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Motor Propulsion

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The illustrated device is operated directly by _____. Illustration MO-0041
fuel oil pressure

Illustrations: MO0041_AO_020215WM
See REF2356

The bearing shown in the illustration is designed to carry thrust when applied _____. Illustration MO-0001
right to left only

Illustrations: MO0001_AO_101014WM
See REF2355

The component shown in the illustration, labeled "I", is the _____. Illustration SE-0013
first reduction gear

Illustrations: SE0013_WM_100118
See REF2354

The pinion gear shown in the illustration, is located _____. Illustration MO-0086
between "1" and "3"

Illustrations: MO0086_WM_101918

According to the illustrated diesel propulsion plant fresh water cooling systems diagram, in which subsystem is the deaerator located? Illustration MO-0072
Main engine cylinder jacket cooling water system

Illustrations: MO0072_WM_060316

As shown in the illustration, the function of component "1" is to _____. Illustration MO-0128
evaporate circulating boiler water into saturated steam

Illustrations: MO0128_WM_102016

As shown in the illustration, what component would normally be installed at location "D"? Illustration MO-0128
Oil fired mechanical burner

Illustrations: MO0128_WM_102016

The device shown in the illustration is commonly used to _____. Illustration MO-0080
utilize the flow of exhaust gases to supercharge the engine

Illustrations: MO0080_WM_071416, MO0080B_WM

The section of the turbocharger which would be connected to the aftercooler inlet is labeled _____. Illustration MO-0080
B

Illustrations: MO0080_WM_071416, MO0080B_WM

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Illustrations: MO0080_WM_071416, MO0080B_WM

The section of the turbocharger which would be connected to the aftercooler inlet is labeled _____. Illustration MO-0080
B

Illustrations: MO0080_WM_071416, MO0080B_WM

During the starting of a diesel engine, compression gases are prevented from backing into the air starting system, shown in the illustration, by the _____. Illustration MO-0046
cylinder air starting check valves

Illustrations: MO0046_AO_031115WM

A modern centrifuge, similar to the device shown in the illustration, is opened for periodic cleaning. The most common cause of operating failure after reassembling, is due to _____. Illustration MO-0012
not replacing the bowl O-rings that have taken a permanent set

Illustrations: MO0012_WM_101718

What would be the most accurate description of the illustrated cutaway drawing of a reduction gear as used for medium-speed diesel propulsion? Illustration MO-0085
Single input, single reduction, reversing gear

Illustrations: MO0085_WM_101918

What type of clutch is used in the illustrated medium-speed diesel engine reduction gear? Illustration MO-0085
Pneumatic

Illustrations: MO0085_WM_101918

What type of clutch is pictured in the illustration? Illustration MO-0089
Hydraulic

Illustrations: MO0089_WM_101918

Component 'U' of the diesel engine shown in the illustration is called the _____. Illustration MO-0122
crankshaft counterweight

Illustrations: MO0122_WM_011922
See REF2278

The diesel engine component labeled "3", shown in the illustration is called the _____. Illustration MO-0122
cylinder head

Illustrations: MO0122_WM_011922
See REF2278

In the illustrated diesel engine, which label points to the piston? Illustration MO-0122
4

Illustrations: MO0122_WM_011922
See REF2278

The diesel engine wrist pin in the illustration is indicated by the component labeled _____. Illustration MO-0122
"7"

Illustrations: MO0122_WM_011922

See REF2278

According to the illustrated main and auxiliary diesel engine cooling water systems diagram, which of the following heat exchangers are connected directly in series with one another? Illustration MO-0129
Lube oil cooler and jacket water cooler

Illustrations: MO0129_WM_102218

According to the illustrated diesel engine cooling water systems diagram, what fluid is the low temperature central fresh water thermostat designed to maintain? Illustration MO-0129
The low temperature central fresh water supply header temperature.

Illustrations: MO0129_WM_102218

According to the illustrated diesel engine cooling water systems diagram, what is the functional description of the low temperature central fresh water thermostat? Illustration MO-0129
The thermostat is a three-way valve set up as a mixer proportioning flow through and around the central fresh water cooler.

Illustrations: MO0129_WM_102218

How is the illustrated strainer element cleaned during engine operation? Illustration MO-0057
The T-handle is rotated.

Illustrations: MO0057_WM_101918

The lube oil strainer shown in the illustration is used on the reduction gear of a mid-size diesel engine. The strainer elements consist of _____. Illustration MO-0057
metal disks

Illustrations: MO0057_WM_101918

According to the illustrated diesel engine fuel treatment and fuel service systems schematic, what would be the appropriate valve configuration for operating the two heavy fuel oil purifiers in series? Illustration MO-0077
Valves 2 and 3 CLOSED, and Valve 6 OPEN

Illustrations: MO0077_WM_101918

According to the illustrated diesel engine fuel treatment and fuel service systems schematic, what statement is true concerning the valves labeled "4" and "5"? Illustration MO-0077
Valves 4 and 5 are closed during normal operation, but when opened will allow one of the HFO purifiers to be used as a backup DO purifier, should the DO purifier become disabled.

Illustrations: MO0077_WM_101918

Valve '1', as shown in the illustration when, should be operated when _____. Illustration MO-0077
entering or departing port.

Illustrations: MO0077_WM_101918

According to the illustrated diesel engine fuel treatment and fuel service systems schematic, what is the purpose of the valve labeled "1"? Illustration MO-0077
HFO/DO fuel changeover valve for main engine

Illustrations: MO0077_WM_101918

According to the illustrated main engine cooling water systems drawing, which of the labeled heat exchangers represents the charge air coolers? Illustration MO-0111
5 and 6

Illustrations: MO0111_WM_102218

According to the illustrated main engine cooling water systems drawing, which labeled pump is the main engine sea water cooling water pump? Illustration MO-0111
8

Illustrations: MO0111_WM_102218

According to the illustrated main engine cooling water systems drawing, which labeled heat exchangers use sea water as a cooling medium? Illustration MO-0111
3, 4, 5, 6, and 24

Illustrations: MO0111_WM_102218

According to the illustrated main engine cooling water systems drawing, which labeled sea water-cooled heat exchanger would have the highest sea water inlet temperature? Illustration MO-0111
3

Illustrations: MO0111_WM_102218

According to the illustrated main engine cooling water systems diagram, which of the following labeled heat exchangers represents the main lube oil cooler? Illustration MO-0111
4

Illustrations: MO0111_WM_102218

According to the illustrated main engine cooling water systems diagram, which of the following heat exchangers would be isolated and bypassed while maneuvering in or out of port? Illustration MO-0111
23 and 24

Illustrations: MO0111_WM_102218

The boiler shown in the illustration would be classed as _____. Illustration MO-0064
single-pass, fire-tube, scotch marine

Illustrations: MO0064_WM_101918

The process of scavenging a two-stroke/cycle diesel engine serves to _____.
cool the exhaust valves
See REF2329

During the valve overlap period, the exhaust pressure of a turbo-charged, four-stroke cycle diesel engine must be less than the intake manifold pressure to ensure _____.
effective cylinder scavenging and cooling

The expansion tank in a diesel engine closed fresh water cooling system is located at _____.
the highest point in the system
See REF2340

If the cooling water temperature and the lube oil temperature in a diesel engine are too high, the cause can be _____.
excessive wear of the cooling water pump

Heat damage to fuel injection nozzles can be prevented by avoiding _____.
long periods of engine overload

Maintaining the lowest possible scavenging air temperature at all times is not recommended due to the possibility of the _____.
formation of excessive quantities of condensate

The highest pressure in a diesel engine cylinder normally occurs _____.
after TDC
See REF2308

When attempting to restart a warm high-speed engine, which of the following reactions can you expect?
Higher than normal temperatures for start up

Which of the following methods is used to lubricate main propulsion medium-speed diesel engine reduction gears?
Oil is sprayed through nozzles at the point of gear mesh.

Fuel is admitted to a diesel engine cylinder through the _____.
injector nozzles
See REF2356

Compared to a naturally aspirated diesel engine, a supercharged diesel engine has _____.
a cylinder air charge of higher pressure

The possibility of a diesel engine crankcase explosion will be increased by operating an engine _____.
with a leaking crankcase inspection cover gasket
See REF2328

When an engine fitted with a hydraulic starting system starts up, the starter is protected from the higher speed of the engine by _____.
the overrunning clutch

Casing drains may be required on a waste heat boiler gas passage side to _____.
drain off condensation

Why will a turbocharged diesel engine produce black smoke if excessive additional load is applied too quickly?
The inertia of the turbocharger rotor causes a time lag which delays the turbocharger speed increase.

The power consumed during the scavenging process of a diesel engine is known as the _____.
pumping loss

A closed freshwater cooling system is commonly used with marine diesel engines because the _____.
jacket water temperature is more easily controlled

If the raw water supply pressure for a diesel engine cooling system is below normal, you should check for a _____.
clogged sea strainer

One cause of diesel engine surging can be a result of _____.
injection pump fuel rack binding or sticking

The power output of a turbo-charged diesel engine will drop if the cooling water flow through the after cooler is interrupted because the _____.
air charge density decreases

The load is always placed on the lower half of the main bearings in a/an _____.
two-stroke/cycle engine

Before starting a diesel engine that has an engine driven lube oil pump, you should _____.
pressurize the lube oil system with the pre-lube pump
See REF2324

The purpose of the main diesel engine reduction gears is to _____.
reduce high diesel engine RPM to an efficient propeller RPM

Fuel injection systems are designed to primarily meter fuel, atomize fuel, and _____.
inject fuel at the proper time

A naturally aspirated diesel engine at full throttle will have an intake manifold pressure _____.
slightly less than atmospheric pressure

If a diesel engine has been stopped because of piston seizure due to severe overheating, the crankcase _____.
inspection covers should not be opened until the engine has cooled
See REF2328

The purpose of the engine-driven hydraulic pump in an auxiliary diesel engine hydraulic starting system is to _____.
restore hydraulic pressure in the accumulator after starting

If a slow-speed two-stroke cycle diesel engine is fitted with exhaust valves located in the cylinder heads, what scavenging flow-pattern is utilized?
Uniflow scavenging

Corrosion inhibitors and/or soluble oils are added to diesel engine cooling systems to _____.
form a protective film on metal surfaces

Antifreeze solutions containing ethylene glycol should not be mixed with corrosion protection oils, as the resultant mixture _____.
may cause frothing

Which of the following problems can occur if you continually fail to drain off condensate from a starting air receiver?
Corrosion and eventual failure of the tank.

Which condition indicates the air side fouling of an aftercooler on a turbocharged diesel engine?
A decrease in the air temperature differential between the cooler inlet and outlet.

Which of the terms listed below represents the operational speed at which excessive engine vibration is created?
Critical speed.

Babbitt is a metal alloy commonly used for lining _____.
precision bearings
See REF2353

Movement of the pump control rack in a fuel injection system using individual plunger-type pumps _____.
varies the quantity of fuel delivered

The most common instrument used to measure diesel engine exhaust pressure is the _____.
manometer
See REF2345

Which of the following methods is normally used to lubricate bearings in a small high-speed diesel engine?
Pressure lubrication

A Bendix drive starting motor disengages the drive gear from the flywheel by _____.
having the flywheel impart a torque to the starter pinion

Which of the following devices will increase the power output of a diesel engine without increasing its frictional load?
Turbine-driven centrifugal blower

If a slow-speed two-stroke cycle diesel engine is fitted with scavenging air ports and exhaust ports located on opposite sides of the cylinder wall, what scavenging flow-pattern is utilized?
Cross-flow scavenging

In a closed cooling water system, which of the following problems can cause the water pressure to fluctuate?
Air entrained in the cooling water.

On a diesel engine with direct-cylinder admission air starting, a leaking air starting valve would be indicated by _____.
an overheated starting air supply pipe

Which of the following problems can cause an above normal air temperature to develop in the intake manifold of a turbocharged and after cooled diesel engine?
Insufficient cooling water flow to the after coolers

The cubic inch (or liter) displacement of a cylinder is determined by the diameter of the piston and the _____.
length of the stroke

When checking a water-lubricated stern tube bearing while underway, what should be checked for?
Ensure that the stuffing box packing gland is taken up just enough so that the leakoff rate is a periodic drip.

What type of reduction gear would most commonly be used with twin medium-speed propulsion diesel engines driving a single shaft?
Single reduction, double input o

Fuel oil discharged into the diesel engine cylinder is atomized at the _____.
injector nozzle tip
See REF2317

To minimize corrosion, fuel oil strainer disks, spacers and scraper blades are made of _____.
monel metal or stainless steel

In a diesel engine exhaust system, the cooling of the exhaust gases below their dew point, will result in _____.
sulfuric acid corrosion

In an auxiliary diesel engine "by-pass type" lubricating oil system, the main lube oil pump forces _____.
some of the oil used by the engine through a filter
See REF2321

The pinion of an auxiliary diesel electric starting motor normally engages the flywheel ring gear by means of a/an _____.
Bendix drive or similar mechanism

Which of the following statements concerning fire-tube boilers is correct?
Combustion gases flow through the tubes.

Some diesel engines are supercharged with a _____.
turbocharger o

As it applies to the combustion process associated with diesel engines, what is meant by the term "scavenging"?
Scavenging is the process of removing exhaust gases from the cylinder by blowing in fresh air.

Sacrificial zinc anodes are used on the saltwater side of diesel engine heat exchangers to _____.
reduce electrolytic action on heat exchanger metals
See REF2159

When a leak has developed in the lube oil cooler of an operating diesel engine, which of the listed operating conditions can be expected to occur?
Lube oil level decreases

Which of the following conditions is most likely to occur if the electric starter motor pinion gear fails to disengage from the flywheel of a diesel engine after the engine has started?
Starting motor will dangerously over speed

An operating diesel engine that suddenly loses power, is due to a/an _____.
restricted turbocharger air intake

Which of the following is an example of a solid bearing?
Piston pin bushing

Which of the following methods is used to securely fasten the Babbitt lining of a reduction gear bearing to its shell?
The Babbitt is centrifugally spun into the bearings or cast under a pressure head.

Reduction gear casings are vented in order to _____.
avoid a buildup of pressure within the gear case
See REF2343

For a continuous operation diesel engine, a duplex filter unit would be the best arrangement because _____.
changing filter elements would not interrupt engine operation

One of the factors limiting the amount of load which can be put on a modern marine diesel engine is the _____.
exhaust temperature

Lubrication for the main reduction gears used with diesel engines is usually supplied by _____.
an independent lube oil system
See REF2358

Auxiliary diesel engine electric starting motors use _____.
battery power direct current

Corrosion inhibitors and/or soluble oils are added to diesel engine cooling systems to _____.
form a protective film on metal surfaces

In a diesel engine jacket water cooler, with sea water cooling the fresh water, the _____.
jacket water pressure should always be greater than the sea water pressure

On small diesel engines, a noticeable decrease in the time interval between the replacement of the lube filter cartridge indicates _____.
piston ring blow-by

When starting air is admitted, a diesel engine turns over very slowly without firing. The cause may be _____.
low starting air pressure

Corrosion and grooving on the blading of an exhaust driven turbocharger is caused by certain components of residual fuel oils. These components are vanadium, sodium, and _____.
sulfur

The proper location for journal bearing oil grooves is _____.
as a side relief where the two shells meet

As found in a reduction gear drive system, thrust bearings serve to _____.
transmit the force produced by the propeller to the structure of the ship

In addition to achieving a speed reduction for efficient propeller operation, what statement represents other possible functional purposes for reduction gears?
Reduction gears can be used for propeller thrust reversal and reduction gears can be used for multiple prime mover inputs.

The main advantage of unit injectors over other fuel injection systems is _____.
the lack of high pressure fuel lines

Exhaust pipes for separate main propulsion diesel engines can be combined only when _____.
they are arranged to prevent gas backflow to each engine

Lube oil pumps taking suction from the sump of most small marine engines are usually _____.
positive displacement type
See REF2282

Starting systems for large, direct reversing, main propulsion diesel engines are usually _____.
direct air admission

The tube sheets installed in a fire-tube auxiliary boiler are normally connected by _____.
fire-tubes and stay-tubes

Ethylene glycol, when used as a coolant in a closed cooling system for a diesel engine, is more advantageous than untreated raw water because it _____.
has a lower freezing point and higher boiling point

When checking zincs in a saltwater cooled heat exchanger, you should _____.
replace the zincs if they are approximately 50% consumed

Scale and dirt accumulation in the waterside of a lube oil cooler will be indicated by a gradual increase in the lube oil _____.
temperature

When an additional load is applied to a diesel engine which is using an inadequately inflated air bladder clutch unit, you can expect _____.
overheating because of slipping shoes

A sudden power loss from a turbocharged and aftercooled diesel engine is an indication of a/an _____.
turbocharger malfunction or failure

Which of the bearings listed below is most widely used for the main and connecting rod bearings of a modern high-speed diesel engine?
Precision insert
See REF2331

By what means are two sections of propulsion line shafting typically joined together?
By the use of a flange type solid coupling

Injection pressure in a common rail fuel system is controlled by _____.
a bypass valve

What would be the primary indication that a heavy fuel oil purifier supply pump suction strainer needed cleaning?
An increased pressure drop across the strainer (more differential).

The exhaust system for a turbocharged diesel engine functions to _____.
power the turbocharger
See REF2344

Which of the routine maintenance procedures listed is required for starting air receivers?
Frequent draining of accumulated moisture.

Fusible plugs are installed in fire-tube boilers to _____.
warn the engineer of low water level
See REF2359

At rated engine load and RPM, the diesel engine turbocharger is powered by _____.
exhaust gases

In a diesel engine lube oil cooler, with sea water cooling the lubricating oil, what statement is true?
The lube oil pressure is always kept higher than the sea water pressure, and in case of a lube oil cooler leak, the lube oil sump level will decrease.

Misalignment of the drive shaft and propeller shaft flanges can be detected by using a dial indicator or _____.
feeler gage

A thin film of oil on the lobes of a Roots-type blower indicates _____.
leaking rotor bearing oil seals

The linear motion of a diesel engine piston is converted into the rotary motion required to drive gears, propeller shafts, and generators by the _____.
crankshaft
See REF2352

In addition to checking the lube oil sump level and temperature of a line shaft steady bearing, what else must be checked for?
Ensure free rotation of the oiling ring with the shaft.

Which of the statements represents a characteristic of the thrust collar in a Kingsbury thrust bearing?
It turns with the shaft and the pivot shoes do not rotate.

Fuel injection pumps using the port and helix metering principle requires the use of a _____.
lapped plunger and barrel

What would be the primary indication that a fuel oil service system booster pump duplex suction strainer needed to be shifted over and cleaned?
An increased pressure drop across the strainer on service (more differential).

Starting air check valves are held firmly on their seats by _____.
spring force

When an air started, four-stroke/cycle diesel engine is being cranked over; the starting air is admitted to each cylinder during the beginning of its _____.
power stroke

Constant capacity, pressure atomizing, fuel burners designed to meet a wide variation in steaming loads on an auxiliary boiler, are _____.
cycled on and off in response to steam demand

The operating speed of a turbocharger is directly dependent upon _____.
engine load

in a diesel engine jacket water cooler, with sea water cooling the engine jacket cooling water, what statement is true?
The jacket water pressure is always kept higher than the sea water pressure, and in case of a jacket water cooler leak, the jacket water expansion tank level will increase.

In a normally operating diesel engine, the main source of lubricating oil contamination in the crankcase is a result of the _____.
combustion byproducts removed from the cylinder walls

One of the most common causes of reduction gear failure is gear wear caused by scoring as a result of _____.
an inadequate lube oil film

The theoretical minimum compression ratio necessary to ensure compression ignition in a direct injection diesel engine is _____.
12:1

Connecting rods in a diesel engine are used to connect the _____.
piston to the crankshaft
See REF2280

What is the primary purpose of self-aligning spherically-seated line shaft bearings?
To compensate for flexing of the hull in response to different loading conditions.

Which of the fuel injection systems listed uses a spring loaded differential spray needle valve and an individual pump for each cylinder?
Jerk pump injection
See REF2303

Cooling the intake air supplied to a diesel engine will _____.
increase peak power output

Lube oil cannot be efficiently filtered if it's _____.
temperature is too low
See REF2357

A two-stroke/cycle diesel engine requires less starting air than a four-stroke/cycle diesel engine, of equal displacement, because the two-stroke/cycle diesel engine _____.
operates without energy absorbing intake and exhaust strokes

In a medium-speed marine propulsion engine equipped with direct admission air starting valves, the cylinders without air starting valves fire first because the _____.
cylinders are not chilled by the expansion of the starting air
See REF2334

The primary function of a flame safeguard system, as used on an automatically fired auxiliary boiler, is to prevent _____.
explosions in the boiler furna

What statement is true concerning the charge air system of a modern turbocharged slow-speed two-stroke cycle diesel engine?
An electrically driven auxiliary blower is usually provided because the turbocharger cannot provide enough air at low engine speeds and loads.

A three-way thermostatic control valve regulates the diesel engine cooling water temperature by passing a portion of the water _____.
around the cooler

A dirty diesel engine oil filter element can best be detected by _____.
the pressure drop across the filter

In a diesel engine, a leaking exhaust valve can cause _____.
misfiring

If the compression ratio is increased on any diesel engine, _____.
thermal efficiency will increase

What statement is true concerning oil-lubricated stern tube bearings?
The forward and after seals are both designed to retain the lubricating oil within the bearings and the after seal is designed to prevent the ingress of sea water.

What is the function of the main thrust bearing?
Transmits propeller thrust to the hull.

The amount of fuel delivered by a helical plunger fuel injection pump is controlled by _____.
rotation of the pump plunger

A large, low-speed, main propulsion diesel engine uses sea water to directly cool the _____.
scavenging air

A magnetic strainer is primarily used in diesel engine reduction gear oil systems to remove small particles of _____.
ferrous materials
See REF2325

Where is the air charge for an air starting system stored?
Pressurized tank

Auxiliary boilers are divided into several classifications, one of which is _____.
water-tube forced circulation

A photoelectric cell installed in an automatically fired auxiliary boiler burner management system _____.
opens the burner circuit upon sensing a flame failure

What statement is true concerning the charge air system of a modern turbocharged slow-speed two-stroke cycle diesel engine?
A charge air cooler is usually provided to increase the charge air density. o

What would be considered a normal temperature increase between the inlet and outlet jacket cooling water of a medium or high-speed diesel engine operating at normal load?
10° to 20°F
See REF2341

The color of the diesel engine detergent type lube oil in an operating diesel engine is black, this indicates _____.
normal oil condition

A dry-type exhaust silencer clogged with soot, will cause _____.
loss of engine power

The most important factor in engine performance is the actual power output at the end of the crankshaft available for doing work. This is known as _____.
brake horsepower
See REF2307

Which of the devices listed is commonly used to compensate for the expansion and minor misalignments occurring between the main turbine rotor and the reduction gear?
Gear-type flexible coupling

Kingsbury thrust bearings are lubricated by _____.
flooding the thrust bearing assembly with oil

In what location is heavy fuel oil kept below the flash point?
Heavy fuel oil settling and day tanks

An increase in the air inlet manifold pressure of a diesel engine will result in a/an _____.
decrease in fuel consumption per horsepower-hour

Where would a coarse screen wire-mesh strainer normally be found on a diesel engine lubrication system?
pump suction line
See REF2326

An accumulator used in a hydraulic starting system is generally located between the _____.
pump and the starting motor

In a coil-type forced circulation auxiliary water-tube boiler,_____.
steam demand response is comparatively rapid

The pressuretrol which is installed on an auxiliary boiler senses steam pressure changes and _____.
automatically regulates the quantity of oil and air flow to the burner

The process of supplying a diesel engine cylinder with air at a pressure greater than atmospheric is called _____.
supercharging

On a typical turbo-charged marine diesel engine, what type of blower/compressor is used within the turbocharger?
Centrifugal o

An electric heater built into some smaller diesel engines is used to _____.
increase jacket water temperature for easier starting in cold weather

A dirty lube oil strainer can result in _____.
low bearing oil pressure

White smoke exhausting from a diesel engine can result from _____.
low cooling water temperature
See REF2297

Which of the following relationships exist between the temperature developed in a combustion space, and the compression ratio of the engine?
Higher compression ratios create higher temperatures.

Hydraulic couplings will transmit torque equal to the input torque by means of energy changes in a rotating vortex of liquid. For the vortices to form there must be _____.
slip between the impeller and runner

On a large diesel engine installation, crankshaft axial alignment is maintained by the _____.
engine thrust bearing

In what location is heavy fuel oil kept above the flash point, but below the boiling point of water?
Heavy fuel oil final heater outlet

In a naturally aspirated diesel engine, the volume of air intake is directly associated with engine _____.
displacement

Which of the following statements is true concerning a main diesel engine oil cooler?
The oil pressure is greater than the cooling water pressure.

For a diesel engine, approximately how long can an electric starter motor be operated continuously before damage may begin to occur due to overheating?
Not more than 30 seconds
See REF2299

Which of the following statements concerning fire-tube boilers is correct?
Combustion gases flow through the tubes.

A variable capacity, pressure atomizing, fuel oil burner functions to _____.
provide a wide range of combustion

Forcing the exhaust gases from the cylinder of an operating two cycle diesel engine with the aid of a blower is known as _____.
scavenging

If oil discharges are detected when the scavenging air receiver drains are blown on a slow-speed, two-stroke, turbocharged, aftercooled engine, what is the most likely oil source?
Cylinder lubricating oil

Cooling water pumps driven by direct-reversing diesel engines are usually _____.
straight impeller vane with concentric housing

In a diesel engine closed freshwater cooling system employing a radiator, proper water temperature can be obtained by _____.
adjusting the radiator louvers

In an operating diesel engine, pre-ignition can be caused by _____.
oil in the air charge

Black smoke exhausting from an operating diesel engine is an indication of poor combustion which may be caused by _____.
clogged air intake passages
See REF2288

Which of the following reasons represents why the designed compression ratio of a gasoline engine is lower than that of a diesel engine?
The heat of compression is not used as an ignition source of the fuel.

With a direct drive main propulsion arrangement, what statement is true?
The engine speed is equal to the propeller shaft speed.

In an HFO service system, what is the immediate destination of the fuel unconsumed by the main propulsion diesel engine?
The unconsumed fuel is recirculated back to the mixing tank (if fitted) or to the day tank.

What is the function of the intake system for a diesel engine?
The intake system's function is to ensure an adequate supply of clean air to support engine combustion and scavenging.

The lube oil cooler is located after the lube oil filter in order for _____.
the filter to operate more efficiently

Auxiliary diesel engine electric starting motors use _____.
battery power direct current

Bottom blow valves are installed on auxiliary water-tube boilers to _____.
remove settled solids from the water drum

The solenoid valves in the fuel oil supply line to an automatically fired auxiliary boiler, are automatically closed by _____.
high steam pressure

Which of the listed types of superchargers will NOT have a volumetric capacity proportional to engine speed?
Exhaust gas turbocharger

Upon conducting a machinery space round on a slow-speed main propulsion diesel, you detect a significant amount of oil discharge when blowing down the scavenging air receiver drains. What should you do?
Notify the watch or duty engineer immediately.

The temperature at which an adjustable bellows type thermostatic valve operates is determined by _____.
changing the spring compression opposing the bellows

Irregular engine speed in a diesel generator can be caused by _____.
binding in the fuel control linkage

A diesel engine may be hard to start if the _____.
air intake is restricted
See REF2287

In the starting process of a diesel engine, the main object is to attain the compression conditions sufficient to _____.
ignite the fuel

A normally operating diesel engine is shutdown by _____.
securing the fuel supply

One advantage of electromagnetic slip couplings is _____.
torsional vibrations are reduced

When a slow-speed diesel engine is used to directly drive a fixed-pitch propeller, how is a stop order met?
The engine itself must be stopped.

Which of the listed substances can be satisfactorily removed from diesel fuel by centrifuging?
Sludge

What is the function of the after coolers installed in the diesel engine air intake system?
Increase the air density

Heat exchangers are most commonly found in a small auxiliary diesel engine _____.
lube oil system

Diesel engine electric starting motors generally require heavier duty motors and operate at higher voltages than comparable starting motors for gasoline engines due to _____.
higher compression pressures

The purpose of try-cocks used on an auxiliary boiler is to _____.
provide an alternate means of determining the water level, if the gage glass fails

Control of the fuel oil metering valve in an automatically fired auxiliary boiler is accomplished by a _____.
steam pressure sensing device with linkage to the damper air vanes

The relative air pressure in the inlet manifold of a turbocharged diesel engine is usually _____.
greater than the average exhaust manifold pressure

You are asked by the watch or duty engineer to check for any evidence for turbocharger surging. What should you check for?
By listening for cyclic changes in turbocharger sound pitch.

The expansion tank for a diesel engine closed cooling system is designed to maintain a constant head on the system and _____.
allow for an increase in water volume as the engine warms up
See REF2340

If fuel oil were being discharged from the waste water outlet of a fuel oil disk type centrifuge, operated as a separator, you should _____.
reprime the purifier with sealing water
See REF2305

Which of the following conditions is indicated by the presence of water in the scavenging air receiver?
Leaking after cooler

The thermal energy produced by an internal combustion engine is transformed into _____.
mechanical energy

Before starting a diesel engine, you should always _____.
check the crankcase oil level
See REF2323

What type of propeller thrust reversing method (or methods) is or are used with a main propulsion slow-speed crosshead type diesel engine installation?
Either a reversible engine driving a fixed-pitch propeller or a non-reversible engine driving a controllable-pitch propeller could be used.

Whether using a centrifuge or a simple filter, oil cleaning and filtration will be the most effective when the oil is at a _____.
high temperature and a low viscosity

The purpose of an oil mist detector in a main propulsion diesel engine is to warn of _____.
a possible overheated bearing

Air motors used for starting some auxiliary diesel engines are generally the type known as a/an _____.
vane motors

An exhaust gas bypass is installed on a waste heat boiler in order to _____.
minimize moisture condensation in the boiler gas passages at low loads

After cooling of a turbocharged diesel engine will result in _____.
higher torque and higher brake horsepower

Upon conducting a machinery space round on a main propulsion diesel, you detect a significant amount of water discharge when blowing down the charge air cooler or scavenging air receiver drains. What should you do?
Notify the watch or duty engineer immediately.

The highest pressure in any closed diesel engine freshwater cooling system is at the _____.
cooling water pump outlet

Excessive mechanical and pulsating vibrations developed in a main propulsion diesel engine may be more likely to cause damage to an attached _____.
gas driven turbocharger because it has a wide speed range, high operating temperatures and close tolerances.

Diesel engines are classified as reciprocating internal combustion engines because they _____.
burn fuel in a closed chamber which imparts linear motion to Pistons

Which of the listed diesel engine operating conditions should be checked immediately after any diesel engine is started?
Lube oil pressure
See REF2323

Diesel engines powering large vessels that drive fixed-pitch propellers through a nonreversing reduction gear are of what type?
Medium-speed, reversing engines

When monitoring a heavy fuel oil treatment plant, what would be an indication that the treatment plant throughput volume is less than the main engine consumption?
The HFO day tank will continuously drop in level.

Which of the following problems could develop due to the accumulation of oil vapors in the crankcase of a diesel engine?
Crankcase explosion

Hydraulic starters are installed on many lifeboat diesel engines instead of comparable air start systems, because _____.
the system can be manually recharged

REF2159
Zinc, when used as a sacrificial anode, reduces and controls electrolysis (i.e., electrolytic action) in a heat exchanger.

REF2278
This illustration shows a cutaway view of an Electromotive Diesel (EMD) engine. This engine is installed on many vessels under 1, 600 gross tons. These EMD engines come in 8, 12, 16 and 20 cylinder models as main propulsion as well as electrical generation plants. They are "V"-type, two-stroke/cycle, positive scavenging air system (with uniflow scavenging exhaust valves), turbocharged with solid unit injection. They are designed with "power packs" so that their integral liners, pistons and connecting rods can be removed as a "cylinder power assembly." In a two stroke cycle engine there is only a Compression stroke and a Power stroke. The intake and exhaust of the gases occurs near Bottom Dead Center (BDC). when the piston is farthest from the cylinder head. The cylinder fIres for every revolution of the crankshaft. All two-stroke engines must have ports (i.e., holes) in the lower part of the cylinder that become exposed as the piston approaches Bottom Dead Center (BDC).

REF2280
Note: The crankshaft assembly of a diesel engine must be statically and dynamically balanced in order to minimize vibration and component wear. When a stationary crankshaft's center of mass is on the axis of rotation, it is said to be statically balanced. With the crankshaft supported on two horizontal knife edges, the shaft will be stable at any position of the cranks, and will have no tendency to roll.

REF2282
Lube oil pumps of most diesel engines are most commonly positive-displacement type gear pumps .

REF2287
Engines equipped with a turbocharger also have an aftercooler (also called an intercooler) to remove the heat of compression produced by compressing the air. This increases the amount of air intake pushed into the cylinder. The aftercooler uses cool water passing through water jackets to cool the air passing through its air passages. If the aftercooler becomes clogged, the water will not flow through its water jackets and the air fed into the engine's air intake will not be cooled. In hot climates, diesel engines require air that is cool and dense for most efficient operation.

REF2288
Black smoke is caused by incomplete combustion. Common causes of black smoke are engine overloading, too much fuel, or insufficient air caused by a clogged air filter.

REF2297
White smoke in diesel engines is most commonly condensed water vapor. This is normal in cold engines at start up. However, in an operating engine, white smoke may indicate a cracked liner, a leaking exhaust valve, etc.

REF2299
Do not operate an electric starting motor for more than 30 seconds without allowing it to cool for at least two (2) minutes.

REF2303
A jerk pump injection system has an individual injection pump and a separate spray needle valve nozzle for each cylinder.

REF2305
A disk type centrifugal purifier must have a water seal to operate properly. When starting the unit you must add water (i.e. , prime the unit) to establish the water seal. If you do not do this, or if you lose the water during operation (for example - through a deteriorated bowl ring gasket), oil will leak from the water (heavy phase) discharge port and be wasted. Water escaping from the water discharge of an operating centrifuge indicates a loss of the water seal. You must add water to the centrifuge bowl to seal it.

REF2307
Brake horsepower is the horsepower of an engine measured by the degree of resistance offered by a brake, that represents the useful power that the machine can develop. For an electric motor, brake horsepower is the mechanical horsepower available at the shaft at specified rpm and full load current. The difference between the brake horsepower and the indicated horsepower represents the rate at which energy is absorbed in overcoming mechanical friction of the moving parts of the engine. Brake horsepower is the horsepower of an engine measured by the degree of resistance offered by a brake, that represents the useful power that the machine can develop.

REF2308
During compression the pressure and temperature both increase. In a diesel engine this temperature rise, called the "Heat of Compression." causes the fuel to ignite as it is injected into the cylinder. The highest pressure in a Diesel engine occurs after Top Dead Center (TDC).

REF2317
Atomization (i.e., the process of breaking fuel down into very small droplets) normally takes place at the injector nozzle tip. Proper fuel oil temperature is required for improved atomization.

REF2321
The main bearings of a diesel engine normally are the first components lubricated in the lube oil system. In a by-pass type lube oil system, the oil that by-passes the filter is sent directly to the bearings.

REF2323
Always check oil levels before starting a diesel engine. Check the oil pressure as soon as the engine starts.

REF2324
Before starting, pressurize (i.e .. "pre-lube") a Diesel engine's lube oil system with an engine-driven or hand-operated lube oil pump.

REF2325
Magnetic strainers are located in the lube oil discharge piping to protect the bearings from iron or steel particles.

REF2326
Lube oil strainers are nonnally located before the oil cooler since hot oil filters more easily than cold oil. They are also commonly located at the pump suction.

REF2328
When oil vapor, oxygen, and hot spots occurring at the same time, they can cause a crankcase explosion. The purpose of crankcase explosion vent (Illustration MO-OI05) is to protect the engine crankcase from overpressure damage in an explosion. Do not open crankcase inspection covers after an engine stops as a result of piston seizure caused by severe overheating until the engine cools. Opening an inspection cover invites a crankcase explosion as fresh air pours into the crankcase.

REF2329
"Scavenging" replaces the products of combustion that linger in a cylinder after it receives a charge of fresh air. On a two stroke engine scavenging is accomplished by a mechanical blower since the engine has no intake or exhaust stroke to remove these gases .

REF2331
A diesel engine's main bearings connect the crankshaft with the engine block. Precision insert bearings are widely used as main and connection rod bearings.

REF2334
Note: On V-type medium-speed diesel engines, typically only one bank of cylinders is ftted with air starting valves. operation is under higher compression : Incorrect answer. Compression pressures are essentially the same for all cylinders, whether or not they are ftted with air starting valves. fuel is admitted only to these cylinders during cranking : Incorrect answer. During cranking, fuel is admitted to all cylinders in the sequence of their fring order. compression is released during starting by opening the exhaust valve : Incorrect answer. During cranking, compression is not released by any means. The exhaust valves open toward the end of the power stroke, as they would normally when the engine is in operation. cylinders are not chilled by the expansion of the starting air : Correct answer. Even though the compression pressures are essentially the same for all cylinders — whether or not ftted with air starting valves — those cylinders ftted with air starting valves would tend to have a lower fnal compression temperature due to the chilling effect of starting air. Therefore, those cylinders not fitted with air starting valves would tend to fire frst.

REF2340

The expansion tank maintains a constant head (i.e., pressure) on the cooling system and provides room for changes in the volume of coolant (i.e., water and chemical mi) with changes in its temperature. Any rapid drop in the water level of an expansion tank normally indicates a leak in the primary engine cooling system (i.e., the jacket coolant). Leakage anywhere in the system results in loss of the jacket water coolant, as long as the jacket water pressure remains higher than the cooling water pressure.

REF2341
Jacket water temperature normally increases 10°F to 20°F as it passes through a diesel engine.

REF2343
Reduction gear casings are vented to avoid the buildup of pressure .

REF2344
The exhaust system of a turbocharged engine discharges exhaust gases and smoke, reduces engineroom noise, and powers the turbocharger.

REF2345
A manometer is a device that measures air pressure using a container with a "U"-shaped tube open at one or both ends. ... The height of the fluid on the open side will be higher on that side when air pressure is less than the gas pressure and lower on the open side when the air pressure exceeds the gas pressure.

REF2352
The crankshaft changes the linear motion of the piston to the rotary motion of the reduction gear, shaft, and propeller. Linear motion means: movement in a straight line. In this case an up and down(reciprocating) motion. Note: The crankshaft assembly of a diesel engine must be statically and dynamically balanced in order to minimize vibration and component wear. When a stationary crankshaft’s center of mass is on the axis of rotation, it is said to be statically balanced. With the crankshaft supported on two horizontal knife edges, the shaft will be stable at any position of the cranks, and will have no tendency to roll.

REF2353
Babbitt is a metal alloy commonly used for bearing surfaces, particularly for lining precision insert bearings

REF2354
An Articulated Double Reduction Gear for a cross-compounded turbine has four pinions (small gears).

REF2355
Thrust bearings absorb loads and control movements along the shaft axis. Main propulsion turbine thrust bearings are normally the "pivoted segmental shoe" (i.e., "Kingsbury") type bearings.

REF2356
Diesel fuel enters a cylinder through an injector nozzle. Modern diesel injector nozzles are opened by the hydraulic pressure of the fuel oil.

REF2357
Lube oil should be hot to lower its viscosity (i.e., thickness) to insure efficient filtering.

REF2358
Main reduction gears attached to diesel engines normally have a lube oil system that is independent of the diesel engine.

REF2359
A fusible plug is a threaded metal cylinder usually of bronze, brass or gunmetal, with a tapered hole drilled completely through its length. This hole is sealed with a metal of low melting point that flows away if a pre-determined, high temperature is reached. The initial use of the fusible plug was as a safety precaution against low water levels in steam engine boilers, but later applications extended its use to other closed vessels, such as air conditioning systems and tanks for transporting corrosive or liquefied petroleum gasses.