NIGERIA MARITIME UNIVERSITY
DEPARTMENT OF MARINE ENGINEERING

Course Title: Navigation and Meteorology | *Course Code: MAR 360.2*
Attempt any 5 out 6 questions | *Maximum marks 70*
All questions carry equal marks. | *Time allowed: 2hrs*

Question 1

a. Itemize the precautions a captain would take in Navigating in the event of heavy weather (7Mks)

b. Explain the following terms

i. Marine cybernetics ii. Anabatic iii. Auto-pilot
iv. ARPA v. Sleet (7Mks)

Question 2

a. Briefly discuss the components of GMDSS (8Mks)

b. Differentiate between Dynamic Positioning and Positioning Mooring (6Mks)

Question 3

a. What is Mooring and list the different type of mooring? (6Mks)

b. Define the following

i. Towing ii. Breast lines iii. Head lines
iv. Spring lines v. Stern lines. (5Mks)

c. Explain emergency towing (3Mks)

Question 4

a. State the purpose of mooring. (8Mks)

b. Explain the tanker ship under the following headings;

i. The purpose she serves ii. Loading/discharging iii. Features of design (6Mks)

Question 5

a. Define the following terms

i. Visual signaling ii. Sound signaling iii. Transmitting station
iv. Station of Destination v. Time of origin (5Mks)

c. Discuss four method of signal that can be used for marine communication (5Mks)

c. With examples describe how identity signal can be used (4Mks)

Question 6

a. What is Hatch covers (6Mks)

b. State the different type of hatch covers (4mks)

c. Discuss the two fundamental requirement of a hatch cover (4Mks)

NIGERIA MARITIME UNIVERSITY, KURUTIE
DEPARTMENT: MARINE ENGINEERING
FACULTY OF ENGINEERING
MAE 338.2- COLLISION REGULATION (COLREG)
SECOND SEMESTER (2020/2021)

INSTRUCTION: ANSWER ALL QUESTIONS IN SECTION A AND ANY OTHER THREE (3) QUESTIONS IN SECTION B TIME: 2HRS

SECTION A

1. In line with collision regulation 1972 rule 3, give a brief definition of the following?

   (a) Vessel and what types of craft does the word "vessel" include? ***(8MARKS)***

   (b) Power-driven vessel. Give extra comment regarding the immediate use of the vessel's machinery? ***(8MARKS)***

   (c) Sailing vessel. ***(8MARKS)***

   (d) Vessel restricted in her ability to manoeuvre. Give some examples. ***(8MARKS)***

   (e) Vessel constrained by her draught. ***(8MARKS)***

SECTION B

2. Give some valuable reasons why the master of a vessel should decide not to use a traffic separation scheme. ***(10MARKS)***

2. What are the objectives of a routeing system? ***(10MARKS)***

4. What precautionary measures shall the master take before proceeding to sea? ***(10MARKS)***

5 (a) Define the term "safe speed". ***(5 MARKS)***

(b)Which factors shall be taken into account by all vessels in determining a safe speed? ***(5 MARKS)***

6 Define the term "narrow channel" or "fairway". ***(10MARKS)***

NIGERIA MARITIME UNIVERSITY

OKERENKOKO, DELTA STATE

FACULTY OF ENGINEERING

DEPARTMENT OF MARINE ENGINEERING

Second Semester Examination 2020/2021

COURSE TITLE : Economics for Marine Engineers (2 Units)
COURSE CODE : MAE 373.2
TIME ALLOWED : 2Hours
INSTRUCTION: *(a) Attempt Any four (4) questions out of Six (6) questions set.*

Question One

a. Describe demand and supply in detail utilizing appropriate curves where applicable **(7.5 Marks).**

b. States the Laws of Demand and Supply together with the relationship of both of them **(5 Marks)**

c. Explain Market Demand and Elasticity of Demand and also enumerate the various factors influencing Demand and Supply **(5 Marks).**

Question Two

a. Define Profit Maximization and describe three benefits of profit maximization **(8.5 Marks)**

b. Explain how you can achieve profit maximization through increasing of sales revenue **(9 Marks)**

Question Three

a. Nigeria Maritime University issued 10% bond of N500,000.00 at par. Calculate the cost of debt, if the applicable tax rate on NMU is

i. 50%

ii. 40%

iii. 45% **(10 Marks)**

b. Describe investment policy using NMU as a case study **(7.5 Marks)**

$P(1+I)^n - 1$

Question Four

Calculate the cost of capital of 12% bond issued by ENIOS MARINE OIL AND GAS LTD face value of N100, amount of N200,000.00 in the following situations. The life of the bond is seven years.

i. Issued at par , redeemable at par.

ii. Issued at 10% premium.

iii. Issued at 10% discount. **(17.5 Marks)**

Question five

a. What is equipment depreciation? And state the different depreciation methods used in calculating depreciation of equipment **(3 marks)**

b. An equipment costs $25,000 and has an estimated useful life of 8 years and a salvage value of $2,500. Find the depreciation using the double-decline method **(5 marks)**

c. Dr Efiok took a three-year loan of $20,000 at an interest rate of 5 percent that compound annually. What is the interest on the loan **(5 marks)**

d. Explain the application of benefit – cost ratio to government projects **(4.5 Marks)**

Question Six

a. What is equipment retirement and replacement, and why is it necessary? **(3 marks)**

b. State and explain the reasons firm carry out equipment retirement and replacement **(5 marks)**

c. What is benefit – cost ratio ? and explain the implications of the values **(4.5 marks)**

d. A piece of equipment considered for replacement costs $625,000. The rate of inflation is 3%, and a profit boost by $220,000 a year for 3years by upgrading the equipment. Find the net present value and benefit- cost ratio **(5 marks)**

$\frac{100}{3} \times 2$

NIGERIA MARITIME UNIVERSITY, OKERENKOKO

FACULTY OF ENGINEERING

DEPARTMENT OF MARINE ENGINEERING

SECOND SEMESTER EXAMINATION 2020/2021 ACADEMIC SESSION

SHIP POWER PLANT (MAE 356.2)

INSTRUCTION: ANSWER QUESTION ONE AND ANY FOUR (4) QUESTIONS

Time allowed: 2hrs 30 mins.

QUESTION 1

(a) As a young marine engineering graduate trainee in Adah's Systems Engineering Consultancy design team, your lead engineer just confronted you with a design problem of a new vessel for one of their clients who happens to operate around the Warri axis and needs a vessel that can multitask in offshore supply and security patrol operations. Knowing the mission statement of the vessel, you are required to choose a power plant configuration. What configuration would you chose? What are your reasons for your choices? Briefly sketch any three (3) types of power plant combined configurations you know.

(b). List and neatly sketch, not to scale, seven (7) piping and instrumentation equipment commonly found in the typical fuel oil system.

(c) Outline five reasons for choosing a powerplant.

(d). A two-stroke, 6-cylinder marine diesel engine running at 4500 rev/min with a torque of 3676 Nm and consumes 6.5 tonnes of fuel per day. The bore diameter of the cylinders is 24cm and the stroke 320 mm. If the mean pressure of mechanical losses from all the cylinders was 0.45 bar, Estimate

(i) The brake power (ii) The indicated power

(iii) The indicate specific fuel consumption.

(iv) The Engine efficiency

L C V of fuel = 42.0 MJ/kg, γ = 1.4 and c_p = 1.005

QUESTION 2

(a) list five properties of fuel.

(b) Draw a well labelled diagram of the fuel oil system and explain.

QUESTION 3

(a) state three functions of cooling system

(b) state the different types of piston cooling

(c) Draw a schematic well labelled diagram of a closed cooling system.

(d) state three disadvantages of an open cooling system.

QUESTION 4

4. (a) list four types of engines starting method.

(b) give a schematic diagram of the air starting system and explain.

QUESTION 5

(a) List four (4) methods of lubricating system

(b) List four functions of lubrication

(c) Draw a well labelled diagram of marine 2-stroke engine lubrication system.

QUESTION 6

(a). The following data is available for a steam power station:

Maximum demand = 25,000 kW; Load factor = 0.4; Coal consumption = 0.86 kg/kWh; Boiler efficiency = 85%; Turbine efficiency = 90%; Price of coal = $55 per tonne.

Determine the following: (i) Thermal efficiency of the station. (ii) Coal bill of the plant for one year.

(b). List five factors affecting power plant design

(c). Give two modifications of the Carnot cycle.

Question 7

(a). State three advantage and disadvantage of a reheat cycle.

(b). With the aid of a schematic diagram, give a step-by-step working principles of a closed cycle gas turbine power.

to minimize wear and tear
Oil Sounds as a Cooling System
Oil Sounds as a custom agent or damper
Oil Sounds as a Cleaning agent.

Maximum d = 25,000 kw
Load factor = 0.4, Coal Consuption = 0.86
Boiler efficiency = 85%
Turbine efficiency 90
$\eta_{steam} = \eta_{boiler} \times \eta_{turbine}$
$\frac{85}{100} \times \frac{90}{100} = 0.765$
$\eta_{ther} = 0.765$ ans

NIGERIA MARITIME UNIVERSITY
OKERENKOKO, DELTA STATE.

(SECOND SEMESTER)

COURSE TITLE	:	**COLREG (COLLISION REGULATION)**
COURSE CODE	:	**MAE 338.2**
LEVEL	:	**300L**
INSTRUCTION	:	**ANSWER ANY THREE (4) QUESTIONS**
DURATION	:	**2HOURS**

(1a) Define the term "sailing vessel".
(1b) Define the term "vessel restricted in her ability to maneuver". Give some examples.
(1c) Define the term "vessel constrained by her drought"

(2a) Define the term "safe speed".
(2b) Which factors shall be taken into account by all vessels in determining safe speed?
(2c) Which are the factors that determine the maneuverability of a vessel?

(3a) Define the term risk of collision
(3b) What precautionary measures shall the master take before proceeding to sea?
(3c) Discuss how action to avoid collision should be taken.

(4a) Give some valuable reasons why the master of a vessel should decide not to use a traffic separation scheme.
(4b) What action shall two power-driven vessels take to avoid collision when they are meeting on reciprocal or nearly reciprocal courses?

(5a) What are the main measures that the give-away vessel must take in case of risk of collision with another vessel?
(5b) When there is risk of collision between two vessels, sum up the types of actions the stand-on vessel may eventually take?

(6a) Define the term "narrow channel" or "fairway".
(6b) Which factors shall be taken into account with regards to the traffic density?

NIGERIA MARITIME UNIVERSITY
DEPARTMENT OF MARINE ENGINEERING

Course Title: Steam and Gas Turbine
Course Code: MAR 381.2
Attempt any 5 questions with question one compulsory
Maximum marks 70
All questions carry equal marks except question one.
Time allowed: $2\frac{1}{2}$ hrs

QUESTION ONE

a. State three advantages and two disadvantage of a combine steam and gas turbine using a T-S diagram (7Mks)

b. A combine power plant consists of a gas turbine unit and a steam turbine unit, the exhaust from the gas turbine is supplied to the steam generator. The pressure ratio for the gas turbine is 7 and the inlet temperature is 18°C, maximum cycle temperature of the gas turbine is 800°C. The temperature of gas leaving the steam generator is 160°C. The steam condition at turbine entry is 20bar and 400°C. The condenser pressure is 0.05bar total and the total power output of the plant is 50MW. Isentropic efficiency of air compressor, gas turbine and steam turbine is 80%, 82% and 80% respectively. Cp and γ for the combustion gasses 1.11Kj/kg and 1.333. Using the data above, neglecting mass flow rate of the fuel, feed pump work and all pressure losses calculate

i. The cycle efficiency for the gas turbine cycle (5Mks)
ii. The cycle efficiency for the steam cycle if the heat supplied in the generator were supplied by an external fuel (5Mks)
iii. Calculate the mass flow rate of the power plant in terms of Mgt + Mst (5Mks)

QUESTION TWO

a. using a T-S and P-V diagram discuss the major component of a gas turbine (5Mks)

b. A gas-turbine power unit has a pressure ratio of 7 and a maximum cycle temperature of 650°C. The isentropic efficiency of the compressor and turbine are 0.82 and 0.85 respectively. Calculate the power output and efficiency of the gas turbine when the air enters the compressor at $15^{o}C$ at the rate of 12kg/s take C_p=1.005Kj/kgk and γ =1.4 for the compressor process while C_p=1.11kg/k and 1.33 for the expansion process (7Mks)

QUESTION THREE

a. With a clear diagram, draw and label the working/line flow of an ideal Reheat-Regenerated Rankine cycle with one open feed water heater and the T- S diagram (4Mks)

b. Calculate the ideal cycle efficiency and specific steam consumption of a Reheat-Regenerative Rankine cycle using one open feed heater. The steam leaves the boiler at 30 bars superheated to 450°c and reheat to a temperature of 450°c at the pressure when the steam becomes saturated vapor, and the condenser pressure is 0.04 bars, choose the bleed off pressure so that the temperature difference is divided into equal steps (8Mks)

QUESTION FOUR

a. With a clear diagram, draw and label the working/line flow of a Reheat- Cogeneration power plant and the T- S diagram (4Mks)

b. A Cogeneration power plant is modified with reheat and produces 3MW of power and supplies 7MW of process heat, the rate of heat input to the boiler and fraction of steam

$-CP(T_2-T_1)$

extracted for the process heating are to be determine. The steam leaves the boiler at 30 bar superheated to 450 °C and reheat to a temperature of 450 °C at the pressure when the steam becomes saturated vapor, and the condenser pressure is 0.04bar, choose the bleed off pressure so that the temperature difference is divided into equal steps, the steam extracted for the process heater at a temperature of 120 °C (hint: feed pump neglected) (8Mks)

QUESTION FIVE

a. List five difference between Impulse turbine and Reaction turbine (2Mk)

b. With a clear diagram, illustrate the working principle of a binary cycle (4Mks)

c. Steam enter a nozzle at 450 °C and 30 bars with a velocity of 10 m/s, it leaves at 300 °C and 20 bar. During the process heat is lost at a rate of 25kj/s for an inlet area of 800 cm^2, determine the steam at the nozzle exit (6Mks)

QUESTION SIX

The following data apply to single stage Impulse steam turbine

Steam pressure at inlet to nozzle	9 bar P_1
Steam temperature at inlet nozzle	200 °C T_1
Steam pressure at casing	0.4 bar P_2
Isentropic efficiency of the Nozzle	0.91
Inlet angle of the Blade	16°
Outlet angle of the blade	28°
Blade velocity co-efficient	0.83
Ratio of blade speed to steam speed	0.43
Disc friction and windage loss	4% of blade work
Bearing friction loss	1% of blade work

Determine the isentropic efficiency of the turbine and draw up an energy balance expressing the various items as percentage of the isentropic change of enthalpy (12Mks)

$C_p(T_3 - T_4)$

$T_1 = \left(\frac{P_1}{P}\right)$