds later, the operator takes the switch to "Close" momentarily and then releases the switch. Which one of the following describes the valve response after the switch is released?

A. The valve will stop opening and remain partially open.

B. The valve will stop opening and then go fully closed.

C. The valve will open fully and remain fully open.

D. The valve will open fully and then go fully closed.



VALVE MOTOR CONTROL CIRCUIT

QUESTION: 23

A neutron that appears 10^{-16} seconds after the associated fission event is classified as a _____ fission neutron.

A. delayed

B. prompt

C. thermal

D. spontaneous

QUESTION: 24

The fractional change in neutron population from one generation to the next is called...

A. beta.

B. lambda.

C. reactivity.

D. K-effective.

QUESTION: 25

A small amount of positive reactivity is added to a critical reactor in the source/startup range. The amount of reactivity added is much less than the average effective delayed neutron fraction.

Which one of the following will have a significant effect on the magnitude of the stable reactor period achieved for this reactivity addition?

A. Moderator temperature coefficient

B. Fuel temperature coefficient

C. Prompt neutron lifetime

D. Average effective decay constant

QUESTION: 26

Which one of the following will result in a less negative fuel temperature coefficient? (Consider only the direct effect of the change in the listed parameters.)

A. Increase in fuel burnup

B. Decrease in fuel temperature

C. Increase in void fraction

D. Decrease in moderator temperature

QUESTION: 27

For a normal reactor power increase from 20% to 100%, the smallest change in negative reactivity at steady-state conditions will be caused by...

A. void content.

B. fuel temperature.

C. xenon concentration.

D. moderator temperature.

QUESTION: 28

Rod position indication shows that a control rod is at position 22. If the control rod is then moved to position 12, it is being...

A. inserted 30 inches.

B. withdrawn 30 inches.

C. inserted 60 inches.

D. withdrawn 60 inches.

QUESTION: 29

Integral rod worth is the...

A. change in reactivity per unit change in rod position.

B. rod worth associated with the most reactive control rod.

C. change in worth of a control rod per unit change in reactor power.

D. reactivity added by moving a control rod from a reference point to another point.

QUESTION: 30

A nuclear reactor has been operating at 100% power for two months when a reactor scram occurs. Four hours later, the reactor is critical and stable at 10% power.

Which one of the following operator actions is required to maintain reactor power at 10% over the next 18 hours?

A. Add positive reactivity during the entire period

B. Add negative reactivity during the entire period

C. Add positive reactivity, then negative reactivity

D. Add negative reactivity, then positive reactivity

QUESTION: 31

A reactor is initially operating at 50% power with equilibrium core xenon-135. Power is increased to 75% over a 1 hour period with no subsequent operator actions. Considering only the reactivity effects of core xenon-135 changes, which one of the following describes reactor power 6 hours after the power change?

A. Greater than 75% and decreasing slowly

B. Greater than 75% and increasing slowly

C. Lower than 75% and decreasing slowly

D. Lower than 75% and increasing slowly

QUESTION: 32

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

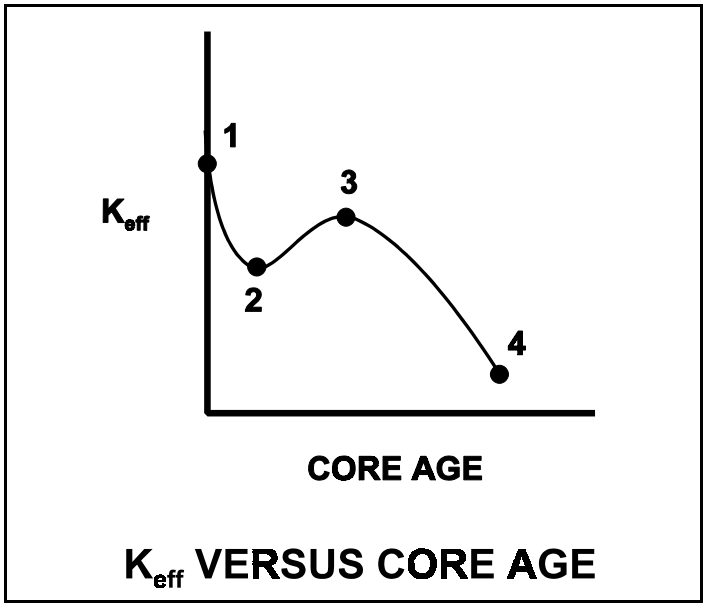
The major cause for the change in K_{eff} from point 3 to point 4 is...

A. depletion of U-235.

B. depletion of U-238.

C. burnout of burnable poisons.

D. buildup of fission product poisons.



QUESTION: 33

A refueling outage has just been completed and a reactor startup is being commenced. Which one of the following lists the method(s) used to add positive reactivity during the startup to criticality?

A. Control rods only

B. Recirculation pump flow only

C. Control rods and recirculation pump flow

D. Recirculation pump flow and steaming rate

QUESTION: 34

A nuclear power plant was shut down for maintenance following six months of full power operation. Now, two weeks later, the reactor has been taken critical and currently has a stable positive period. All control rod motion has been stopped. Core neutron level is currently increasing slowly through the overlap region between the source and intermediate ranges.

Which one of the following describes how the fission energy is being captured and its effect on fuel temperature?

A. Most of the fission energy is transferred by the fission fragments to the other atoms in the fuel pellets; the additional fission energy raises the temperature of the fuel.

B. Most of the fission energy is transferred by the fission fragments to the other atoms in the fuel pellets; however, the fission energy is insignificant when compared to the core decay heat and does not result in a fuel temperature increase.

C. Most of the fission energy is transferred by beta and gamma radiation to the other atoms in the fuel pellets; the additional fission energy raises the temperature of the fuel.

D. Most of the fission energy is transferred by beta and gamma radiation to the other atoms in the fuel pellets; however, the fission energy is insignificant when compared to the core decay heat and does not result in a fuel temperature increase.

QUESTION: 35

Which one of the following parameter changes will occur if reactor power is increased from 70% to 90% by only changing recirculation flow?

A. Core void fraction increases.

B. Feedwater temperature decreases.

C. Reactor vessel outlet steam pressure increases.

D. Condensate depression in the main condenser hotwell increases.

QUESTION: 36

A nuclear power plant is operating at 100% power when one recirculation pump trips. Reactor power decreases and stabilizes at a lower power level. Which one of the following reactivity coefficients caused the initial decrease in reactor power?

A. Void coefficient

B. Pressure coefficient

C. Moderator temperature coefficient

D. Fuel temperature (Doppler) coefficient

QUESTION: 37

Refer to the drawing of four tank differential pressure level detectors (see figure below).

The tanks are identical and are being maintained at 30 psia and a water level of 20 feet. They are surrounded by standard atmospheric pressure. The water in the tank and reference leg is at 70°F.

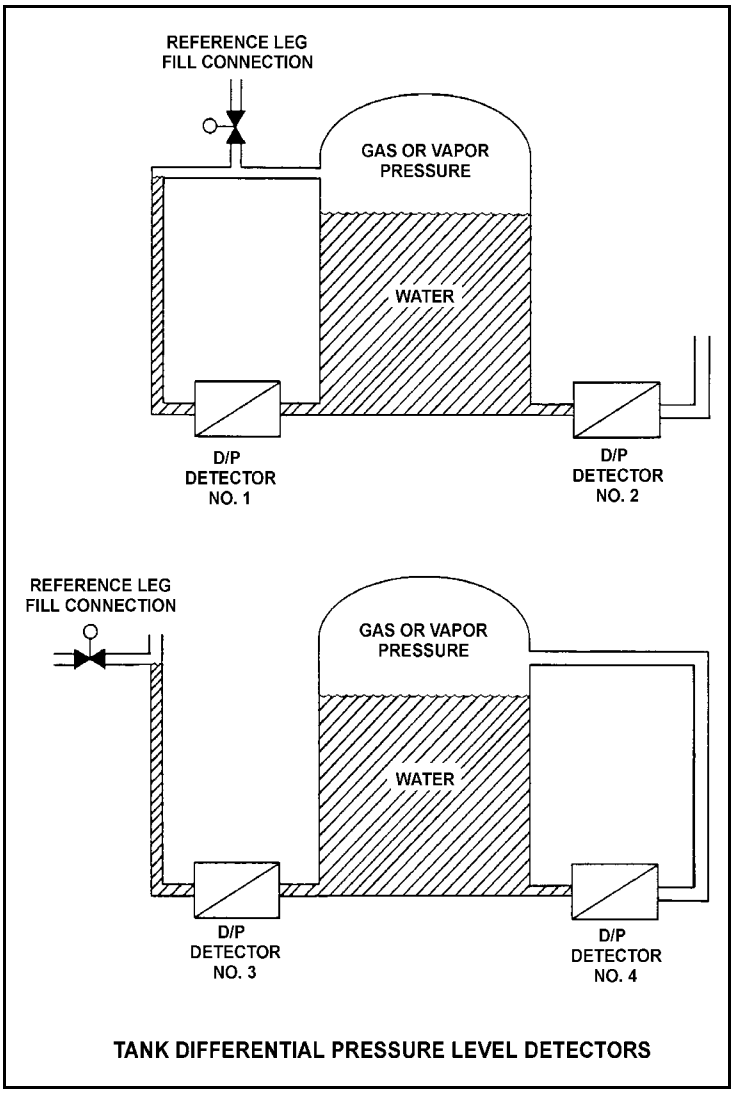
If each detector experiences a ruptured diaphragm, which detector(s) will cause indicated tank level to increase? (Assume actual tank water level remains constant.)

A. No. 1 only

B. No. 2 only

C. No. 1 and 3

D. No. 2 and 4



TANK DIFFERENTIAL PRESSURE LEVEL DETECTORS

QUESTION: 38

Saturated steam at 50% steam quality is leaving a main turbine at a flow rate of 1.0×10^6 lbm/hr and entering a condenser at 1.6 psia. Condensate is entering the hotwell at 112°F.

Which one of the following is the approximate condenser heat transfer rate?

A. 3.1×10^8 Btu/hr

B. 3.8×10^8 Btu/hr

C. 4.5×10^8 Btu/hr

D. 5.2×10^8 Btu/hr

QUESTION: 39

Refer to the drawing of a steam-jet air ejector (see figure below) in normal operation with supersonic steam velocities.

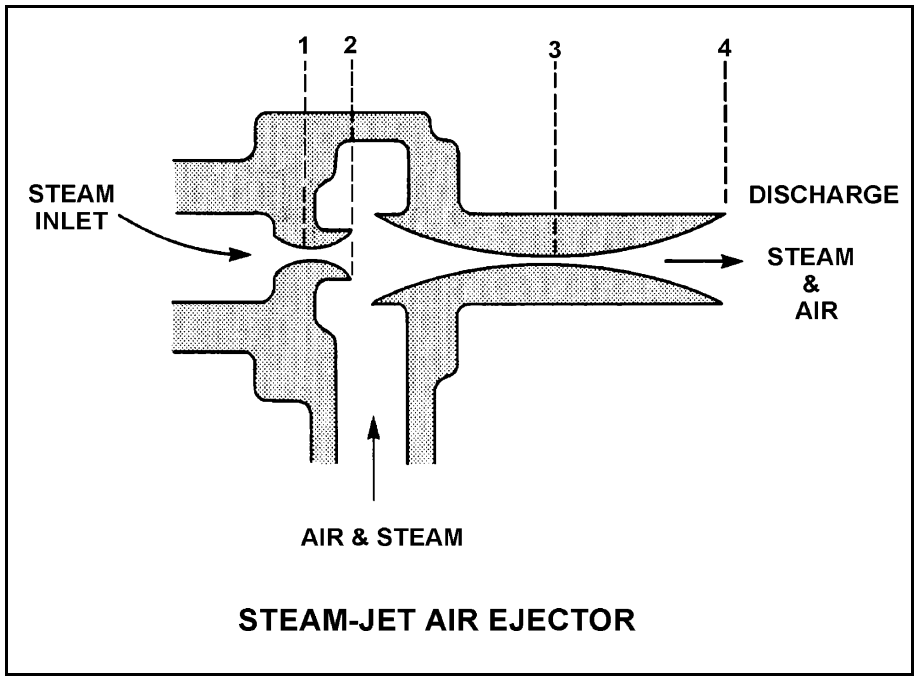
At which one of the following locations is the lowest pressure experienced?

A. 1

B. 2

C. 3

D. 4



STEAM-JET AIR EJECTOR

QUESTION: 40

A nuclear power plant is operating at 80% of rated power with 10°F of condensate subcooling. Which one of the following initially will increase plant thermodynamic efficiency? (Assume main condenser vacuum does not change unless otherwise stated.)

A. Isolating heating steam to a feedwater heater

B. Decreasing circulating water flow rate

C. Decreasing circulating water temperature

D. Decreasing main condenser vacuum (increasing pressure)

QUESTION: 41

Subcooled water at 150 psig is flowing through a pipe at 500 gpm when an isolation valve instantaneously closes, causing a momentary maximum pressure increase to 450 psig at the valve. If the initial flow rate had been 1,000 gpm, what would have been the maximum pressure experienced by the isolation valve?

A. 750 psig

B. 900 psig

C. 1,350 psig

D. 1,800 psig

QUESTION: 42

An 85 gpm leak to atmosphere has developed from a cooling water system that is operating at 100 psig. Which one of the following will be the approximate leak rate when system pressure has decreased to 50 psig?

A. 33.3 gpm

B. 42.5 gpm

C. 51.7 gpm

D. 60.1 gpm

QUESTION: 43

The measure of heat input per unit time from the reactor core to the reactor coolant in units of megawatts defines...

A. specific heat.

B. power density.

C. core thermal power.

D. percent reactor power.

QUESTION: 44

Refer to the drawing of a hypothetical fuel coolant channel (see figure below).

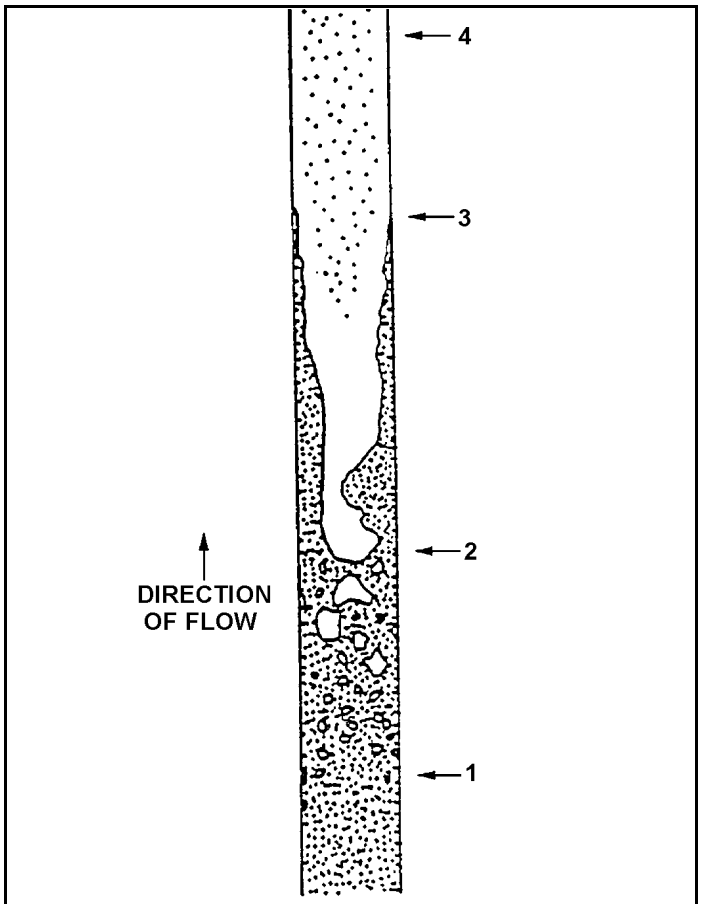
For the hypothetical fuel coolant channel shown below, at what point along its length does transition boiling begin?

A. 1

B. 2

C. 3

D. 4



HYPOTHETICAL FUEL COOLANT CHANNEL

QUESTION: 45

A nuclear power plant is operating at steady state 80% power. Reactor recirculation flow rate is decreased from 100% to 80%.

Which one of the following statements describes the initial response of the boiling boundary within the reactor core?

A. It physically moves up the fuel rods, because fewer Btus per pound mass of water are now being transferred.

B. It physically moves up the fuel rods, because more Btus per pound mass of water are now being transferred.

C. It physically moves down the fuel rods, because fewer Btus per pound mass of water are now being transferred.

D. It physically moves down the fuel rods, because more Btus per pound mass of water are now being transferred.

QUESTION: 46

Which one of the following is the quality of the steam leaving a cyclone separator at 985 psig and 1171 Btu/lbm? (Answer should be rounded to the nearest whole number.)

A. 95%

B. 96%

C. 97%

D. 98%

QUESTION: 47

The 2,200°F maximum peak fuel cladding temperature limit is imposed because...

A. 2,200°F is approximately 500°F below the fuel cladding melting temperature.

B. the rate of the zircaloy-steam reaction increases significantly at temperatures above 2,200°F.

C. any cladding temperature higher than 2,200°F correlates to a fuel centerline temperature above the fuel melting point.

D. the thermal conductivity of zircaloy decreases rapidly at temperatures above 2,200°F.

QUESTION: 48

During a loss-of-coolant accident, which one of the following heat transfer mechanisms provides the most core cooling when fuel elements are <u>not</u> in contact with the coolant?

A. Radiation

B. Emission

C. Convection

D. Conduction

QUESTION: 49

Bundle critical power ratio must be maintained _____ 1.0 to prevent fuel damage caused by a rapid increase in the temperature of the _____.

A. greater than; fuel pellets

B. less than; fuel pellets

C. greater than; fuel clad

D. less than; fuel clad

QUESTION: 50

A reactor plant heatup is in progress. The thermal stress applied to the reactor vessel is...

A. tensile across the entire wall.

B. tensile at the inner wall and compressive at the outer wall.

C. compressive across the entire wall.

D. compressive at the inner wall and tensile at the outer wall.

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

SEPTEMBER 2004 NRC GENERIC FUNDAMENTALS EXAMINATION
BOILING WATER REACTOR - ANSWER KEY

FORM A	FORM B	ANS.	FORM A	FORM B	ANS.
1	15	B	26	40	D
2	16	D	27	41	D
3	17	A	28	42	A
4	18	A	29	43	D
5	19	B	30	44	C
6	20	D	31	45	A
7	21	C	32	46	A
8	22	B	33	47	A
9	23	B	34	48	A/B
10	24	A	35	49	C
11	25	D	36	50	A
12	26	B	37	1	A
13	27	C	38	2	D
14	28	B	39	3	B
15	29	C	40	4	B
16	30	D	41	5	Deleted
17	31	D	42	6	D
18	32	A	43	7	C
19	33	C	44	8	C
20	34	A	45	9	D
21	35	C	46	10	C
22	36	C	47	11	B
23	37	B	48	12	A
24	38	C	49	13	C
25	39	D	50	14	D