


Merchant Marine Academy of Macedonia

School of Engineers

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Name:

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FINAL EXAM

(Για όσους παρακολούθησαν το μάθημα το Χειμερινό Εξάμηνο 2014-2015)

A. Put the words below in the right gap. (15)

*incoming burners volute Scotch enters water-tube diffuser
cooled spiral steam circulates rotor furnace water tubes*

- The fuel oil system provides the _____ with fuel.
- The _____ is the space where the air and fuel mix and burn.
- The boiler has three main parts: the _____ drum, the _____ drum and the water _____ that connect them.
- When the boiler is in operation, the water _____ through the water tubes.
- There are two basic types of boilers: The _____ boiler and the _____ boiler.
- A turbocharger consists of a single turbine wheel, the _____ of which is mounted on a shaft. The compressor compresses the _____ air, which is then _____ and _____ the scavenge air manifold.
- In the _____ pump the impeller is surrounded by a _____ case.
- The _____ type of pump is used on high pressure (e.g. boiler feed).

B. Put the words below in the right gap. (12)

*gas packing gland solid impulse mounted deaerating
throttle boiling reaction liquid produce volume*

- We can _____ steam by heating water to its _____ point.
- The water can exist in three stages: as _____ it is water, as _____ it is ice, and as _____ it is steam.
- The rotor is _____ on a shaft.
- The piston rod slides into the _____.
- In the _____ feed tank the condensate gets rid of air.
- The high pressure steam passes from the H.P. Line into the H.P. Turbine through a _____ valve.
- When the pressure of the steam is decreased its _____ is increased, because the steam expands.
- There are three types of turbines: the _____ turbine, the _____ turbine, and the action-reaction one.

C. Fill in the gaps with the following words. There are two extra words. (11 points)

*scavenge crankpin B.D.C. T.D.C. exhaust rotor diffuser
compression crown combustion skirt crosshead impeller*

- The three upper rings of the piston are _____ rings.
- The _____ connects the piston rod to the connecting rod.
- The connecting rod is connected to the crankshaft with the _____.
- At the end of the 1st stroke of a 4-stroke D.E. the piston is at the _____.
- In a 2-stroke D.E. two phases, _____ and _____, happen at the same time.
- The upper part of the piston is called _____ and the lower _____.
- The two main parts of a turbocharger are the turbine _____ and the compressor _____.
- On the compressor's side of a turbocharger there is a _____ which contributes to further rising of the pressure of the compressed air.

D. Complete the sentences with the correct form of the words in parentheses. (16x0.5=8 points)

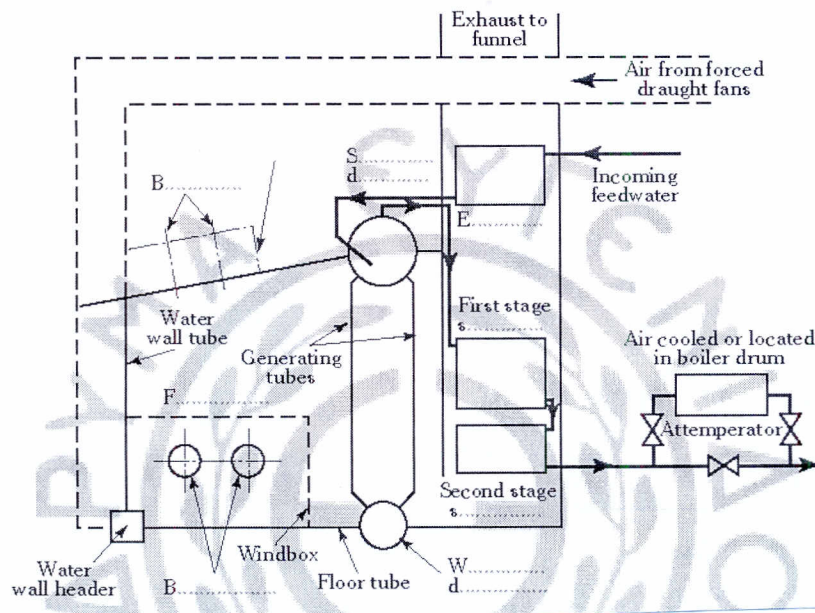
- The steam drum mainly serves as a _____ (store) space for the steam.
- The furnace has an _____ (insulate) of fireproof bricks.
- The 4-stroke D.E. has lower fuel _____ (consume) than the 2-stroke one.
- The L.P. turbine usually consists of a _____ (combine) of impulse and reaction elements.
- The turbine bearings require special _____ (attend).
- _____ (centrifuge) pumps are _____ (suit) for all duties except very small capacities.
- _____ (displace) pumps are not used for high speeds.
- The _____ (regenerate) type of pump is used where high pressure and small capacity are required.
- Salt water, evaporated into steam and then brought into a _____ (condense) produces _____ (condense), which is fresh water.
- In a sewage _____ (treat) plant human body waste is treated _____ (biology) before being discharged into the sea.
- An _____ (incinerate) burns garbage.
- Fin-stabilizers improve a ship's _____ (stable).
- Electric fans provide forced _____ (ventilate) to holds.

E. Write a paragraph comparing a 4-stroke to a 2-stroke D.E. (15 points)

F. Match the words in Column A to their synonym or explanation in Column B. Write the pairs in the empty lines below. (10 points)

A	B
Irregular or abnormal function	Feed check valve
Fittings (gauges and valves)	Main stop valve
A valve to control the entry of water to the boiler	Malfunction
A valve to remove water from the system	Drain valve
Gauge	A gauge to check the salinity of water
A valve which controls the passage of steam to the engine	Chemical dosing valve
A valve which releases the excess of steam	meter, indicator
Salinometer	Mountings
A valve for adding chemicals directly to the boiler	Safety valve
It removes the black carbon particles from the tubes of the boiler	Soot blower

G. Look at the diagram and fill in the missing terms in the passage that follows--not in the diagram. (15 points)



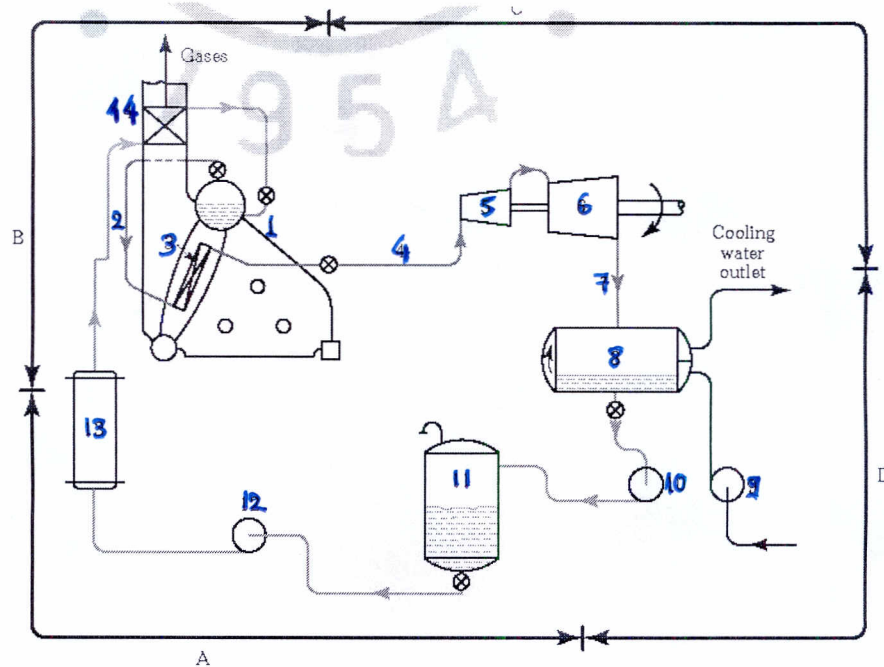
The incoming feed water passes through a(n) (1) _____ first before it enters the lower part of the (2) _____. From there it enters the circulating tubes which take it in the water (3) _____, where water is heated by the combustion (4) _____.

Then it enters the (5) _____ tubes where water changes into wet steam which enters the upper part of the steam drum and becomes saturated. From there the steam passes through the 1st and the 2nd stage (6) _____ where it becomes superheated and is led to the turbine.

Depending on the case there may be a(n) (7) _____ to decrease the temperature of the superheated steam. The side and the roof of the furnace form a(n) (8) _____ of tubes very near each other, which are supplied with water from a water wall (9) _____. The (10) _____ may be placed either at the bottom of the boiler or at the top (preferably on modern boilers).

H. Study the following diagram and put the terms below next to the right number. (14 points)

Diagram of steam power plant of reaction turbine



Economizer	Condensation	Feed pump	H.P. steam turbine
Preheater	Condensate pump	Condenser	Superheated steam pipe
DFT	L.P. steam turbine	Boiler	Saturated steam pipe
Steam generation	Expansion	Superheater	Sea water cooling circulating pump
Exhaust pipe	Feeding		

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.