

Reviewed by Vikram

MENG 4534-650	MARINE ENGINEERING KNOWLEDGE IV STEAM
MID TERM (WINTER: 2021)	
YEAR -4	
DURATION: 2 HRS	
NAME: <u>Sou</u>	
FACULTY: <u>SJS</u>	
ID NO: <u>W0293846</u>	DATE: 26 th FEB 2021

PASS CRITERIA: Answer all the 5 questions out of 6 below. Each question carries 10 Marks. All questions must be answered.

NOTE: Must be written in Pen (Black Ink -Preferred). Use only the provided Plain sheets. Number the sheets. Drawings must be in Pencil.

- 1) Reference Water Tube Boiler Survey,
AA) Give reasons to have the Marine Boiler surveyed by the Class society?-----2
BB) List the checks that are usually done on a Marine Boiler during a Class Survey-----8

(6.5/10) ① ③ → 4
- 2) Compare Thermal fluid plant with conventional steam plant mentioning advantages and disadvantages of each of the system-----10

(5/10) ④ 4
- 3) With reference to boiler safety valves:
a) state the meaning of the term easing gear;-----3
b) state the circumstances under which the easing gear would be operated;-----3
c) state the purpose of the open drain on the valve body;-----2
d) state how unauthorized adjustments are prevented;-----2

(8/10) ⑥ ⑥ ⑥ ② 4
- 4) With reference to directly mounted boiler water level gauges:
A) Explain the effect on the indicated water level in EACH of the following cases:--
(i) blockage at water connection; --2
(ii) blockage at steam connection.---2
B) Describe the procedure to prove that the gauge is functioning correctly-----6

⑥
- 5) Sketch & Describe the working of a fresh water generator using Main Engine Jacket water system heat for evaporator. (Fresh Water Generator)-----10

(5/10) ② ② 4

not a functional
- 6) List the procedure to put the marine water tube boiler in cold state back on service after class survey-----10

(1/10) ⑥

⊗ Knowledge, understanding not up the mark for a 4th year student.

16

MENG 4534-650
MARINE ENGINEERING KNOWLEDGE IV STEAM
MID TERM (WINTER: 2021)

YEAR -4

DURATION: 2 HRS

NAME: Sou

FACULTY: SJS

ID NO: W0293546

DATE: 26th FEB 2021

AA) constitutes the maintenance schedule of the boiler to ensure safe working + operation

① Insurance purposes - Ensure boiler is up to classification standards → ?? What standard?

BB) - Hydrostatic test + 1.5 x WP

- Hammer test all stay bolts, furnace

- Inspect all alarm + control systems fuel feed systems, main steam piping, lagging, chocks

~~drift test near water~~

- Pressure test steam piping 115% WP

~~Inspect furnace~~

~~Test safety valves~~

- Test safety valve 3% above WP no longer than 10 mins

- Check water level and pressure gauges

①

③

(Water analysis for)
(Furnace side inspection)
(Boiler inlet)
(FD fan inspection)
(Boiler door)

MENG 4534-650	MARINE ENGINEERING KNOWLEDGE IV STEAM
MID TERM (WINTER: 2021)	
YEAR -4	
DURATION: 2 HRS	
NAME:	
FACULTY: SJS	DATE: 26 th FEB 2021
ID NO:	

2) Thermal fluid plants have the ability to operate in sub zero temperatures as well as pump at a lower pressure than conventional steam plants lowering pumping costs. Thermal fluid plants operate at lower pressure and temperatures compared to conventional steam systems which have increased wall thickness to handle higher stress loads. Both mechanically and thermally thermal fluid plants have a lower chance of corrosion fouling and formation of scale.

Steam plants have the advantages of:
~~being there being lots~~
 having a high availability of sea water

high availability of water, low initial cost. Steam plants are more complex in configuration/layout as well as not having the ability to hold heat as well as thermal fluid.

(4)
(5)
Need better explanation.

MENG 4534-650

MARINE ENGINEERING KNOWLEDGE IV STEAM

MID TERM (WINTER: 2021)

YEAR -4

DURATION: 2 HRS

NAME:

FACULTY: SJS

ID NO:

DATE: 26th FEB 2021

3) a) Easing gear is a means of convenience to operators (1)

b) Easing gear is operated in the event of a failure for the (1)

Emergency operation Safety Valve to open as well as allows for ~~man~~ easy checks for proper operation of the valve by engineers (2)

c) To prevent the build up of condensate in the valve body which may lead to corrosion of internal parts and sticking of the valve (1)

d) Unauthorized adjustments are prevented by a seal placed on a cap screw by a boiler inspector (2)

MENG 4534-650 MARINE ENGINEERING KNOWLEDGE IV STEAM
MID TERM (WINTER: 2021)

YEAR -4

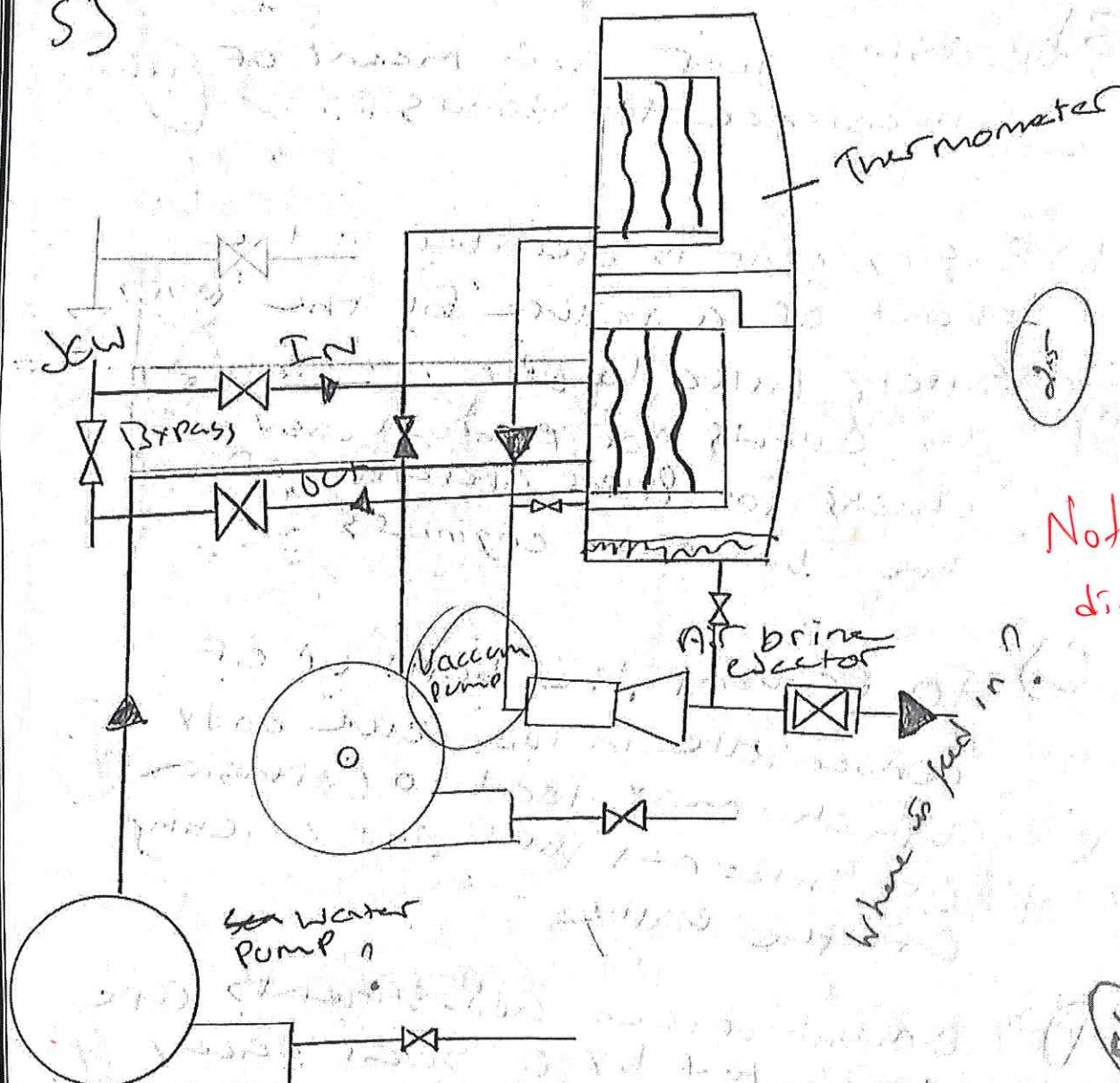
DURATION: 2 HRS

NAME:

FACULTY: SJS

ID NO:

DATE: 26th FEB 2021



MENG 4534-650

MID TERM (WINTER: 2021)

MARINE ENGINEERING KNOWLEDGE IV STEAM

YEAR -4

DURATION: 2 HRS

NAME:

FACULTY: SJS

ID NO:

DATE: 26th FEB 2021

~~Fresh water~~ is evaporated

Sea water is evaporated to make fresh water. The heat source used for this process is JCW Jacket cooling water which is usually around 70°C. In order to lower the boiling point a vacuum pump is used to create vacuum in the chamber in which evaporation takes place.

6) Ensure all tools are clear and out of furnace

Ensure all internal surfaces are clean

Replace all gaskets for boiler mountings

Check burner, air damper ~~etc.~~

Replace man hole doors

(1)