OIC - EW: COMPETENCE 7

Maintenance and Repair of Electronic and Electrical Equipment

1	An electro-magnetic relay is most commonly used for what purpose?			
	provide inductive power to a circuit	remotely open and close contacts by action of a coil	provide transformer secondary winding over current protection	provide capacitance to a circuit
2	As load is added to an AC generator provided with constant field excitation, the prime mover slows down. What immediate effect will this have on frequency and voltage?			
	lowering frequency and lowering generated voltage	lowering frequency and lowering generated voltage	increasing frequency and lowering generated voltage	lowering frequency and increasing generated voltage
3	By what means is the division of the reactive kVAR load between paralleled AC generators automatically controlled?			
	prime mover governors	voltage regulators	phase balance relay	proportioner
4	Compared to the fuse being replaced, what should be the characteristic of the replacement fuse for a fuse that blows often?			
	the recommended current and voltage rating	higher current and voltage rating than the fuse being replaced	higher current and lower voltage rating than the fuse being replaced	lower current and higher voltage rating than the fuse being replaced
5	Consider a three-phase squirrel cage induction motor rated at 450 VAC and60 Hz. What would happen to the motor if the line frequency dropped from the normally supplied 60 Hz to 55 Hz and the voltage remained normal at 450 VAC.			
	run at a slower speed	operate at a lower current	vibrate excessively	trip off the line
6	For what purpose are thermal strip heaters provided in DC main propulsion motors?			
	prevent moisture buildup in windings when motor is idle	maintain a relatively constant temperature in the motor enclosure	prevent the rotor from warping while in operation	provide an additional means of starting resistance
7	How is the frequency output of an operating alternator controlled?			
	relative speed of the rotating magnets	number of turns of wire in the armature coil	strength of the magnets used	output voltage

8	How is the speed of the propeller shaft directly coupled to an AC synchronous drive motor changed when powered by either a dedicated or integrated constant frequency alternator in an AC diesel-electric drive system?			
	Varying the generator speed	Varying the number of motor poles	Varying the field strength of the generator	Varying the output frequency of the power converter
9	How would a DC ammeter designed to directly measure current be connected?			
	in series with a circuit	in parallel with a circuit	with internal shunts only	without regard to polarity
10	If a magnetic controller contact fails to pick up when the operating coil is energized, what could be one possible cause?			
	low spring pressure	low applied voltage to the coil	residual magnetism of the contact faces	dirty contact faces
11	If many turns of an alternating current coil for a contactor become short circuited, what will happen to the coil?			
	it will have a higher resistance value	it will probably burnout immediately	it will operate on reduced current	it will experience a temperature will drop
12	If you hear a loud buzzing noise coming from a magnetic motor controller, what should you do?			
	assume that the motor is operating at a full load	assume that the controller is operating normally	notify the electrician or watch engineer of the problem	feel the outside of the casing with your hand to see if it is hot
13	In a logic circuit, how does a NOT gate function?			
	it does not alter the input logic condition	it serves to amplify a given signal level	it serves to attenuate a given signal level	it reverses the input logic condition
14	In a shunt-wound DC generator, with what generator component are the shunt field windings connected in parallel with?			
	the interpoles	the armature circuit	the compensating windings	the series field winding

15	In an inductive-resistive circuit, what is the unit of measure for power associated with just the inductive aspects of the load?			
	kilovolt amps (kVA)	kilovolt amps reactive (kVAR)	kilovolts (kV)	kilowatts (kW)
16	A single-phase capacitor-start induction motor starts, comes up to about 75% rated speed, slows down to a lower speed, and accelerates again. Where is the problem most likely to be?			
	starting winding	running winding	starting capacitor	running centrifugal switch
17	A voltage amplifier has a calculated voltage gain of 10. Which statement correctly states the gain?			
	If the input changes 1 volt, the output changes 10 volts.	If the input changes 5 volts, the output changes1/2 volt.	If the input changes 5 volts, the output changes 15 volts.	If the input changes 10 volts, the output changes25 volts.
18	According to 46 CFR, Subchapter J(Electrical Engineering), the type of control circuit logic associated with auxiliaries vital to the operation of propulsion equipment, where automatic restart after a voltage failure would not create a hazard, is termed what?			
	low voltage protection	high amperage protection	low voltage release	high amperage release
19	An AC generator produces 60 Hz at1800 RPM. If the generator speed is increased to 1830 RPM, what will happen to the frequency in Hz?			
	decrease to 59 Hz	remain at 60 Hz	increase to 61 Hz	increase to 63 Hz
20	An accidental path of low resistance by passing the intended path and allowing passage of an abnormally high amount of current is known as what?			
	open circuit	short circuit	polarized ground	ground reference point
21	Besides voltage and frequency, what other factor must be the same when alternators are operating in parallel?			
	kilowatt load division	amperage load division	reactive load division	phases in synchronism

22	By what means is the voltage of an operating AC turbo generator raised or lowered?			
	exciter generator governor controls	synchronizing switch	phase sequence switch	generator field exciter
23	Capacitors can be used in electric distribution systems to improve power factor. This is accomplished by seesawing energy between the capacitor and what device or devices?			
	generator	inductive loads	resistive loads	capacitive loads
24	Consider a series circuit employing two resistors. What is true about the resistance value of the second resistor compared to the first when the voltage drop across the first resistor is one half the source voltage?			
	the second resistor has a resistance value equal to that of the first	the second resistor has a resistance value that is half of the first	the second resistor has a resistance value double that of the first	the second resistor has a resistance value relative to that of the first which cannot be determined
25	DC generator circuits are protected against malfunctions due to prime mover power loss by the use of what device (or devices)?			
	main bus disconnect links	a separate battery backup	reverse current relays	reverse power relays
26	Due to the operating characteristics of the system, time lag fuses (or dual- element fuses) are necessary for use in what types of circuits?			
	main lighting circuits	motor starting circuit	emergency lighting circuits	general alarm circuits
27	Electrical wire in general, when used aboard vessels must meet minimum requirements. Which of the following statements is/are correct?			
	Each wire must be14 AWG or larger, regardless of locations and use.	Wire must be of the stranded copper type.	Wire must be of the solid copper type.	Wire need not be in an enclosure nor component insulated.
28	How are AC and DC generators are similar?			
	They both internally generate alternating current voltages.	They both rectify the voltage before delivery	They both operate eat 60 cycles.	They both supply three- phase power.

29	How are the line losses in a distribution circuit kept to a minimum?			
	adding rubber insulation conductors to the circuit	using higher current and lower voltage	increasing the number of thermal relays in the circuit	using higher voltage and lower current
30	How is the full-load (rated) torque of an induction motor defined?			
	minimum torque developed by the motor accelerating from rest to the speed at which breakdown torque occurs	torque developed by the motor operating at rated horsepower, speed, and frequency	maximum torque developed by an overloaded motor with rated voltage and frequency with appreciable drop in speed	torque developed by the motor at the instant voltage is applied to the motor at startup
31	How is the rated temperature rise of an electric motor defined?			
	average temperature at any given latitude	normal temperature rise above the standard ambient temperature at rated load	average temperature rise due to resistance at 10% overload	permissible difference in the ambient temperature of the motor due to existing weather conditions
32	How many possible states does a binary logic circuit have?			
	One	Two	Three	Four
33	How will the value of the output frequency change if the load is removed from a turbo generator having a governor speed droop setting of 3%?			
	It will remain unchanged	It will decrease by approximately 3%.	It will become variable.	It will increase.
34	Humming or buzzing of electric contacts is a symptom of what condition?			
	low voltage on the operating coil	power failure to the operating coil	a control circuit ground	a control circuit overload
35	If a short circuit in the armature of a DC motor occurs what would be the result?			
	run fast	hum when energized	spark at the brushes	fail to start

36	If an electric motor fails to start, what should you check FIRST?			
	phase sequence	motor winding resistances	fuses or circuit breaker as applicable	line frequency
37	If field excitation is suddenly lost to an alternator operating in parallel with another alternator, what will happen to the alternator that has experienced a loss of field excitation?			
	It will supply excessive current to the bus.	It will operate at the same load, but with reduced voltage.	It will lose its load and tend to over speed.	It will become overloaded and slow down.
38	If the contacts of a motor starter or controller fail to drop out when the 'stop' button is depressed, what could be the cause?			
	stop contacts are carrying insufficient current	stop contacts have become welded together	starter shading coil is broken	starter shading coil is loose
39	If the field excitation is increased to one of two alternators operating in parallel and decreased on the other, what will be the result on the alternator with the field excitation increased?			
	the power factor will change in the lagging direction	the power factor will change in the leading direction	the kilowatt load will be greatly increased	the ampere load will be greatly decreased
40	In a basic AC induction motor, by what means are rotor currents induced in the rotor?			
	a bridge rectifier	an armature and brushes	magnetically by the rotating stator field	external variable resistors
41	In a dual element time-delay cartridge-type fuse, what type of protection is provided for motor applications?			
	short-circuit protection using a fusible link only	sustained overload protection using a spring loaded soldered joint only	short-circuit protection using a spring loaded soldered joint AND sustained overload protection using a fusible link	short-circuit protection using a fusible link AND sustained overload protection using a spring loaded soldered joint

42	In a short-shunt cumulatively compound wound DC motor, how is the shunt field connected?			
	in parallel with the armature	in parallel with the armature and series field	in series with the armature	in series with the armature and series field
43	In a three-phase, wye-wye connected transformer, what is the relationship between line current and phase current?			
	the line current is equal to the phase current	the line current is three times the phase current	the line current is equal to the sum of any two phase currents	the line current is equal to the difference of any two phase currents
44	In an impressed current cathodic protection system, concerning the anodes associated with the hull, what statement is true?			
	The anodes are connected to the hull and waste away with time.	The anodes are insulated from the hull and do not waste away with time.	The anodes are connected to the hull and do not waste away with time.	The anodes are insulated from the hull and waste away with time.
45	In the flow of one cycle of single phase alternating current past any given point in a circuit, how many times will the current peak to a maximum?			
	one time	two times	three times	four times
46	A main switchboard for an AC electrical distribution system is different from a main switchboard for a DC distribution system in that it will be provided with which of the following meters?			
	Frequency meter	Ammeter	Voltmeter	Kilowatt meter
47	A single-phase split-phase induction motor will only start if you spin the rotor rapidly with the line switch closed. After starting, its speed fluctuates between very slow and half-speed. What motor component most likely is faulty?			
	starting winding	centrifugal mechanism	centrifugal switch	running winding
48	A thermal-magnetic circuit breaker for a 300 KW alternator is rated at 500 amperes at full continuous load. Which of the following conditions will trip the breaker?			
	Sustained current draw of 450 amperes for 2 hours.	Sustained current draw of 500 amperes for 10 minutes.	Momentary current draw of 1000 amperes for 3 seconds.	Instantaneous current draw of 5,000 amperes.

49	AC circuits can possess characteristics of resistance, inductance, and capacitance. In terms of units of measure, how is the capacitive reactance of the circuit expressed?			
	ohms	mhos	henrys	farads
50	Ammeters and voltmeters used in sinusoidal AC power systems indicate which of the following values of the waveforms measured?			
	Peak value	Root-mean-square value	Average value	Maximum value
51	An electrical connection between the wiring of an electric motor and its metal frame is known as what?			
	eddy current	ground	impedance	flux leakage
52	By what means is the rotation of a three-phase induction motor reversed?			
	interchanging any two of the three line leads to the stator	disconnecting one of the three line leads to the stator	switching the shunt field coil leads	permanently disconnecting any two of the three line leads to the stator
53	How many cells are within a twelve volt lead acid battery?			
	one cell	three cells	six cells	twelve cells
54	According to the 46 CFR, Subchapter J (Electrical Engineering) requires which of the listed features to open the power circuit to a motor due to low voltage and re-close automatically when the voltage is restored to normal?			
	Low voltage protection	6 volt non-renewable link fuse	12 volt renewable link fuse	Low voltage release
55	An AC generator operating in parallel loses its excitation without tripping the circuit breaker. What will be the result?			
	It will not affect the faulty generator due to the compensation of the other generators.	It will cause the slip rings to melt.	It will increase the output amperage between the armature and the bus.	It will cause high currents to be induced in the field and stator windings.

56	An accidental ground in a motor can be defined as an electrical connection between the wiring of the motor and what other aspect of the motor installation?			
	supply fuses	circuit breaker	metal framework	contactor
57	An accidental path of low resistance which by passes the intended resistance and passes an abnormal amount of current is known as what?			
	polarized ground	short circuit	ground reference point	open circuit
58	An increase in which of the listed conditions will increase the speed of a synchronous electric motor?			
	Frequency	Voltage	Armature current	Inductance
59	An insulation resistance test is performed on a particular piece of electric equipment. In addition to the resistance reading and date of test, what information listed below should be entered in the electrical log?			
	The maximum al allowable operating temperature of the machine.	The temperature of the machine at the time the resistance reading was taken.	The normal temperature rise of the machine.	The complete name plate data from the resistance test instrument used to obtain the reading.
60	At high discharge rates, why are nickel-cadmium storage batteries superior to lead-acid batteries?			
	they require fewer cells for the same voltage and less mounting space	they are able to produce higher voltages and do not have to be charged as often	they can be charged and discharged many times without much damage	they have no individual cells to replace at the end of useful life
61	Besides voltage regulation, what is a function of the voltage regulators used with AC generators?			
	To cut out generators when they are no longer required.	To cut in additional generators automatically as required.	To divide the kW load equally between generators operating in parallel.	To divide the kVAR load equally between generators operating in parallel.

62	By what means does a molded-case circuit breaker provides protection against short circuits?			
	use of a magnetic trip unit	use of a shading coil	use of an arc quencher	use of a bimetallic strip
63	By what means is a constant output voltage from an AC generator maintained?			
	prime mover governor	exciter generator	voltage regulator	reverse power relay
64	By what means is the frequency of an alternator adjusted from the main switchboard?			
	frequency meter	voltage regulator	governor control	sychroscope switch
65	By what mechanism does a reverse-power relay prevent AC generator motorization?			
	automatically redirecting the load	automatically speeding up the prime mover	tripping the panel board main switch	tripping the generator circuit breaker
66	Capacitance is the property of an electric circuit opposing a change in what value of a circuit?			
	current in the circuit	voltage in the circuit	inductance in the circuit	resistance in the circuit
67	Compared to conventional alternators, brushless alternators are designed to operate without the use of what?			
	slip rings and commutators	exciters	voltage regulators	rectifiers
68	Compared to the original wire, what will be the resistance of a replacement wire having twice the length and one-half the cross-sectional area of the original?			
	four times that of the original wire	twice that of the original wire	the same as that of the original wire	one-half that of the original wire
69	Consider a series circuit employing two resistors. What is true about the resistance value of the second resistor compared to the first when the voltage drop across the first resistor is one half the source voltage?			
	the second resistor has a resistance value equal to that of the first	the second resistor has a resistance value that is half of the first	the second resistor has a resistance value double that of the first	the second resistor has a resistance value relative to that of the first which cannot be determined

70	D.C. propulsion motor brush pressure depends on the brush grade used. In practice with what device is the proper brush pressure established?			
	multi meter	manometer	spring scale	compound gauge
71	Diesel generators #1 and #2 are operating in parallel at near full load capacity. Diesel generator #1 suddenly trips out mechanically due to low lube oil pressure. The reverse power relay functions properly and trips generator #1 electrically off the board. Which of the following actions should you carry out FIRST?			
	Start the emergency generator	Ascertain cause of the low lube oil pressure.	Strip the board of all non vital circuits.	Secure alarms, reset reverse power relay, and restart #1 engine.
72	During discharge of a lead-acid storage battery, which of the following actions occurs?			
	The acid becomes stronger.	Both plates change chemically to ammonium chloride.	The acid becomes weaker	Hydrogen gas is liberated.
73	How are AC and DC generators are similar?			
	They both internally generate alternating current voltages.	They both rectify the current before delivery.	They are both constructed at the same physical size for the same kilowatt rating.	They both internally produce three-phase power.
74	How are fuses rated?			
	voltage and amperage only	amperage only	interrupting capacity only	voltage, amperage, and interrupting capacity
75	How are the field windings of a DC shunt generator connected?			
	in series with the series windings	in parallel with the field rheostat	in series with the armature windings	in parallel with the armature windings
76	How are the number of cycles per second developed by the alternator aboard your vessel determined?			
	the speed of the engine driving the alternator	the resistance applied to the field rheostat	the synchronous speed of induction	the adjustments made to the voltage regulator

77	How is the output voltage of a 440 volt, 60 hertz, AC generator controlled?			
	varying the prime mover speed	varying the strength of the excitation field	varying the load on the alternator	varying the number of poles
78	How is the power factor of an AC generator operating singularly determined?			
	the connected load	prime mover speed	the ground current	the generator's rated voltage
79	How should the shunt of a DC ammeter be connected?			
	in series with the load and in parallel with the meter movement	in parallel with the load and in series with the meter movement	in parallel with the load and in parallel with the meter movement	in series with the load and in series with the meter movement
80	How will a molded-case circuit breaker with a thermal trip unit react immediately after it has tripped, as a result of an overloaded motor circuit?			
	The breaker cannot be reset to the ON position until the thermal element cools down.	The breaker handle will lock in the OFF position.	The breaker handle will lock in the TRIPPED position.	The thermal element must be replaced after an overload trip has occurred before it can be restored into service.
81	How would you increase the frequency of an operating AC generator?			
	increase the field excitation	decrease the field excitation	increase the number of magnetic poles	increase the speed of the prime mover
82	Hysteresis is one cause of electrical power loss associated with electricity generation equipment. What phenomenon results in hysteresis?			
	arcing at the brushes	pulsating terminal current	heat generated by magnetic polarity reversals	excessive field current
83	If a DC motor runs faster than designed, with all other conditions being normal, what could be the possible cause?			
	open shunt field coil	open armature coil	reversed commutating pole	overload

84	If a magnetic controller relay fails to drop out when the coil voltage is removed from the relay, what is the probable cause?			
	excessive spring tension	over voltage	excessive current	welded contacts
85	If all three ground-detection lamps continue to burn at equal intensity after the test button is depressed and released, which of the listed conditions is indicated?			
	No grounds exist	All three phases are grounded	The test switch is faulty	The current transformers are shorted out
86	If an unloaded DC compound motor's shunt field were weakened by excessive rheostat resistance or by an open circuit, how would the motor respond?			
	over speed due to reduced CEMF	stop because of low flux	continue to run at base speed	slow down and overheat
87	If the centrifugal switch or relay used for cutting out the starting winding of a split-phase induction motor fails to open once the motor is in operation, what will be the result?			
	the motor will over speed	the starting winding will burn out	the motor will immediately stall under load	the motor torque will be above normal at rated speed
88	If the excitation of an alternator operating in parallel is decreased below normal and the other above normal, what will be the result on the alternator with the excitation decreased below normal?			
	power factor will change in the lagging direction	power factor will change in the leading direction	ampere load will be greatly increased	kilowatt load will be greatly decreased
89	If the field current of a paralleled AC generator is increased above normal, what will be the net result to the VAR's and power factor?			
	VAR's will decrease and the power factor will be more leading	VAR's will increase and the power factor will be more leading	VAR's will decrease and the power factor will be more lagging	VAR's will increase and the power factor will be more lagging
90	If the voltage and the current developed in an AC circuit reach their peak values at the same time (with a phase angle difference of zero), what is the power factor considered to be?			
	lagging	leading	unity (1.0)	infinity

91	Impressed current cathodic hull protection systems are commonly used on modern vessels. What are these systems designed to replace or reduce?			
	electroplating of the hull	repeated painting of the hull	sacrificial zinc anodes	vacuum tube degaussing systems

92	In a diesel electric plant, raising the generator's field excitation current will have what effect on the DC propulsion motor speed?			
	increase in speed	decrease in speed	affect generator speed only	affect main motor speed if done in conjunction with higher generator engine speeds
93	In a logic circuit, what statement is true concerning how the NOR and NAND logic gates function?			
	Both the NOR and NAND logic gates must be used together in a logic circuit and cannot be used individually.	Given the same inputs, the NOR and NAND logic gates are the opposite of each other in terms of outputs.	Given the same inputs, the NOR logic gate has the opposite output from the OR logic gate and similarly the NAND logic gate has the opposite output from the AND logic gate.	The NOR and NAND logic gates can be used interchangeably.
94	In a rectified DC diesel electric plant, raising the AC generator's field excitation current will have what effect on the DC propulsion motor?			
	increase in speed	decrease in speed	operate with a lower power factor	operate with a higher power factor
95	In a series circuit what is the total applied voltage equal to?			
	the sum of the individual voltage drops	the total resistance divided by the total current	the sum of the individual currents multiplied by the number of resistors	the total current divided by the total resistance
96	In a single element cartridge-type fuse, what type of protection is provided for lighting and general power applications?			
	sustained overload protection using a fusible link	sustained overload protection using a spring loaded soldered joint	short-circuit protection using a fusible link	short-circuit protection using a spring loaded soldered joint
97	In addition to testing the calibration of a circuit breaker, what additional maintenance should be routinely performed?			
	changing out of magnetic elements yearly as appropriate	changing out of bimetallic elements yearly as appropriate	performing an external visual inspection	complete disassembly to perform an internal inspection

98	In an alternating current circuit, what factor of a circuit will cause the inductive reactance to vary?			
	resistance of the circuit	frequency of the circuit	voltage of the circuit	current of the circuit
99	In general, why are nickel-cadmium storage batteries superior to lead-acid batteries?			
	they put out higher voltages and require no maintenance	they can remain idle and keep a full charge for a long time	they need fewer cells in series and use less mounting space	they are less costly to replace