U.S.C.G. Merchant Marine Exam

QMED

Q801 Junior Engineer-Part II

(Sample Examination)
Choose the best answer to the following Multiple Choice Questions

1. With regard to the number of passes through the tubes of shell-and-tube heat exchangers, what statement is true?
   - (A) In single-pass and two-pass heat exchangers, the inlet and outlet tube-side fluid connections are at opposite ends.
   - (B) In two-pass and four-pass heat exchangers, the inlet and outlet tube-side fluid connections are at opposite ends.
   - (C) In single-pass and two-pass heat exchangers, the inlet and outlet tube-side fluid connections are at the same end.
   - (D) In two-pass and four-pass heat exchangers, the inlet and outlet tube-side fluid connections are at the same end.

   If choice D is selected set score to 1.

2. The capacity of a gear type rotary pump, when operated at a constant speed, will decrease with an increase in the pump __________.
   - (A) suction pressure
   - (B) rotor clearances
   - (C) discharge volume
   - (D) torque rating

   If choice B is selected set score to 1.

3. When testing the low pressure cut out switch, assuming the compressor is running, what should be done to initiate the test?
   - (A) stop the circulating pump
   - (B) stop the compressor
   - (C) secure the condenser
   - (D) close the compressor suction valve

   If choice D is selected set score to 1.

4. The illustrated valve, figure "A", needs to be repaired due to a leak across the valve disk. To disassemble the valve, you should __________. Illustration GS-0140
   - (A) first fully loosen part 8, then turn the handwheel clockwise to separate the bonnet from the body
   - (B) turn the handwheel clockwise as viewed from the top, using a pipe wrench for assistance
   - (C) first fully loosen part 8, then turn the handwheel counter-clockwise to separate the bonnet from the body
   - (D) tighten part 4

   If choice A is selected set score to 1.
5. In figure "2" of the diagram shown in the illustration, the three-phase power transformer has a step-down turns ratio of four to one. If a three-phase 440 volt supply is connected to terminals "A1-B1-C1", what voltage should develop across terminals "A2-B2-C2"? Illustration EL-0084

- (A) 64 volts
- (B) 110 volts
- (C) 190 volts
- (D) 762 volts

If choice B is selected set score to 1.

6. In a refrigeration system, once the gage manifold hoses are attached to the compressor service valve connections and properly purged, what should be the status of the manifold valves and the service valves when the purpose for attachment is to read system pressures?

- (A) both manifold hand valves should be open and the compressor service valves should both be backseated
- (B) both manifold hand valves should be open and the compressor service valves should both be frontseated
- (C) both manifold hand valves should be closed and the compressor service valves should be cracked-off their backseats
- (D) both manifold hand valves should be open and the compressor service valves should be cracked-off their backseats

If choice C is selected set score to 1.

7. During the initial cooling down of a box temperature in a refrigeration system, which of the devices listed is used to prevent excessive gas pressure at the compressor suction for the purpose of prevention of overloading of the compressor driver?

- (A) Crankcase pressure regulator
- (B) High-pressure cut-out
- (C) Low-pressure cut-out
- (D) Solenoid valve

If choice A is selected set score to 1.

8. In a typical automatic fire alarm system, which of the listed actions will cause an indication of a fire to be given in the annunciator cabinet?

- (A) A rise in temperature activating a heat detector.
- (B) A manual fire alarm box is activated.
- (C) The fire alarm test push button is operated.
- (D) All of the above.

If choice D is selected set score to 1.
9. A good approach to personnel safety is to assume that all tanks and pumprooms are potentially dangerous. You should immediately leave an area whenever __________.

- (A) you smell an unusual odor
- (B) you experience an abnormal bodily sensation
- (C) you have irritation of the eyes, nose, or throat
- (D) any of the above conditions occur

*If choice D is selected set score to 1.*

10. A coolant is usually used when cutting metal in a power hacksaw to prevent the __________.

- (A) blade from overheating
- (B) blade from catching on the work piece
- (C) blade from bending
- (D) cut from clogging

*If choice A is selected set score to 1.*

11. To properly install a new blade in a hand hacksaw frame, the __________.

- (A) blade can be installed in any position for normal use
- (B) teeth should point away from the handle
- (C) teeth should point toward the handle
- (D) blade should be kept loose in the frame

*If choice B is selected set score to 1.*

12. Rotor-to-stator air gap readings should be periodically taken for electrical generation equipment. What is the best tool to use to take these measurements?

- (A) inside micrometer
- (B) dial indicator
- (C) cloth (non-metallic) tape measure
- (D) tapered, long blade, feeler gage

*If choice D is selected set score to 1.*

13. During normal operation, traditionally, how has most of the refrigerant released to the atmosphere from low-pressure systems?

- (A) through the compressor shaft seal
- (B) through the purge unit vent
- (C) through water-side system leaks
- (D) through a leaking rupture disk

*If choice B is selected set score to 1.*
14. In heavy seas the helmsman should steer the survival craft __________.

- (A) into the seas
- (B) broadside to the seas
- (C) in the same direction as the seas
- (D) in a series of figure-eights

*If choice A is selected set score to 1.

15. What is the unit of measure for electrical resistance?

- (A) ohm
- (B) volt
- (C) watt
- (D) ampere

*If choice A is selected set score to 1.

16. What statement is true concerning the vent pipes and sounding tubes associated with a vented tank?

- (A) Both the vent pipe and the sounding tube pass through the tank top and extend almost to the tank bottom.
- (B) The vent pipe attaches to and ends at an opening at the top of the tank, and the sounding tube passes through the tank top and extends almost to the tank bottom.
- (C) The sounding tube attaches to and ends at an opening at the top of the tank, and the vent pipe passes through the tank top and extends almost to the tank bottom.
- (D) Both the vent pipe and the sounding tube attach to and end at an opening at the top of the tank.

*If choice B is selected set score to 1.

17. Remote valve operators are frequently fitted with a handwheel for local operation if the motor fails. If this is so, what is the procedure for local manual control?

- (A) First move the lever to disengage the motor clutch, then rotate the handwheel.
- (B) Motor operated valves are generally not fitted with local handwheels.
- (C) Just rotate the handwheel in the appropriate direction for valve operation.
- (D) First move the lever to engage the motor clutch, then rotate the handwheel.

*If choice A is selected set score to 1.
18. An undervoltage release mechanism (UVR) is fitted to all generator breakers and some main feeder circuit breakers for what primary reason?

- (A) trip out the breaker when a severe voltage dip occurs
- (B) trip out the breaker if the generator overspeeds by 5%, but continues to run
- (C) trip out generators when there is reversal of power in the main circuit
- (D) trip out generators in the event of severe arcing or sparking

*If choice A is selected set score to 1.*

19. If there is a "large" release of R-134a refrigerant gas in a confined area, which of the following statements would be true?

- (A) safety goggles and lined butyl gloves would be required before entering the space
- (B) a self-contained breathing apparatus (SCBA) would be required before entering the space
- (C) dust or particle masks would be required before entering the space
- (D) an explosive atmosphere would be created

*If choice B is selected set score to 1.*

20. Whether analog or digital, what are most AC voltmeters calibrated to measure?

- (A) peak voltage only
- (B) peak-to-peak voltage
- (C) root-mean-square voltage
- (D) average voltage

*If choice C is selected set score to 1.*

21. In a refrigeration system, what component is installed directly downstream of the thermal expansion valve?

- (A) box solenoid valve
- (B) compressor
- (C) evaporator coil
- (D) receiver

*If choice C is selected set score to 1.*

22. When changing fuses, what safety precaution should be taken after ensuring that the circuit is dead?

- (A) wear safety glasses
- (B) wear rubber boots
- (C) stand on a rubber mat
- (D) use a fuse puller

*If choice D is selected set score to 1.*
23. In order for the automatic lifeboat drain to operate properly __________.
   - (A) the cap should be removed to drain the boat when it is waterborne
   - (B) the cage must be free of rubbish or the ball may not seat properly
   - (C) there is an automatic ball check located in a siphon tube
   - (D) the small lever to release the rubber ball float must be turned counter-clockwise

   If choice B is selected set score to 1.

24. What would be the most probable cause for a high-pressure alarm to be activated in a low-pressure CO₂ fixed fire extinguishing system?
   - (A) The tank cooling system has malfunctioned.
   - (B) An air leak has developed in the tank.
   - (C) An excessive amount of insulation has been installed on the tank and piping.
   - (D) The pilot cylinder discharge valve is leaking.

   If choice A is selected set score to 1.

25. If a magnetic controller relay fails to drop out when the coil voltage is removed from the relay, what is the probable cause?
   - (A) welded contacts
   - (B) excessive spring tension
   - (C) excessive current
   - (D) overvoltage

   If choice A is selected set score to 1.

26. What type of grease is the most commonly used aboard ship?
   - (A) Calcium-based grease
   - (B) Aluminum-based grease
   - (C) Lime-based grease
   - (D) Lithium-based grease

   If choice D is selected set score to 1.

27. As shown in the illustration, which of the following statements is correct concerning the circuits in a sound-powered telephone system? Illustration EL-0093
   - (A) Both the talking and ringing circuits are common circuits.
   - (B) The talking circuit is a common circuit and the ringing circuit is a selective circuit.
   - (C) Both the talking and ringing circuits are selective circuits.
   - (D) The talking circuit is a selective circuit and the ringing circuit is a common circuit.

   If choice B is selected set score to 1.
28. If a lifeboat winch allows a lifeboat to descend to the water at an excessive speed, you should _________.

- (A) adjust the centrifugal brake mechanism
- (B) adjust the davit mounted limit switches
- (C) engage the motor friction clutch bands
- (D) remove unnecessary weight from the boat

*If choice A is selected set score to 1.*

29. As demand on the device shown in the illustration fluctuates in the pressure range of 100 to 110 psi, the output of the unit is controlled by _________. Illustration GS-0119

- (A) proportional modulation of the compressor speed
- (B) complete shut down until the lower pressure limit is reached causing it to restart
- (C) the modulation of the opening of a butterfly valve located in the air intake
- (D) change in control pressure to modulate the discharge of compressed air to the atmosphere

*If choice C is selected set score to 1.*

30. What is the physical state and pressure condition of refrigerant as it leaves a receiver in a typical refrigeration system?

- (A) low-pressure liquid
- (B) high-pressure vapor
- (C) low-pressure vapor
- (D) high-pressure liquid

*If choice D is selected set score to 1.*

31. What could be the cause of water hammer in a steam heating system?

- (A) filling the auxiliary boiler with cold water
- (B) steam admitted to a cold pipe
- (C) filling the auxiliary boiler with hot water
- (D) draining a sootblower line before cracking the steam supply valve

*If choice B is selected set score to 1.*

32. What type of wound is generally associated with no bleeding and is very susceptible to infection?

- (A) Puncture
- (B) Incision
- (C) Laceration
- (D) Abrasion

*If choice A is selected set score to 1.*
33. When an aluminum plate is bolted to a steel plate, what is required at the bolted joint to minimize bimetallic corrosion?

- (A) The plates should be bonded together electrically by joining the plates by a bonding strap in addition to bolting together.
- (B) The plates should be bolted together in such a way as to ensure good electrical contact between the plates.
- (C) The plates should be electrically insulated from one another by use of non-conductive gaskets and non-conductive ferrule sleeves with the bolts.
- (D) Steel and aluminum are so close together on the Noble series that no particular provision need be made for bolting steel and aluminum plates together.

*If choice C is selected set score to 1.*

34. What is the drive arrangement of refrigeration compressor shown in figure “B” of the illustration?

Illustration RA-0041

- (A) serviceable, bolted, accessible semi-hermetic
- (B) open
- (C) external-drive
- (D) welded, fully hermetic

*If choice D is selected set score to 1.*

35. Which of the listed characteristics of fuel oil establishes the danger point as far as transferring, pumping, and firing procedures are concerned?

- (A) Specific gravity
- (B) Fire point
- (C) Flash point
- (D) Viscosity

*If choice C is selected set score to 1.*

36. There are three pieces of information that should be included in delivering a message via a sound-powered telephone. Which of the following represents the proper sequence of information delivery?

- (A) First: state the message. Second: give the name of the station being called. Third: give the name of the calling station.
- (B) First: give the name of the station being called. Second: give the name of the calling station. Third: state the message.
- (C) First: give the name of the calling station. Second: give the name of the station being called. Third: state the message.
- (D) First: state the message. Second: give the name of the calling station. Third: give the name of the station being called.

*If choice B is selected set score to 1.*
37. What is the purpose of a ship's service generator circuit breaker's reverse power trip?

- (A) prevent alternator motorization
- (B) protect the circuit breaker blowout coil
- (C) prevent low voltage tripout
- (D) prevent main circuit overload

*If choice A is selected set score to 1.*

38. What statement is true concerning the specific gravity of the electrolyte solution in a lead-acid battery?

- (A) the specific gravity remains the same during discharge
- (B) the specific gravity is not affected during charging
- (C) the specific gravity would read close to 1.830 when discharged
- (D) the specific gravity gives an indication of the state of charge of the battery

*If choice D is selected set score to 1.*

39. Under what conditions is a DANGER tag installed at equipment control stations in preparation for performing maintenance or repairs?

- (A) When operation of the equipment will endanger personnel OR harm the equipment.
- (B) When operation of the equipment requires unusual caution to be exercised.
- (C) When operation of the equipment will endanger personnel ONLY.
- (D) When operation of the equipment will harm the equipment ONLY.

*If choice A is selected set score to 1.*

40. When performing routine AC motor maintenance what should be included?

- (A) inspection of the motor's internals for loose rotor bars or field poles
- (B) rotor balance check
- (C) verifying RPM if a synchronous motor
- (D) temperature readings at normal loads to detect abnormal temperature rises

*If choice D is selected set score to 1.*

41. Which of the following statements is correct concerning antifriction bearings installed on pumps?

- (A) The outer race should be free to turn in its housing.
- (B) They are usually pressed onto their shafts.
- (C) Alignment is not a critical factor in their installation.
- (D) The inner race should be free to turn on the shaft.

*If choice B is selected set score to 1.*
42. The minimum length of dimension "C" shown in the illustration is __________. Illustration GS-0014
   - (A) 27/32 inch
   - (B) 11/16 inch
   - (C) 21/32 inch
   - (D) 33/64 inch

   If choice D is selected set score to 1.

43. In a refrigeration system, the bulb for the thermal expansion valve is always located where?
   - (A) at the evaporator coil inlet
   - (B) in the middle of the evaporator coils
   - (C) at the beginning of the bottom row of the evaporator coils
   - (D) at the evaporator coil outlet

   If choice D is selected set score to 1.

44. What information can be obtained from a marine chemist's certificate on a tank barge?
   - (A) The number of fire extinguishers required onboard.
   - (B) The tanks which are safe to enter when the certificate was issued.
   - (C) The barge's stability information.
   - (D) The quality of the barge's cargo.

   If choice B is selected set score to 1.

45. A squeeze-grip type carbon dioxide portable fire extinguisher has been partially discharged. It should be __________.
   - (A) replaced in its proper location if weight loss is no more than 25%
   - (B) replaced in its proper location if weight loss is no more than 15%
   - (C) labeled empty and recharged as soon as possible
   - (D) replaced in its proper location regardless of weight

   If choice C is selected set score to 1.

46. To measure the circumference of a piece of pipe, you should use a __________.
   - (A) flexible steel rule
   - (B) hook rule
   - (C) machinist's steel rule
   - (D) folding rule

   If choice A is selected set score to 1.
47. When a solid-state component of an electronic circuit is mounted to a metallic mass, what is the general purpose of that mass?

- (A) act as a heat sink
- (B) dissipate stray magnetic currents
- (C) prevent mechanical damage to solid-state components
- (D) prevent vibration damage to delicate components

*If choice A is selected set score to 1.*

48. The most common cooling agent used for fighting fires on tank vessels is __________.

- (A) steam smothering
- (B) water
- (C) flue gas
- (D) carbon dioxide

*If choice B is selected set score to 1.*

49. Which of the following statements is TRUE concerning life jackets?

- (A) Buoyant vests may be substituted for life jackets.
- (B) Life jackets are designed to turn an unconscious person's face clear of the water.
- (C) Life jackets must always be worn with the same side facing outwards to float properly.
- (D) Lightly stained or faded life jackets will fail in the water and should not be used.

*If choice B is selected set score to 1.*

50. What type of motor enclosure is utilized for the motor labeled "A" in the illustration? Illustration EL-0001

- (A) Open
- (B) Open, drip-proof
- (C) Totally enclosed
- (D) Totally enclosed, fan-cooled

*If choice D is selected set score to 1.*

51. In a cartridge-operated dry chemical type fire extinguisher, when the CO2 cartridge is activated, the dry chemical is released from the extinguisher __________.

- (A) by squeezing the control valve carrying handle
- (B) by turning the activating handle on the bottom of the container
- (C) with the squeeze-grip trigger on top of the container
- (D) with the squeeze-grip on/off nozzle at the end of the hose

*If choice D is selected set score to 1.*
52. Of the many impurities commonly found in marine lubricating oil, which of the following CANNOT be removed by a centrifugal purifier at normal operating speeds and temperatures?

- (A) Carbon particles
- (B) Water
- (C) Diesel fuel oil
- (D) Metal particles

*If choice C is selected set score to 1.*

53. With all other factors considered equal (such as voltage, conducting path through the body and the duration of contact), contact with an energized electrical system conductor of which system type would produce the most damaging effect?

- (A) DC systems
- (B) 60 Hz AC systems
- (C) 10 kHz AC systems
- (D) All the above systems would be equally as damaging

*If choice B is selected set score to 1.*

54. On vessels exceeding 1600 GRT, who is responsible for the practical upkeep of machinery and the manning of the engine room?

- (A) Chief engineer
- (B) Chief mate
- (C) First assistant engineer
- (D) Officer in charge of the engineering watch

*If choice C is selected set score to 1.*

55. In cleaning up an oil spill, the use of straw or reclaimed paper fibers would be an example of which type of oil removal?

- (A) Mechanical removal
- (B) Chemical agent removal
- (C) Absorbent removal
- (D) None of the above

*If choice C is selected set score to 1.*

56. When giving first aid, you should understand how to conduct primary and secondary surveys in addition to ________.

- (A) how to set broken bones
- (B) the limits of your capabilities
- (C) how to diagnose an illness from symptoms
- (D) which medications to prescribe

*If choice B is selected set score to 1.*
57. Which of the following statements is true regarding oxygen indicators?

- (A) A cotton filter placed in the end of the sampling tube prevents damaging the instrument when exposed to strongly acidic gases.
- (B) The instrument is capable of providing an immediate accurate reading of any space with no delay.
- (C) Prolonged exposure to gases such as CO₂ may affect the accuracy of the indicator.
- (D) All of the above.

If choice C is selected set score to 1.

58. R-134a is often the replacement for which older type of refrigerant?

- (A) R-11
- (B) R-12
- (C) R-22
- (D) R-123

If choice B is selected set score to 1.

59. Which of the following shoring materials is used to tightly make up the difference in length of a shore cut slightly shorter than the measured distance for required length and must be frequently checked for tightness?

- (A) Beam
- (B) Wedge
- (C) Shole
- (D) Strongback

If choice B is selected set score to 1.

60. What type of eye protection affords the best protection from dust and airborne abrasives?

- (A) Side-shielded safety glasses
- (B) Full-face shield
- (C) Standard safety glasses
- (D) Eyecup safety goggles

If choice D is selected set score to 1.
61. In the system shown in the illustration, the engine room station is unable to signal any other station, nor is any other station able to signal the engine room station. The engine room station can, however, ring itself by proper positioning of its selector switch. What is the most probable cause of this problem? Illustration EL-0093

- (A) The coil of component "C" of the problem station is open-circuited.
- (B) The switch at component "A" of the problem station is stuck open.
- (C) The selector switch is grounded at the problem station diverting current from the other stations’ ringing devices.
- (D) There is an open between terminal "C" of the problem station and the common wire of the multi-conductor cable to the other stations.

*If choice D is selected set score to 1.*

62. In the event of a fire, the doors to a stair tower must be closed to prevent the spread of fire by

- (A) convection
- (B) radiation
- (C) conduction
- (D) ventilation

*If choice A is selected set score to 1.*

63. How can the loss of residual magnetism in an alternator or generator be corrected?

- (A) running the generator at normal speed with the field rheostat fully counter-clockwise
- (B) running the rotor in the opposite direction for 5 minutes
- (C) allowing the generator to run at 10% of normal speed for 5 minutes
- (D) using a storage battery or battery charger to ‘flash’ the field

*If choice D is selected set score to 1.*

64. What device is best used to test for a short circuit between windings of a three-phase motor that is not running?

- (A) ohmmeter
- (B) ammeter
- (C) voltage tester
- (D) infrared temperature meter

*If choice A is selected set score to 1.*
65. "Portable" oil tank cleaning machines are usually provided with a water supply from the __________.

- (A) potable water supply
- (B) inert gas scrubber
- (C) mucking supply system
- (D) fire main

*If choice D is selected set score to 1.*

66. What is the function of the electric brake on a deck cargo winch?

- (A) automatically hold the load if power to the winch motor is disconnected
- (B) automatically govern the lowering speed of the load
- (C) automatically engage when the winch motor current is reaching full load
- (D) automatically govern the hoisting speed of the load

*If choice A is selected set score to 1.*

67. What statement is true concerning the effect of elevating the temperature of the oily-water mixture associated with an oily-water separator?

- (A) Heating the oily-water mixture increases the viscosity of the oil and decreases the specific gravity differential between the oil and water.
- (B) Heating the oily-water mixture increases the viscosity of the oil and increases the specific gravity differential between the oil and water.
- (C) Heating the oily-water mixture decreases the viscosity of the oil and increases the specific gravity differential between the oil and water.
- (D) Heating the oily-water mixture decreases the viscosity of the oil and decreases the specific gravity differential between the oil and water.

*If choice C is selected set score to 1.*

68. Which characteristic or condition will have the greatest effect on increasing a hydraulic oil's viscosity?

- (A) Temperature
- (B) Pour point
- (C) Vacuum
- (D) Cloud point

*If choice A is selected set score to 1.*
69. The push button on the handset of a ship's sound-powered telephone must be depressed in order to do what?

- (A) talk then released to listen
- (B) listen then released to talk
- (C) both talk and listen
- (D) ring the station being called

If choice C is selected set score to 1.

70. Minor repairs may be performed on low-pressure refrigerant systems without recovering the refrigerant charge if the pressure in the system is raised to atmospheric. How may this be accomplished?

- (A) open the system vent to the atmosphere and allow the pressure to equalize
- (B) heat the refrigerant
- (C) charge the system until it is completely filled with liquid refrigerant
- (D) pressurize the system with nitrogen

If choice B is selected set score to 1.
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