Sl. No. 3

EXTRA FIRST CLASS EXAMINATION (PART-A)

Subject: Law of the Sea & Maritime Law

(Time allowed - 3hours)

India (2017) **Morning Paper** **Total Marks 60**

Note:

(i) All question carry equal marks.

(ii) Answer any six questions

(iii) The answers should be legible.

1. (a) Describe the limits and rights of jurisdiction on ships in Territorial Sea and High Seas as per ***UNCLOS.*** Why the concept of innocent passage is applicable within Territorial seas but is not mentioned under High seas. (b) Discuss the interrelation between UNCLOS 82 and IMO Regulations on Pollution. What is the position in USA and Europe?
2. (a) Explain the concept of ***Tort*** with examples. (b) Discuss negligence in the Law of Torts. On a claim of damages in negligence, what is the effect of the defendant successfully establishing 'contributory negligence'?
3. Insurance is a **Contract of Indemnity**- discuss and how is it different from Guarantee? What is role of Underwriters and Indemnifiers in Maritime trade?
4. Nairobi International Convention on the **Removal of Wrecks, 2007**- discuss the key issues and co relate to Indian enactments on the issue of removal of wrecks
5. Discuss the salient features of **COLREG 1972** and Merchant Shipping (Prevention of Collisions at Sea) Regulations, 1975.
6. What are the key Sections in **Indian Arbitration and Conciliation Act.**
7. Discuss various **MOU regimes** that ensure seaworthiness of merchant ships and the benefits to society.
8. Discuss various types of **Charter contacts**..

   What is NOR?

   What do you understand by demurrage and dispatch?
9. What are the features of **Arrest Convention 1999**. What is the Indian position with regard to the above convention?

A2

Sr. No. 8

EXTRA FIRST CLASS EXAMINATION (PART-A)

Subject: Risk Management & Marine Insurance

(Time allowed - 3hours)

India (2017) **Afternoon Paper** **Total Marks 60**

Note:
(i) All question carry equal marks.
(ii) Answer any six questions.
(iii) The answers should be legible.

1. Explain the **principles of utmost good faith** and disclosure prevalent in marine insurance between the assured and insurer
2. Explain the steps to be followed by **Cargo interests** in pursuing cargo damage claims against carriers
3. Explain how **H&M liability** issues are handled when ships are lost
4. What are the norms used by **Clubs** to rate shipowners?
   Should the shipmanager have independent Club Covers, apart from that of owners?
5. List out the requirements for **Strict Liability Covers** for ships calling at Indian ports
6. How is **Cargo that is jettisoned**, compensated by others?
7. In the context of risk control measures differentiate between **"engineering risk control"** and **"procedural risk control"** with suitable examples. Highlight the advantages and disadvantages of both.
8. During departure from port including a river passage, the **main engine failed** to reverse once, but subsequently did. Explain the risk assessment you will carry out to ensure safety during the rest of the manoeuvre. Highlight specific actions you will take.
9. Explain the term "**Risk Control Measures**". What are the broad categories of RCMs. Give examples.

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A3

Sr. No. 8

EXTRA FIRST CLASS EXAMINATION (PART-A)

Subject: Shipping, Economics & Finance

(Time allowed - 3hours)

India (2017) **Morning Paper** **Total Marks: 60**

Note:
(i) All question carry equal marks.
(ii) Answer any six questions
(iii) The answers should be legible.

1. List out the main issues to be considered in locating and developing a **Container terminal**
2. Discuss the **implications to shipping** of the current political imbroglio amongst Arab Oil and Gas producers, isolating Qatar
3. How **Supply and Demand** imbalances affect shipbuilding and recycling sector of standard types and specialized fleets also.
4. Can **Derived Demand** for Trade be managed by stimulating or controlling shipping?
5. While contracting for a **Sale or Purchase** of a New building OR second hand (consider a choice of your option) ship, what all specifics will have to be given attention to?
6. (a) With respect to **charter parties**, list out the important representations, warranties, terms and conditions agreed on contracting, including jurisdiction, applicable law and provision for dispute resolution in **a Voyage Charter** for DRY OR WET trades.

   (b) During Time and/or Voyage Charter negotiations what performance guarantees can be obtained from disponent owners? What are remedies for shortcomings?

   (c) How are voyage and Time charter earning risks of foreign exchange covered on a short term or long term basis?
7. (a) Discuss on regulatory measures where provision for **foreign exchange risks** of heavy capital expenditure incurred in ship acquisitions are provided

   (b) Illustrate your understanding of fund transfers in shipping, especially foreign exchange with due exchange rate risk cover in Cargo sector through Letter of Credit
8. (a) Describe what factors may have influence on the **pricing system** of a port.

   (b) How can uncertainties of heavy investment in Port development and infrastructure be augmented?

c) Is it viable to develop a port or terminal with captive cargoes? if so, please justify with an example

4. a) Explain **indirect operating expenses** per day, along with its constituents and its significance with respect to operation of ships.

b) Freight rate is dependent on the imbalance of supply and demand functions in shipping market – defend this statement with examples.

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A4

Sr. No. 8

EXTRA FIRST CLASS EXAMINATION (PART-A)

Subject: Marine Materials & Corrosion of Marine Structures

(Time allowed - 3hours)

India (2017) **Morning Paper** Total Marks 60

Note:
(i) All question carry equal marks.
(ii) Answer any six questions
(iii) The answers should be legible.

1. Discuss the specific **type of corrosion**, material consideration and corrosion prevention in the following cases:
   (a) Corrosion in Boilers
   (b) Corrosion in Marine Gas turbines
2. (a) What are the criteria for selection of material for **general Engineering purpose**?
   (b) What are the criteria for selection of steel for **shipbuilding**?
   (c) What are the permanent impurities found in steel and what are their effects on the properties of steel?
   (d) Explain the **effects of carbon** on the properties of steel
3. **(a)Define the passivation of metal** or alloy. Give examples of some metals and alloys that show passivity.
   (b) Briefly describe the following theories of metal passivity i) Oxide theory ii) adsorption theory.
4. (a)Distinguish between **plain carbon steels** and alloy steels. Why is alloying of steel done?
   (b) What are the effects of the following alloying elements on the properties of Steel?Carbon, Aluminium, Sulphur, phosphorus, Chromium, Nickel, Copper, Manganese, Silicon, Molybdenum, Vanadium, Boron, Lead, Nitrogen.
5. (a) What is meant by **Iron allotropy**? Show a typical cooling curve of pure iron with the allotropic forms of iron marked on it.
   (b)What are the important micro-constituents of iron and steel? Shortly describe each

6. (a) AISI type 304 stainless steel base plate may not be susceptible to intergranular corrosion, but its weldments definitely are. Why?

(b) State the advantages of Cu-Ni alloys over steel as the material of construction of hull for small boats.

7. (a) Why **martensitic stainless steel** is the most difficult stainless steel to weld. Which means should be employed to avoid failure of welded joint.

(b) Make a detailed report on the analysis of following **welding defects**:-

(i) Lamellar Tearing Solidification cracks (ii) Cold cracking or delayed cracking (iii) Reheat cracking or PWHT cracking.

8. Discuss new developments in **Impressed Current Cathodic Protection** (ICCP) employed for marine structures with specific reference to (a) hull condition management (b) Condition Based Maintenance (CBM) (c) Computer controlled multi-zone systems (d) Fine grain ICCP.

9. (a)Chemical tankers extensively use '**stainless steel** (SS)' for the construction of their cargo tanks. List various grades of stainless steels being for such constructions and

(b) Explain various types of defects usually observed in SS cargo tanks and precautions needed to prevent and methods which can be employed to rectify such defects.

A5

Sr. No. 8

EXTRA FIRST CLASS EXAMINATION (PART-A)

Subject: Advanced Electrical, Electronic and Control Engineering Knowledge

(Time allowed - 3hours)

India (2017) **Afternoon Paper** **Total Marks 60**

Note:
(i) All question carry equal marks.
(ii) Answer any six questions
(iii) The answers should be legible.

1. Based on the logic discuss the **protection provided for the alternator**, in case a fault occurs in the cable between the alternator and MSB. Co-relate such protection for distribution transformers.

2. With respect to **microcontroller 8051**, explain the following:
   a. Interrupt
   b. Interrupt service routine
   c. types of interrupts in 8051
   d. JUMP and CALL instruction

3. (a) What are the advantages and disadvantages of **electric propulsion** system? Draw schematic diagram and explain working of Ward-Leonard system used for diesel electric propulsion with its features?
   (b) Draw diagram and explain construction features and working of High Temperature Superconductor propulsion motor. What are the advantages and disadvantages of this type of propulsion?

4. (a) Mention the types of multimedia and special **cables** used for audio and video communication onboard. Explain in brief about specifications of these cables and its applications with reference to specific area onboard ship?
   (b) Describe the classification society requirements on cable laying on board the ship.

5. (a) What is **SCR**? Explain the working of SCR with reference to its V-I Characteristics, features and applications? Explain working of single phase front end

converter with reference to its diagram and waveforms? Derive the formula for average output voltage?

(b) What is DAC? What are its types & specifications? Explain in detail the working of binary-weighted ladder type and R-2R ladder type DAC? What are the application areas of DAC onboard ship?

6. (a) Why the **electric propulsion** is not so preferred in cargo ships as compared to ice breakers, offshore floating platforms, passenger vessels, cruise ship and ferries? Explain in detail the features of electric propulsion system used for cruise ship?

(b) What is polarization index and describe the procedure for checking the polarization index for a propulsion motor.

(c) Draw diagram, waveforms and explain working of PWM converter for electric propulsion onboard ship? How to change the speed of propeller using VFD? Give some example and show that, how it saves the energy?

7. (a) What is **Pulse width modulation**? What are the various digital triggering methods to generating pulses using microcontroller for controlling switching of IGBT, explain in brief?

(b) What is microcontroller? Explain its features with reference to architecture, instruction set, programming and applications onboard ship?

8. (a) What are the functions of **Power Management System**? Describe various types of protections involved in electric propulsion system? Draw diagram of interconnection of main propulsion components and explains its working in brief?

9. (a) Explain in detail the concept and applications onboard for **wireless sensor network**?

(b) What is smart sensor? What are its features and applications onboard ship? Write detail review of sensors used for process control applications onboard ship? Write a short note on Intelligent Sensor used for Environment Monitoring near port?

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A6

Sr. No. 8

EXTRA FIRST CLASS EXAMINATION (PART-A)

Subject: Environment Protection & Energy Management in the Maritime Industry

(Time allowed - 3hours)

India (2017) **Morning Paper** Total Marks 60

Note:
(i) All question carry equal marks.
(ii) Answer any six questions
(iii) The answers should be legible.

1. Optimization of **ship dimensions** is recognized as means to improve energy efficiency of ships. Discuss scope and impact of optimization of the following in improving energy efficiency of ships:- (i) Ship Size & Capacity; (ii) Service Speed; (iii) Principal Dimensions.

2. (a)Discuss with examples –Marine **Spatial Planning** for space and marine resources (b) Discuss how to plan for EBM (Ecosystem based management)

3. Reference (MARPOL) **Annex VI** discuss Compliance timeframes and issues regarding following

   (a).Ship Energy Efficiency Management Plan (SEEMP)

   (b).Energy. Efficiency Operational Indicator (EEOI)

   (c).Energy Efficiency Design Index (EEDI).As the aim of EEDI is to make more energy efficient vessels, there are many initiatives to design and build such vessels. Discuss the principles involved in design and construction of more efficient Vessels

4. Discuss **UNFCC & Kyoto Protocol** and its impact in shipping. Why developed countries like US not ratified the convention.
5. What are the developments in the usage of **sustainable marine renewable energy** resources to tap into the power of the wind, solar and tidal energy.

6. (a) Discuss **Anti fouling convention** (b) Discuss various alternatives to tin-based antifouling paints, with specific reference to the following types:- (i) Controlled Depletion Polymer (CDP) paint; (ii) Self-Polishing Copolymer (SPC) paint ; (iii) Hybrid TBT free paint ; (iv) Fouling Release paint.

7. Reference **Ballast water convention** highlight the need for the convention and various methods of ballast water exchange including their developments and current compliance requirements for existing ships.

8. (a) "**LNG** is the future fuel for shipping". Justify your views elaborating the cost, environment-friendliness, operational and maintenance perspectives.

(b) Discuss the technical developments in marine diesel engines to use LNG, LPG and Ethyl alcohol as fuels.

(c) Referring to the Code of Safety for Ships using Gases or other Low-flashpoint Fuels (IGF Code) from the IMO, describe the arrangements for storage, installation, monitoring and control of ships using gas and other low-flash points fuels.

9. Against the backdrop of new two stroke engines for ships meeting the future **environment compliance** requirements, discuss the following in details with their merits & demerits:-

a) Methanol as fuel.

b] Ultra-long- stroke engines.

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