

**INDIAN MARITIME UNIVERSITY**  
**(A CENTRAL UNIVERSITY)**  
**Post Graduate in Marine Engineering (PGDME)**  
**FIRST SEMESTER EXAMINATION**  
**JUNE-2012**

**SUB: PGDME/ME/BS/T/111- COMMUNICATIVE ENGLISH**

Time: 3 Hours

Max Marks: 70

**NOTE**

- (1) Attempt Six Questions in all.
- (2) Section "A" is compulsory.

**Section "A" (Question No -1 Compulsory)**

1.a) Read the following passage and answer the following questions set below :

The Alaska pipeline starts at the frozen edge of the Arctic Ocean. It stretches southward across the largest and northernmost state in the united states, ending at a remote ice free seaport village nearly 800 miles from where it begins. It is massive in size and extremely complicated to operate. The steel pipe crosses windswept plains and endless miles of the delicate tundra that tops the frozen ground. it weaves through crooked canyons, climbs sheer mountains, plunges over rocky crags ,makes its way through thick forests and passes over under hundreds of rivers and streams. The pipe is 4 feet in diameter and up to 2million barrels (or 84 million gallons) of crude oil can be pumped through daily.

Resting on the H-shaped steel racks called "bents", long sections of the pipeline follow a zigzag course high above the frozen earth. Other long section drop out sight beneath spongy or rocky ground and return to the surface later on. The pattern of the pipeline's up-and-down route is determined by the often harsh demands of the arctic and subarctic climate, the tortuous lay of the land, and the varied compositions of soil, rock, or permafrost (permanently frozen ground). A little more than half of the pipeline is elevated above the ground. The remainder is buried anywhere from 3 to 12 feet, depending largely upon the type of terrain and the properties of the soil.

One of the largest in the world, the pipeline cost approximately\$8 billion and is by far the biggest and most expensive construction project ever undertaken by private industry. In fact, no single business could raise that much money, so 8 major oil companies formed a consortium in order to share the costs. Each company controlled oil rights to particular shares of land in the oil fields and paid into the pipeline-construction fund according to the size of its holdings. Today, despite enormous problems of climate, supply shortages, equipment breakdowns, labour disagreements, treacherous terrain, a certain amount of mismanagement, and even theft, the Alaska pipeline has been completed and is operating.

**Questions**

1. The passage primarily discusses the pipelines
  1. Operating costs
  2. Employees
  3. Consumers
  4. construction
2. The word "it" in line 3 refers to
  1. Pipeline
  2. Ocean
  3. State
  4. village
3. According to the passage, 84 million gallons of oil can travel through the pipeline each
  1. Day
  2. Week
  3. Month
  4. Year
4. The phrase "Resting on" in paragraph 2,line 1 is closest in meaning to
  1. Consisting of
  2. Supported by
  3. Passing under
  4. Protected with

5. The author mentions all of the following as important in determining the pipeline's route EXCEPT the
1. Climate
  2. lay of the land itself
  3. local vegetation
  4. kind of soil and rock
6. The word "undertaken" in paragraph 3, line 2 is closest in meaning to
1. Removed
  2. Selected
  3. Transported
  4. Attempted
7. How many companies shared the costs of constructing the pipeline?
1. 3
  2. 4
  3. 8
  4. 12
8. The word "particular" in paragraph 3, line 4 is closest in meaning to
1. Peculiar
  2. Specific
  3. Exceptional
  4. Equal
9. Which of the following determined what percentage of the construction costs each member of the consortium would pay?
1. How much oil field land each company owned
  2. How long each company had owned land in the oil fields
  3. How many people worked for each company
  4. How many oil wells were located on the company's land
10. Give an appropriate title for the above passage (10 marks)

**1 b) Read the following passage and note down the important points in it. (5 marks)**

True, it is the function of the army to maintain law and order in abnormal times. But in normal times there is another force that compels citizens to obey the laws and to act with due regard to the rights of others. The force also protects the lives and the properties of law abiding men. Laws are made to secure the personal safety of its subjects and to prevent murder and crimes of violence. They are made to secure the property of the citizens against theft and damage to protect the rights of communities and castes to carry out their customs and ceremonies, so long as they do not conflict with the rights of others. Now the good citizen, of his own free will obey these laws and he takes care that everything he does is done with due regard to the rights and well-being of others. But the bad citizen is only restrained from breaking these laws by fear of the consequence of his actions. And the necessary steps to compel the bad citizen to act as a good citizen are taken by this force. The supreme control of law and order in a State is in the hands of a Minister who is responsible to the State Assembly and acts through the Inspector General of Police.

Give an appropriate title of the page:

## 2. GRAMMAR SECTION

1. The speed of the car was 160 miles..... hour.(insert appropriate articles whenever necessary and write the sentence)
2. .... the airport we went to our hotel ..... bus.(Insert the correct Preposition.
3. Write the sentence in passive voice  
My grandfather established this steel factory in 1940
4. Complete the sentence with the appropriate forms of the given verb.  
A) Naresh (be) not well. He (not come) to school today.  
B) We----- already -----(reach home) when Irfan ----- (say) that he----- (forget) book at school.
5. Rewrite the following in indirect speech.  
He said, "I have decided to change my job".

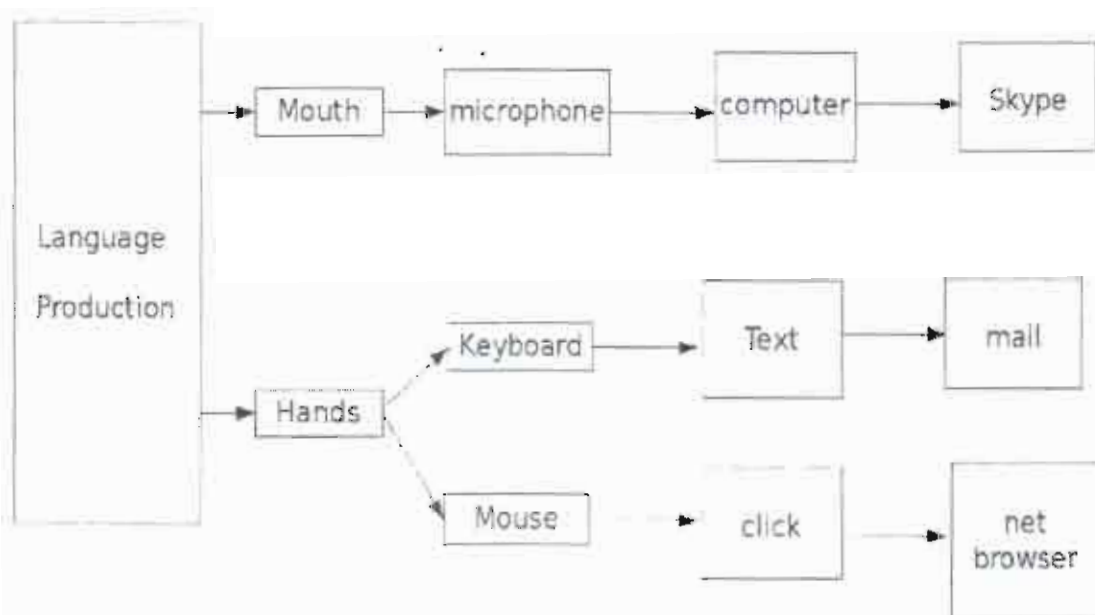
(5 marks)

SECTION "B" (ANSWER ANY FIVE)

Each (10 marks)

1. IMU is running a B.Sc Course in Nautical Science. Write a letter to the Director, IMU Cochin requesting for sending a brochure and Prospectus.
2. You are an eye witness to a road accident resulting in loss of human life and property. As a press reporter of "The Hindu" write a report in about 100-125 words.
3. Read the following tree diagram that gives the information about the computer system and prepare a short note.

Input to the Internet



4. Your College IMU Cochin is organising a national level conference on ship construction on July 15<sup>th</sup> Monday 2012, in connection with it prepare a poster for the display purpose.
5. Write a dialogue between the captain and first officer about the cargo handling of the ship.
6. Give a speech on the IMU Day about the Intension of carrying on your carrier by joining the IMU.
7. Prepare an appeal in the form of a handout about how people in your locality can come together to face the water pollution.

You may take the help of Points to be included from below

Treatment, garbage dumping avoiding, purification, storage tanks usage, hospital facilities.

**INDIAN MARITIME UNIVERSITY**  
**I SEMESTER EXAMINATION (JUNE – 2012)**  
**POST GRADUATE DIPLOMA IN MARINE ENGINEERING**  
**MARINE ELECTRO TECHNOLOGY (PGD/ME/BS/T/112)**

Time: 3 Hrs.

Date: 02/06/2012 : Max.Marks: 70

Note: i) Answer all questions in section – A, and Any five questions in Section – B.

ii) Neatness in handwriting and clarity in expression carry weightage.

iii) Illustrate your answers with clear sketches / diagrams wherever necessary.

**SECTION – A**

**Marks: 20**

i) Give your answer in a few words / sentences or fill up the blanks as applicable.

1. What is AVR?
2. What is peak factor in A.C.?
3. 100v, A.C. is applied to a circuit having resistance of 3 ohms and reactance of 4 ohms. Find the current?
4. What is synchronous speed in induction motor?
5. How will you reverse direction of rotation of a 3 phase A.C. synchronous motor?
6. Which is the equipment used for measuring insulation resistance of an equipment?
7. Beta of a transistor is the ratio of \_\_\_\_\_ and typical values lie between \_\_\_\_\_ and \_\_\_\_\_.
8. What is meant by Trickle charging?
9. Thermistor is made of \_\_\_\_\_ and is used for measuring \_\_\_\_\_.
10. A op Amp has \_\_\_\_\_ input impedance and \_\_\_\_\_ output impedance.

**SECTION – B**

**Marks: 50**

**All questions carry equal marks:**

- i) a) Name the panels in a Main Switch Board. (2)  
b) i) Why cooling system is provided in A.C. Generators? (8)  
ii) Draw and explain the circuit diagram of a brushless alternator bringing out its advantages.
- ii) With reference to the preferential tripping system in Marine distribution system?  
a) State why this facility is provided? (2)  
b) With the aid of sketch, describe a typical arrangement to provide three stages of tripping against overload. (8)
- iv) a) State the requirements of a typical Emergency Power Source on board the ship. (6)  
b) Name the loads fed by the Emergency Power Source. (2)
- v) a) Define Power factors in A.C. Circuits. (2)  
b) A coil having a resistance of  $12\Omega$  and inductance of 0.1 Henry is connected across 100v, 50Hz supply. a) Calculate reactance and impedance of the coil .b) The current, c) Phase difference between current and voltage. (8)
- vi) Write short notes on any three of the following. (10)
  - i) Marine Cables.
  - ii) Maintenance of batteries.
  - iii) Insulated and earthed systems.
  - iv) Ex – Protection.
  - v) Over hauling of a motor contaminated with seawater .
- vii) Write short notes on any three. (10)
  - i) SCR.
  - ii) PN-Junction.
  - iii) Zener diode Voltage regulator.
  - iv) SELSYN
  - v) 2 input AND gate
- viii) Draw the basic circuit diagram of a single stage amplifier circuit using a NPN Transistor to amplify an AC signal. (10)  
Indicate the purpose of components used in the above circuit.

**INDIAN MARITIME UNIVERSITY**  
**I SEMESTER EXAMINATION (JUNE – 2012)**  
**POST GRADUATE DIPLOMA IN MARINE ENGINEERING**  
**MARINE AUXILIARIES (PGD/ME/BS/T/114)**

Time: 3Hrs.

Date: 06/06/2012- Max .Marks: 70

NOTE: I) Attempt 6 Questions in all.

II) Section 'A' is Compulsory.

III) All Questions should be supported with relevant sketches in pencil.

IV) Give importance to safety aspects in your answers.

**Section –A**

I) Answer following questions briefly.

(10x2=20)

- 1) Why a Gear pump is provided with relief V/V and why this is not done on a centrifugal pump.
- 2) Why oily Bilge separator is mandatory on merchant navy vessels.
- 3) What are the safety provisions on main Air Compressor?
- 4) How "AI CAP F.O. PURIFICATION" system is different from conventional F.O. purifier?
- 5) Why "Friction Type Coupling" is provided for purifier horizontal drive?
- 6) How an "Unloader" protect main air compressor during its operation.
- 7) Why "Emergency Air Compressor" is mandatory for E/R?
- 8) Why Propeller Shaft Couplings are "Interference fitted"?
- 9) What are safety provisions provided on windlass to prevent anchor from slipping?
- 10) Why "Vacuum Condenser" is required in a steam power plant on steam return line?

**Section –B**

(10x5=50)

Answer any five from following.

- II) 'S' & 'D' Ballast Wtr system for Bulk carrier.
- III) 'S' & 'D' with support of schematic diagram, hydraulic system for windlass of ship.
- IV) 'S' & 'D' F.W. Generator applicable to merchant navy vessel with all details of operation.
- V) Explain with sketch operation of C.P.P. system.
- VI) What are the mandatory jobs to be carried out at dry dock for the ship?
- VII) What is corrosion? How various parts of ship affected and why. What are remedial measures to be adopted?

**INDIAN MARITIME UNIVERSITY**  
**I SEMESTER EXAMINATION (JUNE – 2012)**  
**POST GRADUATE DIPLOMA IN MARINE ENGINEERING**  
**MARINE I.C.ENGINES (PGD/ME/BS/T/113 )**

Time: 3Hrs.

Date: 05/06/2012- Max .Marks: 70

- Note: 1) Section 'A' is compulsory.  
2) Answer any 5 from the section 'B'  
3) All answers should be supported with appropriate sketches in pencil (Dark).  
4) Present your answer to the point & creditability to neatness and presentation.

i) **Section – A** (10x2=20)

- a) Explain the significance of limiting sulphur content in fuel.
- b) What is the "effective stroke" in Bosch type fuel pump? How it can be varied?
- c) What is meant by Intelligent Engines? How are they different from conventional engines?
- d) What is the importance of "Quill" in cylinder lubrication?
- e) Explain the importance of "Period of overlap" in a four stroke cycle of a super charged engine?
- f) Compare lubricating oil and water as cooling medium for a 2 stroke engine piston.
- g) What is the significance of inter-cooling in multi-stage Air Compressor?
- h) What is "Surging" in a Turbo charger? What action is to be taken when a Turbocharger is found surging?
- i) What is Rocker arm? How tappet clearance is adjusted?
- j) What is the significance of "Oil Mist Detector" in a 2 stroke engine. How does it work?

**Section - B** (10x5=50)

**Answer any 5 questions. Each carrying 10 marks.**

- ii) Sketch and describe a Cylinder Liner for a large 2 stroke engine. How the liner is wear down determined and what is the wear down limit?
- iii) Draw and explain starting Air Systems for a large 2 stroke engine.
- iv) Explain Scavenging, Supercharging and Turbo Charging in an I.C.Engine. What are the relative merits of each system?
- v) Sketch and describe Fuel Injector for a medium speed engine. Describe the defects to which the injectors are prone to. How are the defects rectified?
- vi) How you will carry out C.S.M. survey of main bearing of two stroke diesel engine. What are the critical readings to be recorded and measured? Give sketches of relevant tools and measuring instruments.
- vii) 'S' & 'D' Cross Head bearing of 2 stroke engine and also explain how lubrication is achieved and why H.P. lubrication is resorted.

INDIAN MARITIME UNIVERSITY  
I SEMESTER EXAMINATION (JUNE – 2012)  
POST GRADUATE DIPLOMA IN MARINE ENGINEERING  
MARINE ENGINEERING DRAWING (PGD/ME/BS/T/115)

Time: 3 ½ Hrs.

Date: 07/06/2012

Max .Marks: 70

INSTRUCTIONS TO THE CANDIDATES.

- 1) Orthographic Projections are to be drawn using first angle projection.
- 2) All dimensions in the drawing are in mm.
- 3) Where dimensions are not given suitable dimensions can be given.
- 4) Neatness in drawing carries weightage.
- 5) All the rough work should be done on a separate sheet, which has to be submitted along with the drawing sheet.
- 6) Scale chosen must be clearly indicated.

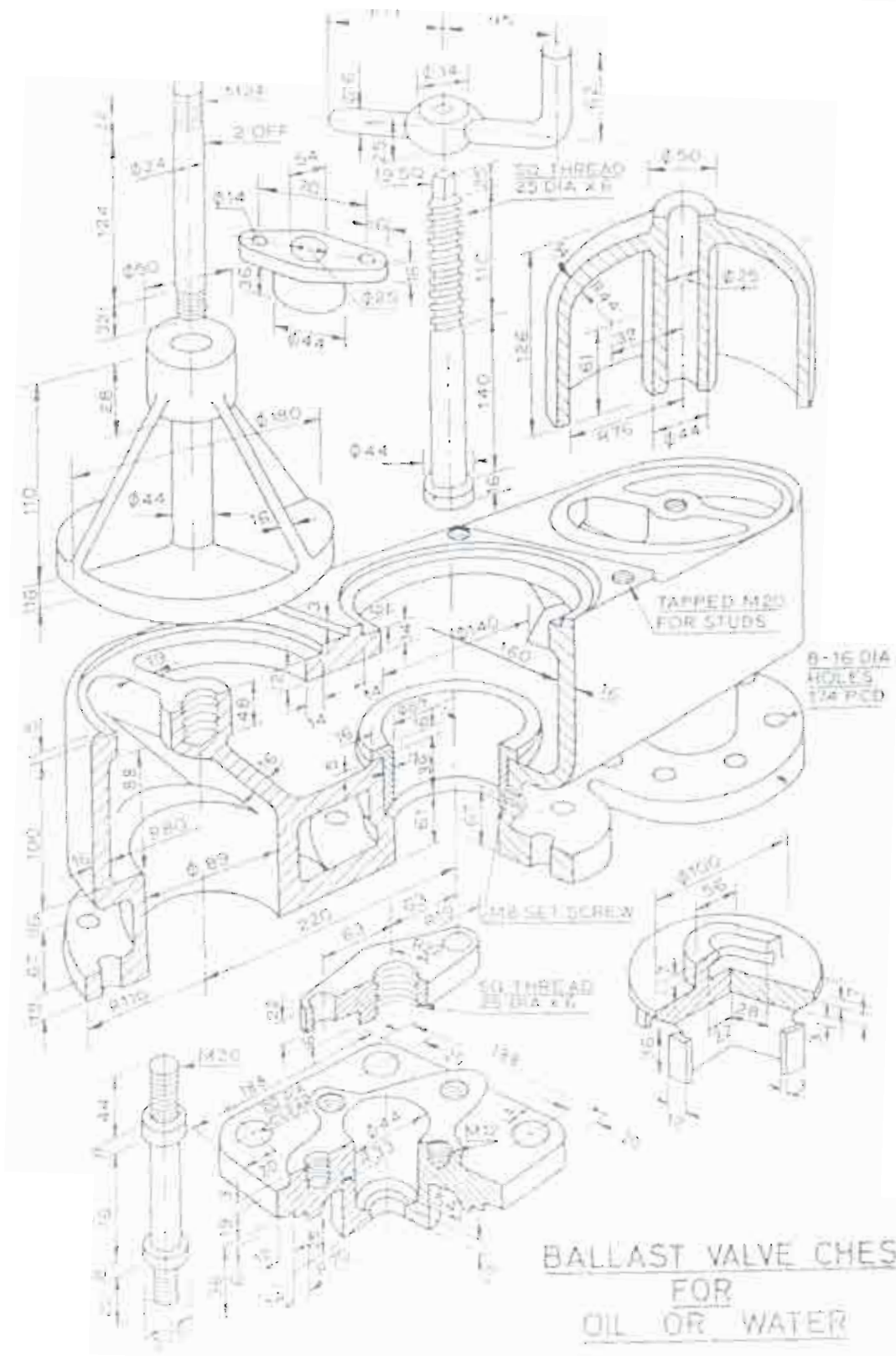
Draw the following view of the Ballast Chest for oil or water.

- a) Elevation in section through branches and valves showing parts assembled.
- b) A plain view with either dome or blank removed.

Or

Draw the following views of the Automatic Valve.

- a) Elevation in section with all parts assembled.
- b) Plan view, the bottom half to be in section.



BALLAST VALVE CHEST  
FOR  
OIL OR WATER





INDIAN MARITIME UNIVERSITY  
I SEMESTER EXAMINATION (JUNE – 2012)  
POST GRAUDATE DIPLOMA IN MARINE ENGINEERING  
FIRE PREVENTION & CONTROL, Marpol, ISO/ISM, WATCH KEEPING (PGD/ME/BS/T/116)

Time: 3Hrs.

Date: 03/06/2012- Max. Marks: 70

- Note: 1) Attempt six questions in all.  
2) Section 'A' is compulsory.  
3) Attempt 2 Questions from Section 'B' one question from Section 'C' 2 questions from Section 'D'  
4) Answers should be substantiated with appropriate sketches with pencil.  
5) Safety aspects should be properly highlighted and explained.

Section –A

(10x2=20)

1) Give the correct answer following multiple choices by ticking your correct choice (only one answer)

- 1) A fire is said to be under control when  
a) it stops spreading    b) No smoke is seen    c) Fire is extinguished    d) Flame is knocked off.
- 2) Co<sub>2</sub> extinguish the fire by  
a) Cooling the material    b) Starving the fire    c) Smothering the fire    d) Breaking the chain reaction
- 3) The weight of portable fire extinguisher is not more than  
a) 9kgs    b) 23kgs    c) 13.5kgs    d) 5kgs
- 4) Form fire extinguisher is most suited for  
a) class 'C' fire    b) class 'D' fire    c) class 'B' fire    d) class 'A' & 'C' fire.
- 5) The minimum capacity of SCBA is  
a) 2400 ltrs of free air    b) 1200 ltrs of free air    c) 1800 ltrs of free air    d) 2000 ltrs of free air
- 6) Chain reaction is caused by  
a) Extreme heat radiation,    b) Reaction of radicals formed at flame zone,    c) enrichment of fuel vapours,    d) None of the above reasons.
- 7) What is the function of designated person?  
a) Designated person provide a link between ship & shore, having direct access to the highest level of management,    b) He is responsible for monitoring the safety & pollution,    c) both a & b,    d) None of the above.
- 8) The overall objective of IMO is summed in the slogan (fill up the blanks) \_\_\_\_\_  
\_\_\_\_\_
- 9) IMO has promoted the adoption of 50 convention and proto co island adopted more than 1000 codes and recommendations concerning Maritime safety and security, the prevention of pollution and related matters.(State whether the statement is true or false).
- 10) As per ISO 9001 requirements, the purpose of QMS record is to provide objective evidence of  
a) Product performance    b) Process capability & quality system conformance and effectiveness.  
c) all the above    d) conformance with environmental health, safety requirement    e) only C & B

12/23

Section - B

Answer any 2 questions from the following:

- II) a) What is fire man's outfit and what does it consist of? (5)  
b) Describe the merits and demerits of "FABA" and "CABA" (5)
- III) Write short notes on the following: (10)  
a) Automatic sprinkler system  
b) Chain reaction.  
c) Emergency means of escape.  
d) D.C.P. Portable.
- IV) 'S' & 'D' any of recommended fixed fire fighting system for E/R. Also highlight the precautions to be taken before release of the media and also precautions to be taken before re-entry in to the E/R. (10)

Section - C

Answer any one from the following:

- V) 'S' & 'D' any oily bilge separator "Which is compliant with rules & regulations of IMO with facilities for monitoring. (10)
- VI) Write short notes of the following: (10)  
a) T.B.T. paints W.R.T antifouling paint.  
b) Water ballast management.  
c) Marpol annexure - III.  
d) Vacuum type sewage treatment plant.

Section - D

Answer any two from the following:

- VII) Differential between "Port control" "Flag state and "Classification society. (10)
- VIII) Why is the "ISO" termed as Generic Standard? (10)
- IX) Differentiate between "ISO" & "ISM". How has it benefited the various industries under it preview? (10)

**INDIAN MARITIME UNIVERSITY**  
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**Post Graduate Diploma in Marine Engineering (PGDME)**  
**SECOND SEMESTER EXAMINATION, AUGUST 2011**

**PG/ME/MS/T/211: SEAMANSHIP AND LIFE BOAT**

Time: 3 Hours

Marks Maximum: 70

**Attempt any 7 questions**

**All questions carry equal marks.**

1. Draw the Working structure of the Ship staff showing various departments. Explain the importance of teamwork.
2. What is the importance of maintaining a proper lookout in navigation? Explain the situation where Extra lookouts may have to be posted.
3. Explain the various factors to be considered for ensuring safe anchoring of a vessel.
4. What are the routine checks and maintenance to be carried out to life boat engines?
5. What are the factors that a ship's Master would consider while deciding to Abandon Ship.
6. Draw and explain any 4 knots commonly used at Sea.
7. Explain the challenges faced by survivors in a survival craft at sea.
8. Discuss the various types of launching arrangements for Lifeboats.
9. Write short notes on:
  - a) Echoe Sounder
  - b) Radar
  - c) Gyro compass
  - d) Marine Sextant.

# INDIAN MARITIME UNIVERSITY

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Post Graduate Diploma in Marine Engineering (PGDME)

SECOND SEMESTER EXAMINATION, AUGUST 2011

PG/ME/MS/T/212: SHIP CONSTRUCTION

Time: 3 Hours

Maximum Marks: 70

## PART – A

Answer any **FIVE** (5 x 2 = 10 marks)

- I. Explain the terms i) Hogging, ii) Sagging.
- II. What is meant by i) Bilge keel, ii) Duct keel.
- III. What is the difference between a Centre Girder and a Bar Keel?
- IV. Define the terms mentioned below in a ship construction.  
i) Displacement ii) Gross tonnage.
- V. What is the difference between a cargo tramp and a cargo liner?
- VI. What are the features of a container ship?
- VII. Why water tight bulk heads are required in a ship construction?
- VIII. Explain i) Floor plate ii) Hatch coaming

## PART – B

Answer any **FOUR** (4 x 15 = 60 marks)

- IX. What is Panting? Sketch and describe the panting arrangement at the fore end of a Vessel?  
(15 marks)
- X. i) Define the following: 1) Free board, 2) Length between Perpendiculars, 3) Net tonnage, 4) Dead weight.  
(8 marks)  
ii) The ship side has a disc and lines marked at midships. Make a sketch and explain the meaning of such markings.  
(7 marks)
- XI. i) Sketch and describe a cruiser stern. What are advantages and disadvantages? (7 marks)  
ii) Describe with the aid of sketches: 1) Round of beam, 2) Flare, 3) Sheer 4) Rise of Floor.  
(8 marks)
- XII. Sketch and describe the general longitudinal section of a bulk carrier. (15 marks)
- XIII. Sketch and describe a transverse section of either an oil tanker or ore carrier having two longitudinal bulkheads. (15 marks)
- XIV. Sketch and describe the different floors used in the construction of a double bottom indicating where each type is employed. Give details of attachments of the floors to the adjacent structure. (15 marks)
- XV. Sketch and describe double bottom construction of a longitudinally framed double bottom. (15 marks)

# INDIAN MARITIME UNIVERSITY

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Post Graduate Diploma in Marine Engineering (PGDME)

SECOND SEMESTER EXAMINATION, AUGUST 2011

## PG/ME/MS/T/213 MARINE REFRIGERATION & AIR CONDITIONING

Time: 3 Hours

Marks Maximum: 70

Attempt all questions in PART – A and any FIVE questions from PART -B

### PART – A

- 1 a) Sketch and describe a direct expansion domestic refrigeration system of a merchant ship for meat, fish and vegetable rooms showing compressor, condenser, receiver, expansion valve, evaporator etc. (15 Marks)
- b) Explain the working of the expansion valve with a sketch and show how the same is fitted in the system (5 Marks)
- c) Explain the functions of the High Pressure and Low Pressure cut outs and show the position of these cut outs in the system. (5 Marks)
- d) Sketch and describe the working of a solenoid valve and show the position of the same in the system (5 Marks)

### PART – B

- 2 What are primary and secondary refrigerants and explain the desirable properties of primary refrigerants in marine systems. Compare the properties of primary refrigerants for different applications. (14 Marks)
- 3 Sketch and describe a reciprocating refrigeration compressor and explain why safety cylinder heads are fitted in the reciprocating compressor (14 Marks)
- 4 Sketch and describe the pressure lubricating system of a refrigeration compressor and explain the desirable qualities of lubricating oils used in refrigeration systems (14 Marks)
- 5 Explain in detail different methods of cooling cargo chambers in conventional reefer ships and compare the advantages. (14 Marks)
- 6 Write short notes on:-
  - i) Automatic starting and stopping of refrigeration compressors (5 Marks)
  - ii) Leak testing of refrigeration gas (5 Marks)
  - iii) Charging of refrigerant in the direct expansion system (4 Marks)
- 7 Sketch and describe a marine central A.C. System and explain the difference between single duct system and double duct system (14 Marks)
- 8 What are the conditions affecting human comfort in A.C. System design and also explain the relation between Effective Temperature and air motion. (14 Marks)

**INDIAN MARITIME UNIVERSITY**  
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**Post Graduate Diploma in Marine Engineering (PGDME)**  
**SECOND SEMESTER EXAMINATION, AUGUST 2011**  
**PG/ME/MS/T/214: MARINE CONTROL AND AUTOMATION**

Time: 3 Hours

Marks Maximum: 70

**Part A**

(Answer all Questions)

Q1

- (a) Describe with the aid of a suitable diagram, the constructional details of one of the following devices:  
(i) Gas filled thermometer  
(ii) Positive displacement Meter  
(iii) Turbine flowmeter
- (b) Explain with a sketch the working of an Electromagnetic Flowmeter
- (c) Explain the principles of measurement of viscosity and detail the type of instrumentation used.
- (d) Describe an electrical or an electronic type of Salinometer and explain clearly the operating principle, how the variation of water temperature is compensated for and how the alarm is activated (10marks)

**Part B**

(Answer any five)

Q2.

Explain why the air supplied to a pneumatic control system must be free from dust and water. Mention the possible consequences if the air supply is contaminated and describe how these impurities are removed. (12 marks)

Q3.

Draw a diagram of a system for fully automatic main engine jacket cooling water temperature control, incorporating steam pre-heating of the coolant, utilizing split range control. Comment on the type of Control action used and the "fail safe" arrangement adopted. (12 marks)

Q4.

Draw a block diagram of an automatic feedback control system. Explain the meaning of the following terms with reference to the automatic control system:

- (a) Control loop
- (b) Transmitter
- (c) Controller
- (d) Desired value.
- (e) Proportional Band. (12 marks)

Q5.

Define the following terms which are used in control systems:

- (a) Cascade control
- (b) Split range control

Discuss the application of such principles in Lubricating oil system and cooling water system of the type used in auxiliary diesel generators. (12 marks)

Q6.

Sketch and describe a boiler water drum level controller. What are the sensing devices used? Explain how three-element-control avoids high deviation when load change occurs. (12 marks)

Q7.

Explain the principles of measurement of viscosity and detail the type of instrumentation used Sketch an Oil viscosity control system and describe the operating principle. Give reasons for which control actions you would incorporate in the controller. (12 marks)

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**Post Graduate Diploma in Marine Engineering (PGDME)**  
**SECOND SEMESTER EXAMINATION, AUGUST 2011**

**Note: Answer Section I & II in Separate Answer Books**

**SECTION - I**

PG/ME/MS/T/216: Marine Boilers

Time: 1½ Hours

Marks Maximum: 35

Answer Part-A and any Two questions from Part-B.

All questions carry equal marks.

Part - A

Sketch and describe an Improved High Lift Safety Valve and explain its special design feature that helps to improve its operation.

Part - B

1. List and briefly explain with the aid of sketches some of the common problems that can arise in the operation of marine boilers.
2. Sketch and describe a Composite Boiler suitable for producing low pressure steam for auxiliary purpose.
3. What are the mountings fitted on a water tube boiler? Briefly describe the function of each of them.

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## SECTION - II

PG/ME/MS/T/217: Marine Steam Engineering

Time: 1½ Hours

Marks Maximum: 35

Answer Part-A and any Two questions from Part-B.

All questions carry equal marks.

### Part – A

What are the main components of a Steam Marine Propulsion Plant? Briefly describe the function of each of them.

### Part – B

1. Explain with the aid of simple sketches the differences between an atmospheric condenser and a regenerative condenser? Where are these types of condensers used?
2. Explain with the aid of schematic diagrams an Open Feed System and a Closed Feed System and their advantages/disadvantages.
3. Briefly describe the warming up procedure of main propulsion steam turbine. Why is proper warming up important for the safe operation of a turbine plant.

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**SECOND SEMESTER EXAMINATION, AUGUST 2011**  
**PG/ME/MS/T/215: NAVAL ARCHITECTURE**

Time: 3 Hours

Marks Maximum: 70

**PART – A**

Answer ANY FIVE Questions (5 × 4 = 20 marks)

1. Draw neat sketches of the following ship's members:  
(a) Rise of Keel                      (b) Bulbous Bow.
2. Explain the meaning of the following terms:  
(a)  $BM_T$                                       (b) MCT 1 cm
3. The Water plane area of a ship is 1730 sq.m. Calculate TPC and the increase in draught if a mass of 270 tonne is added to the ship.
4. Define Prismatic Co-efficient and Mid-ship section area Co-efficient.
5. Explain metacentric diagram.
6. What is free Surface Effect? How it affects the metacentric height of the ship?
7. Define:                      a) Trim                      b) LCF
8. A ship of 10,000 tonne displacement has a Water plane area of 1,300 sq.m. The ship loads in water of 1.010 t/cu.m and moves into water of 1.026 t/cu.m. Find the change in Mean draught.

**PART – B**

Answer ANY FIVE Questions (5 × 10 = 50 marks)

9. a) A ship 13.5 m long, 18 m beam and 7.6 m draught has a displacement of 14,000 tonne. The area of the load water plane is 1,925 sq.m. and the area of the immersed mid-ship section is 130 sq.m. Calculate (i)  $C_w$  (ii)  $C_m$  (iii)  $C_b$  (iv)  $C_p$ .                      (8 marks)
- b) A ship of 5,000 tonne displacement, 95 m. long floats at a draught of 5.5 m. Calculate the wetted surface area of the ship using Denny's formula.                      (4 marks)
10. A double bottom tank 21 m. long has a water tight center girder. The widths of the tank top measured from the center line to the ship side are 10.0, 9.5, 9.0, 8.0, 6.5, 4.0, and 1.0 m respectively. Calculate the second moment of area of the tank surface about a longitudinal axis through its centroid for one side of the ship only.                      (10 marks)
11. a) Sketch the transverse section of a ship, showing the positions of Centre of Gravity, Centre of Buoyancy, and Initial Metacentre, when the ship is in (i) stable (ii) unstable and (iii) neutral equilibrium.                      (6 marks)