B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVAL ARCHITECTURE—II

(2008 onwards)

Time : 3 Hours   Maximum : 100 Marks

Answer **all** questions.

1. (a) Draw and explain the Longitudinal and Transverse framing system of construction followed on ship building.

(15)

(*Or*)

(b) Draw and explain the general pumping and piping arrangement of general purpose oil Tanker for handing it's cargo.

(15)

2. (a) Draw and explain the midship section of tanker of combined framing system of construction.

(10)

(*Or*)

(b) Write short notes on :

(i) Ring Main system.

(ii) Sounding Pipe.

(10)

3. (a) Draw and explain water cooled stern tube used on board a vessel.

(15)

(*Or*)

(b) Draw and explain the parts of ships specially strengthened and stiffened to resist panting and pounding stresses.

(15)

4. (a) Draw and explain semi-balanced Rudder fitted in Twin-screw ship.

(10)

(*Or*)

(b) Explain the stage by stage process carried out in the block-construction of pre fabrication followed in ship building.

(10)

5. (a) A ship 150 m long floats at draughts of 8.2 m. frd. and 8.9 m aft. MCTC 260 t.m. TPC 28 and LCF 1.5 m aft of midships. It is necessary to bring the vessel to an even keel and a double bottom tank 60 m frd of midships is available. Calculate the mass of water required and the final draughts.

(15)

(*Or*)

CP-3411

(b) A ship of 8,000 tonne displacement has its centre of Gravity 4.5 m above the keel and KM = 5 m when a rectangular tank 7.5 m long and 15 m wide contains sea water. A mass of 10 tonne is moved 12 m across the deck. Calculate the angle of heel.

   (i) If there is no free surface of water.

   (ii) If the water does not completely fill the tank.

(15)

6. (a) Construct the GZ curve for M.V. Vijay when KG (Solid) = 6.1 m, FSM = 3050 tm. W = 15400 t, KM = 8.034 m. Find the maximum GZ.

(10)

Take	θ	5°	10°	20°	30°	45°	60°	75°
	KN	0.796	1.575	3.112	4.641	6.546	7.615	7.923

(*Or*)

CP-3411

(b) Define the term "Grain in Bulk". Explain the Hazards while carrying Grain in Bulk in a ship for a voyage.

(10)

7. (a) The Righting moments of a ship at angle of heel of 0, 15°, 30°, 45°, and 60° are 0, 1690, 5430, 9360 and 9140 t.m. respectively. Calculate the Dynamical stability at 60°.

(10)

(*Or*)

(b) Write short notes on :

(i) Free surface effect and effect of Beam on FSE.

(ii) Angle of holl and actions to be taken by the ship's crew to control angle of holl.

(10)

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8. (a) A box barge 100 m long, 12 m beam and 4 m draft has a compartment at the extreme fore and 8 m long, sub-divided by a horizontal water tight flat 2 m above the keel. The CG is 3 m above the keel. Calculate the end draughts if the compartment is bilged above the flat.

(15)

(*Or*)

(b) A rectangular barge of length 40 m and light displacement 200 t. has five identical holds into which bulk cargo is loaded and trimmed level as follows 360 t in No.1, 720 t in No.2, 720 t in No.4 and 360 t in No. 5, No. 3 hold is left empty. Draw SF and BM diagrams to scale.

(15)

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CP-3411

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAUTICAL PHYSICS AND ELECTRONICS—I

(Up to 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** the questions.

$(5 \times 15 = 75)$

1. (a) State Kepler's laws of planetary motion

(3)

(b) Give the method of finding the resultant of system of coplanar forces.

(7)

(c) Find the magnitude and the direction of the resultant force of the two forces $\vec{F_1} = 2\vec{i} - 3\vec{j}$ and $\vec{F_2} = \vec{i} + 2\vec{j}.$

(5)

(*Or*)

(d) Explain Newton's experimental law for the rebound of elastic bodies.

(6)

(e) Obtain the relation between the initial and final velocities for the direct impact of two spheres.

(6)

(f) A ball of mass 10 kg, moving at 5m sec^{-1}, overtakes another of mass 4 kg, moving at 2m sec^{-1} in the same direction. If $e = ½$, find the velocities after impact.

(3)

2. (a) Distinguish Adiabatic change from Isothermal change.

(3)

2

(b) Find expressions for work done in an adiabatic process.

(8)

(c) If the temperature changes by 10° K in an adiabatic process, find the workdone in one mole of the gas. Take $\gamma = 1.4$.

(4)

(*Or*)

(d) Describe the Carnot's cycle of a reversible engine and find expressions for the total work done in a cycle.

(8)

(e) Find an expression for its efficiency.

(4)

(f) Find the efficiency of a Carnot's engine working between 127ºC and 27ºC .

(3)

3. (a) Describe acoustic wave propagation in rod.

(5)

(b) How is the velocity of sound in a rod experimentally measured ?

(7)

(c) Explain reflection and refraction of sound wave at the interface of two media.

(3)

(*Or*)

(d) Give the theory of Doppler effect.

(8)

(e) Mention its applications   (3)

(f) Two trains are approaching each other with speed 60km/hr and 80 km/hr. A whistle of 3000 Hz is sounded by the first train. Calculate the frequency of the note heard by a listener in the second train.

   (i)   before and

   (ii) after the trains pass each other (speed of the sound 332 m/sec).

(4)

4. (a) Explain Hysterisis. (5)

   (b) What is known as declination ? (4)

   (c) How is declination experimentally measured ?

(6)

(*Or*)

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(d) Explain dip and angle of dip.

(4)

(e) How is it measured using dip circle ?

(7)

(f) The values of the apparent angles of dip in two planes at right angles to each other are 30° and 45°. Calculate the true value of angle of dip at the place.

(4)

5. (a) Distinguish N-type semi-conductor form P-types semiconductor.

(3)

(b) How is a semi conductor diode formed ?

(4)

(c) Give the principle, construction and working of a full-wave rectifier circuit.

(8)

(*Or*)

(d) Give the construction of junction transistors.

(4)

(e) Explain CB and CE configurations.

(4)

(f) Discuss the static characteristics of CE configuration.

(7)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVIGATION–I

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Extract of NAUTICAL ALMANAC 1992 and NORIE'S tables permitted.

Section - A   (2 × 15 = 30)

Answer any **two** questions from this Section.

All questions carry equal marks.

1. (a) Define the following with suitable diagrams as required.

   (i) Prime Meridian.

   (ii) Equator.

   (iii) DMP.

   (iv) Geographical mile.

   (v) Estimated position.

   (15)

2. On 6th March a ship in posn 46deg. 36'S 175 deg. 34'E steamed as follows :

Time	Co.C	Deviation	Leeway	Wind	Speed
1200	150	5deg E	3 deg	SW×W	8 kts
1600	140	4 deg E	5 deg	SW	8
2000	120	3 deg E	Nil	SW	7.5
2400	120	3 deg E	Nil	SW	6.5
0400	100	1 deg E	Nil	S	8
0800	095	Nil	Nil	S	8
1200	095	Nil	Nil	S	8

(15)

Variation 10 deg. E throughout. Find the DR position at NOON on 7th March and if the observed posn then was 48deg. 14.3'S 178deg. 6.5'E, find the set and drift.

3. (i) Two ships A and B doing equal speeds are both in Lat. 30 deg S, B being to the east of A. The d'long between the two ships is 2 deg. 30'. Ship A steers 150 deg (T), while B steers 210 deg. (T). Find the latitude reached when they are 20 miles apart.

(9)

(ii) A vessel sails on a course 144 deg (T) from Lat. 15deg. 40' E and makes a d' long of 47 deg.50'. Find the distance covered and the latitude reached.

(6)

Section - B   (3 × 15 = 45)

Answer any **three** questions from this section.

All questions carry equal marks.

4. Explain Keppler's laws of planetary motion.

5. Explain with suitable sketches the occurrences of 3 types of Solar eclipses.

6. Find the initial and final course and the distance along the composite track from A : 51 deg 20′N 010deg. 00′E to B : 52 deg. 00′N 155 deg. 00′E having a ceiling latitude of 53 deg. N.

7. (i)   Find by Mercator's principle the posn. Arrived if a ship sailed a course of 301deg (T) for 1408 M from position 00deg. 04′S 178deg. 20′W.

    (ii) By plane sailing principle find the course and distance from 20deg. 10′N 179deg. 40′W to 13deg. 40′N 178deg. 10′E.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010
Nautical Science
SHIP OPERATION TECHNOLOGY—I
(Upto 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

1. (a) Write short on :

   (i) Special Purpose Ship.

   (ii) Reefer carrier.   (10)

(*Or*)

   (b) Explain the following terms :

   (i) Tween Deck.

   (ii) Keel.

   (iii) Roller Fairlead.

   (iv) Propeller.

   (v) Freeboard.

                                           (10)

2. (a) (i) Describe the construction and purpose of Life Buoy.

(5)

(ii) Describe the purpose and use of line throwing appliance.

(5)

(*Or*)

(b) Describe the construction of totally enclosed life Boat, Draw the neat sketch and label its parts.

(10)

3. (a) Describe any four types of fire extinguishers ? Explain their principle of working and types of fires it is used ?

(10)

(*Or*)

(b) (i) Describe various equipment contained in Fireman's outfit and their use.

(5)

(ii) Write a short note on Self contained breathing apparatus.

(5)

4. (a) (i) List the any 10 equipments carried on the Life Boat ?

(5)

(ii) Explain the launching procedures of a Life Boat.

(5)

(*Or*)

(b) (i) List any 10 L/raft equipments.

(5)

(ii) Explain the launching procedures of a Life raft ?

(5)

5. (a) Briefly explain the following terms.

(i) Whipping.

(ii) Eye Splicing.

(iii) Right Handed Lang's Lay.

(iv) Lay Handed Lang's Lay.

(v) Back Slice.

(10)

(*Or*)

(b) What is the difference between synthetic and natural fibre rope ?

(5)

(c) Explain care and maintenance of steel wire rope.

(5)

6. (a) Draw the diagram of a simple derrick and label its parts.

(10)

(*Or*)

CP-3384

(b) Draw the diagram of Union Purchase and label its parts.

(10)

7. (a) (i) What is the difference between a block and a tackle ?

(3)

(ii) Draw a block and label its parts ?

(3)

(iii) Explain briefly any two type of blocks ?

(4)

(*Or*)

(b) Briefly explain the following terms :

(5 × 2 = 10)

(i) Elastic limit.

(ii) Yield point.

(iii) Chain stopper.

(iv)   Velocity ratio.

(v)   Turn buckle.

8. (a)   Describe the advantages of primer before applying the final finish coat ?

(5)

(*Or*)

(b)   Name any 5 painting defects. Explain any two Painting effects

(5)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

COLLISION PREVENTION AND MARINE COMMUNICATION—I

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 25 Marks

$(5 \times 5 = 25)$

Answer **all** questions.

1. (a) Define the following as per Colregs :

   (i) Fishing vessel.

   (ii) Vessel constrained by draft.

   (iii) Short and prolonged blast.

   (iv) Side Lights.

   (v) Vessel not under command.

(*Or*)

(b) What are the precautions the vessel should take in restricted visibility ?

2. (a) What is safe speed ? Briefly explain the factors effecting safe speed.

(*Or*)

(b) How will you asses a over taking vessel by day and night ? What actions will you take as a stand on vessel ?

3. (a) Define a head on situation. What action will you take in a crossing situation if you are a give way vessel ?

(*Or*)

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(b) Describe the light and shapes exhibited by the following vessels :

    (i)   Vessel not under command.

    (ii)   Vessel engaged in fishing.

    (iii) Towing vessel.

4. (a) (i)   What care you will take while using VHF communication for collision avoidance ?

    (ii)   Describe the positioning of Masthead lights and sidelights.

(*Or*)

(b) (i)   A power driven vessel will keep out of way of which all vessels ?

    (ii)   A sailing vessel will keep out of way of which all vessels ?

5. (a) (i) Explain how will you salute a Naval vessels ?

(ii) List out various ensigns and the type of ships entitled to fly particular Ensign and location.

(*Or*)

(b) Write the meaning of the following signaling flags :

(i) Oscar.

(ii) Golf.

(iii) Echo.

(iv) Juliet.

(v) Qubec.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVAL ARCHITECTURE—I

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 100 Marks

Answer **all** questions.

Use of Hindship tables permitted.

1. (a)   Define the following with a diagram.

(i)   Moulded depth.

(ii)   Sheer.

(iii) DWT Available.

(iv)   Freeboard.

(v)   Rise of floor.

(15)

(*Or*)

(b) Draw and explain the various special features of O.B.O carrier.

(15)

2. (a) Draw and state the special features of a passenger ship.

(10)

(*Or*)

(b) Write the functions of following.

(i) Keel.

(ii) Double Bottom.

(iii) Tween Deck.

(iv) Cargo Gears.

(v) Forcastle deck.

(10)

2

3. (a) Write the features of the following parts of a ship with a needed diagram.

   (i) Steering gear compartment.

   (ii) Cargo Hold.

   (iii) Forepeak compartment.

   (iv) Superstructure.

   (v) Deep tanks.

   (15)

   (*Or*)

   (b) What do you understand by General arrangement plan. Draw and explain various features of G/A. Plan.

   (15)

4. (a) Write short notes on :

(i) Types of weld joints.

(ii) Advantages of welding over Riveting.

(iii) Gas welding.

(10)

(*Or*)

(b) Draw and explain the Electric arc welding. Differentiate AC and DC welding.

(10)

5. (a) Explain various tests that carried out on the ship building materials to know their suitability for shipbuilding.

(15)

(*Or*)

CP-3386

(b) What do you understand by weld joints. Draw and specify various types of weld joints that followed in shipbuilding.

(15)

6. (a) Give the meaning of the following use necessary diagram.

(15)

   (i)   WPA Co-efficient.

   (ii)   DWA.

   (iii) TPC.

   (iv)   Freeboard.

   (v)   Buoyancy.

(*Or*)

CP-3386

(b) Define the following with a necessary diagram.

(15)

    (i)   Centre of gravity.

    (ii)   Statical Moment.

    (iii) Angle of Loll.

    (iv) Fluid GM.

    (v)   Centre of pressure.

7. (a) A vessel displacing 8000t, has a rectangular deep tank 10m long, 8m wide and 9m deep full of SW. The KM is 7m and KG 6.2 m. Find the GM when $\dfrac{1}{3}$ of the tank is pumped out.

(10)

(*Or*)

CP-3386

(b) A Ship of 4000 tonne displacement has its centre of gravity 6m above the keel. Find the new displacement and position of the centre of gravity when masses of 1,000, 200, 5,000 and 3,000 tonnes are added at positions 0.8, 1.0, 5.0 and 9.5m above the keel.

(10)

8. (a) A ship 140 m long and 18 m beam floats at a draft of 9 m. The immersed cross-sectional areas at equal intervals are 5,60,116, 145,152, 153,151,142,85 and 0 m^2 respectively.

Calculate :

  (i) Displacement.

  (ii) Block co-efficient.

  (iii) Mid ship area co-efficient.

  (iv) Prismatic co-efficient.

      (*Or*)

(b) Draw and explain various states of Equilibrium condition of a ship.

            (10)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS–I

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

$(5 \times 15 = 75)$

Answer **all** questions.

1. (a) Define the following terms.

    (i)   Melting point.

    (ii) Elastic Limit.

    (iii) Compressive stress.

    (iv) Triangle law of forces.

(8)

(b) Draw the SF and BM diagram for a Cantilever 1.75 m long carrying a uniformly distributed load of 1200 kg/m run over a length of 1.2m from the fixed end.

(7)

(*Or*)

(c) Define the following term.

    (i)   Shear.

    (ii)   Fatigue.

    (iii) Polygon law of Forces.

    (iv) Factor of Safety.

(8)

CP-3387

(d) A brass bar having a cross section of 1.5 cm² and a length of 1m is subjected to pull of 1.5 tonnes. Find the following :

    (i)   Elongation.

    (ii)   Stress.

    (iii) Strain.

    (iv) Factor of Safety.

Take modulus of elasticity for brass as 1.0×10^6 kg/cm² and ultimate stress as 600N/mm².

(7)

CP-3387

2. (a) Define the following :

(i) Zeroth Law of Thermodynamics.

(ii) Capillarity.

(iii) Dynamic Viscosity.

(6)

(b) Find the diameter of a pipe length 2000 m.when the rate of flow of water through the pipe is 200 litres/sec and the head Lost due to friction is 4m. Take the value of C= 50 in Chezy's Formula.

(9)

(*Or*)

　　CP-3387

(c) Water is flowing through a pipe of diameter 20 cm and 10 cm at section 1 and 2 respectively. Rate of flow is 35 litres/sec. Section 1 is 6m above datum and section 2 is 4m above datum. If pressure at top section is 36.24N/mm^2, find the pressure at the bottom section.

(9)

(d) Define the following terms :

    (i) Laminar flow.

    (ii) Compressible flow

    (iii) Kinematic viscosity.

    (iv) Discharge.

(6)

3. (a) State and prove Bernoulli's Theorem.

(9)

CP-3387

(b) Write short notes on any one hydraulic equipment.

(6)

(*Or*)

(c) A reversible engine operates on the Carnot cycle between temperature levels of 700 K and 298 K.

(i) What is the percentage of the heat taken in that is converted to work ?

(ii) At what compression ratio must a reversible Otto cycle Engine be run to obtain the same thermal efficiency as in the above Carnot Engine. Take $\gamma = 1.4$.

(9)

(d) (i) Distinguish between Otto cycle and Diesel cycle.

(ii) Define Thermodynamics system. Explain its different types.

(6)

4. (a) Derive an expression for the equivalent capacitance of three capacitors C_1, C_2 and C_3 are connected in series and also in parallel.

(7)

(b) An Iron Ring of cross section of 3 cm² and mean diameter of 25cm. An air gap of 0.4 mm has been cut across the section of the ring and the ring is wound with a coil of 200 turns and the current of 2A produces the flux of 0.24 mwb. Find out the relative permeability of the Iron Ring.

(8)

(*Or*)

CP-3387

(c) Three resistors 4Ω, 6Ω and 8Ω are connected in parallel across 36 volt DC supply. Find the current through each resistor.

(9)

(d) Explain the following terms, and give their units.

   (i)   Mmf

   (ii)   Reluctance.

   (iii) Flux density.

(6)

5. (a) Write short notes on the following.

   (i)   Sewage treatment plant.

   (ii)   Fire Pump.

   (iii) Incinerator.

   (iii) Jacket cooling water system.

(8)

(b) Explain the working of an Oily water separator.

(7)

(*Or*)

(c) Explain in brief the various systems required to run the main engine.

(8)

(d) Explain the working of a 2 stage reciprocating Air Compressor with various essential components.

(7)

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CP-3387

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

COMPUTER PROGRAMMING AND UTILITIES

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

$(5 \times 15 = 75)$

Answer **all** questions.

All questions carry equal marks.

1. (a) (i) Draw the block diagram of a digital computer. Explain the functions of each component.

(10)

(ii) Write a note on special purpose computers.

(5)

(*Or*)

(b) (i) Discuss the different types of computers.

(10)

(ii) Write a note on stored program concept.

(5)

2. (a) (i) Summarize the rules of constructing the PRINT statement. Describe the role of delimiter comma in this statement.

(5)

(ii) Explain the action of STOP and END Commands in a BASIC Program.

(5)

(iii) What is the function of a DIM statement ? When is it not required ?

(5)

(*Or*)

CP-3388

(b) (i) Write and explain the syntax of IF–THEN–ELSE Command.

(5)

(ii) What is a library function ? Explain any four Library functions with example.

(5)

(iii) How a subroutine may be invoked by a program ? Explain the way the control can be returned from the Subroutine to the calling program part.

(5)

3. (a) (i) Define the term Data, Record, Field, File and database.

(5)

CP-3388

(ii) Write a procedure to create a database known as "Mail" for preparing mailing list. Let the records contain the following fields.

    (a)   Name with initial.

    (b)   Address including door number and street.

    (c)   City or town and

    (d)   Pincode.

(6)

(iii)   List the advantages between EDIT and Browse.

(4)

(*Or*)

(b) (i) State the difference between INDEX and REINDEX.

(4)

(ii) What do you understand from data arithmetic ? Illustrate all the date arithmetic commands with examples.

(6)

(iii) Explain the syntax of DO WHILE statement and explian with suitable example.

(5)

4. (a) (i) Explain block commands in wordstar.

(7)

(ii) Explain Page formatting commands in wordstar.

(8)

(*Or*)

(b) (i) Explain Mail merge facility available in Wordstar.

(7)

(ii) Explain spell star facility available in Wordstar.

(8)

5. (a) (i) What is a speardsheet ? Enumerate the advantages of using electronic worksheet over page ledgers.

(7)

(ii) Explain database commands in a spread sheet with suitable examples.

(8)

(*Or*)

(b) (i) What are functional keys ? Specify the purpose of the following function keys with reference to spreadsheet.

(a) F1 (b) F4

(c) F6

(6)

(ii) How do you creat a graph in spread sheet ? Illustrate with suitable example.

(9)

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CP-3388

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAUTICAL MATHEMATICS—III

(Upto 2007 Batch)

Time : 3 Hours　　　　　　　　　　Maximum : 100 Marks

Answer any **five** questions.

$$(5 \times 20 = 100)$$

1. (a) Apply Cauchy's general principle of convergence prove that

$$1 - \frac{1}{2} + \frac{1}{3} - \dots + (-1)^n \frac{1}{n} + \text{ is convergent.}$$

(b) Show that in $0 \leq x \leq \pi$

$$x\,(\pi - x)\,\frac{\pi^2}{6} - \left(\frac{\cos 2x}{1^2} + \frac{\cos 4x}{2^2} + \frac{\cos 6x}{3^2} + \dots \right)$$

2. (a) Show that

$$\beta\,(m,n)=\int\limits_{0}^{\infty}\frac{x^{m-1}}{(1+x)^{m+n}}\,dx$$

(b) Show that $\displaystyle\int\limits_{0}^{\infty}\frac{x^{8}\,(1-x^{6})}{(1+x)^{24}}\,dx=0$.

3. (a) Show that if L $[f(t)=F(s)$ then

(i) $L\left[e^{-at}\,f\,(t)\right]=F\,(s+a)$

(ii) $L\left[e^{at}\,f\,(t)\right]=F\,(s-a)$.

(b) Find $L^{-1}\left[\dfrac{s^{2}-s+2}{s\,(s-3)\,(s+2)}\right]$.

4. (a) Derive Bessel's differential equation.

 (b) Show that

$$\frac{2n}{x} J_n (x) = J_{n-1} (x) + J_{n+1} (x).$$

5. Find the series solution of the Legendre's equation.

6. Find the solution of the one dimensional heat equation.

$$\frac{\partial u}{\partial t} = a^2 \frac{\partial^2 u}{\partial x^2}.$$

7. (a) Show that $f(z) = |z|^2$ is differentiable only at the origin.

CP-3389

(b)   Show that $u = \dfrac{1}{2}$ log $(x^2 + y^2)$ is harmonic and determine its conjugate. Also find $f(z)$.

8.   (a)   Find the image of the circle $|z-1| = 1$ in the complex plane under the mapping $w = \dfrac{1}{z}$.

(b)   Find the residue of $f(z) = \dfrac{z^2}{(z-1)^2(z+2)}$ at each of the poles.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVIGATION —II

(Up to 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

EXTRACT OF NAUTICAL ALMANAC 1992 AND
NORIE'S TABLES PERMITTED

Answer any **five** questions.

All questions carry equal marks.

1. Explain any **five** terms with suitable sketches.

$(5 \times 3 = 15)$

(a) Equinoctial.

(b) Visible horizon.

(c) Prime vertical.

(d) Observer's meridian.

(e) Local hour angle (LHA)

 (f) Ascending node and Descending node.

(g) Summer Solstice.

2.   (a)   (i)   Explain Nutation and the effects of nutation.

(9)

(ii) Explain the effects of precession.

(6)

(*Or*)

(b)   (i)   Explain the significance of international date line and explain how the clocks are adjusted at a sea ?

(6)

(ii) On 23rd September 1992, in DR 23 degree 40′N 161 degree 56′ E, the sextant meridian altitude of the sun's LL was 66 degree 10.6′. If IE = 2.3′ on the arc and HE = 10.5m, find the latitude and the PL.

(9)

3. On 31st of August 1992, in DR 00 degree 01′ N 174 degree 56′ W, the moon rose bearing 102 degree (C). If variation was 1.7 degree E, find the deviation.

(15)

4. (a) On 29th November 1992, in DR 36 degree 08′S 096 degree 40′E, the sextant altitude of the Moon's UL near the meridian was 68 degree 53.7′ at 09 h 18m 24 s chron time (error 05 m 01s slow). If IE was 0.2′ off the arc and HE = 14m, find the direction of PL and a position through which it passes.

(15)

(*Or*)

(b) On 22 September 1992, PM at ship in DR 60 degree 10′ N 092 degree 27′ E, the sextant altitude of star ARCTURUS was 25 degree 01′ when chron (error 05 m 01s slow)

Showed 00 h 46 m 31s. If IE was 0.2′ on the arc and HE was 17m, find the direction of the PL and the longitude where it crosses the DR lat.

(15)

5. In DR 60 degree 41′ N 052 degree 27′ E an intercept of 2.1′ Away from AZ 225 degree was obtained. At the same time, an ex-meridian gave an obs. Lat of 60 degree 36.2′N and AZ of 357 degree (T). Find the position of the ship.

(15)

6. (a) (i) Explain North seeking gyroscope.

(7½)

(ii) Name the three degrees of freedom of a Gyro. Explain briefly the gyroscopic inertia and precession.

(7½)

(*Or*)

(b) (i) Briefly explain the characteristics of RADAR set.

(7½)

(ii) Briefly explain spurious echoes.

(7½)

7. On 1st September 1992, AM at ship in DR 18 degree 00' N 178 degree 11' E the sextant altitude of the polestar was 18 degree 47.4' at 05 h 21m 08s by chro. (error 01 m 18 s slow). HE = 12.5 m. IE = 1.6' on the arc. Find the direction of PL and a position through which to draw it. If the AZ 001 degree (C), and Var was 1.3 degree E, find the deviation.

(15)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

SHIP OPERATION TECHNOLOGY—II

(Up to—2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

1. (a) With respect to the carriage of bulk (or) packaged

    dangerous goods explain each of the following ?

    (15)

    (i) EmS No.

    (ii) MFAG No.

    (iii) UN No.

(*Or*)

(b) (i) List the main heading found under an EmS entry.

(10)

(ii) List the principal sources of information available when carrying any type of Dangerous Goods cargo.

(5)

2. (a) A general cargo vessel is loading a heavy lift utilizing ships gear. Outline the precaution to be taken to minimize the dangers of the following. (Write at least two)

(10)

(i) the crew

(ii) the vessel.

(iii) the cargo.

(*Or*)

CP-3391

(b) Define the following Indian dock labour regulations.

(10)

   (i) Responsible person.

  (ii) Thorough examination.

3. (a) Define the following anchor terms : (10)

    (i) Anchor Aweigh.

   (ii) Cockbill.

  (iii) Foul Anchor.

   (iv) Surge.

   (v) Walk back.

(*Or*)

(b) (i) Draw and label the parts of stockless anchor.

(5)

(ii) What are the factors to be considered when determining an anchorage position ?

(5)

4. (a) Explain with simple diagram of Running moor.

(10)

(*Or*)

(b) As officer of the watch on a vessel at anchor, you found that another vsl is dragging its anchor and is in fact dragging down towards your own vsl ? What sequence of actions would you expect to go through ?

(10)

5. (a) Explain with simple diagram how will you berth a vessel with wind onshore and abeam.

(10)

(*Or*)

CP-3391

(b)   Define the following. (10)

    (i)   Smelling the bottom.

    (ii)   Squat.

6.   (a)   When advised of impending heavy weather, imminent, what actions would you take with respect to the following ? (Write atleast two).

(10)

    (i)   Stability issues.

    (ii)   Cargo security.

    (iii)   Navigation safety.

    (iv)   Deck security.

(*Or*)

CP-3391

(b) Draw and explain how will you recover a life boat in heavy weather.

(10)

7. (a) List the procedure for painting shipside in the dry dock with reference to cleaning, surface preparation weather conditions, spray painting.

(10)

(*Or*)

(b) Write short notes on the following :

(i) Anti-fouling paints.

(ii) Method of controlling corrosion in steel.

(10)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

SHIP MASTERS BUSINESS

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 100 Marks

Answer any **five** questions.

(5 × 20 = 100)

1. A voyage charter vessel on Port charter party clause arrives Chennai harbour on january 2010 at 1800 hours and drops anchor and is brought to the berth on 08 January 2010 at 1200 hours. Notice of readiness is given at 1600 hours on 08 January 2010. The ship has to load 12000 tons of cargo. The loading rate is 1000 tons per day of 8 hours working. 10 and 17 january 10 are Sundays. 14-16 January 2010 are Pongal Holidays. The Anchorage charges are 1000 $ / day and 500 $ for

less than 12 hours. Berth charges are 2000 $ / day. Day reckoning from 0001 to 2400 hours. Loading is at the rate of 1000 tons per 8 hours of working.

Calculate the lay time, Lay days. Anchornge and Port dues for the ship's stay at port.

2. What are the evil, Criminal and tortious liabilities of the master of a vessel.

3. (a) Define :

   (i) Arrived ship.

   (ii) Notice of Readiness

   (iii) Passenger.

   (iv) Super numarary.

   (v) NLS.

   (b) Reputation of sea fares convention No 23/1926

CP-3392

4. (a) What are the provision of MSA Sec 237-282 regarding Special Trade passenger Ships.

   (b) What are the salient features Athens Convention

5. (a) What are the salient features of collision Convention 1952.

   (b) What considerations must be taken into account before offering tow to a disabled vessel ?

   (c) When does a towage become a salvage ?

CP-3392

6. (a) What are the reasons for classification of Ships ?

   (b) What are the duties of P and I club.

7. (a) How are shops registered in India ?

   (b) State the salient features of seamer's articles of agreement.

8. (a) Compare Voyage charter with Time charter.

   (b) What is meant by maritime Lien ? Explain maritime contractual liens.

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CP-3392

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

COLLISION PREVENTION AND MARINE COMMUNICATION—II

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 25 Marks

Answer **all** questions.   (5 × 5 = 25)

All question carry equal marks.

1. (a) What are the obligations of a vessel following

a   Narrow Channel.

(*Or*)

(b) Draw and write down its characteristics of the

following.

(i) Starboard hand mark.

(ii) Preferred channel to starboard.

2. (a) Explain the terms :

   (1) Short Blast

   (2) Prolonged Blast.

   (3) Wing-In-Ground Craft (WIG)

   (b) Describe the characteristics for the various shapes (shapes displayed during the day)

   (*Or*)

   (c) (i) Explain the term "Safe Speed". What are the factors considered in determining Safe Speed.

   (ii) List the Lights and shapes displayed by a power driven vessel more than 50 meters in length. What are the minimum ranges of the lights displayed.

CP-3393

3. (a) (i) Explain in brief the functions of a GPS system.

   (ii) What do you mean by DSC.

(*Or*)

   (b) (i) Give a brief description about GMDSS Sea Areas.

   (ii) What do you mean by Marine Safety information (MSI) system.

4. (a) (i) Write down the procedure for transmission of a DSC distress relay behalf of someone else.

   (ii) How do you cancel an inadvertent distress alert (distress alert sent by mistake)

(*Or*)

   (b) Explain the operation of an EPIRB

CP-3393

5. (a) What are the Distress signals mentioned in annex IV of INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA.

(*Or*)

(b) Write briefly how the running fix method is used for determining the position of a ship.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVIGATION—III

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

EXTRACT NAUTICAL ALMANAC 1992 AND NORIE'S
TABLES PERMITTED

Part - A   (3 × 10 = 30)

Answer **all** questions.

1. (a)   To an observer in the northern hemisphere,
in May of a certain year, the sun bore
059 (T) at theoretical rising, suns declination
20 degree 10′N. The vessel then steered
050 (T) × 140 miles till sun set, during which
period the sun's declination altered by
5′. Calculate the bearing of the sun at
theoretical sunset.

(10)

(*Or*)

(b) (i) Define twilight. Explain Civil, nautical and astronomical twilights.

(5)

(ii) Explain why twilights lasts longer in the higher latiduds than in lower latitudes ?

(5)

2. (a) Write short note on :

(i) M and MS notices.

(ii) Ocean passages of the world.

(10)

(*Or*)

(b) What are the four elements you will consider for passage planning Explain each of them.

(10)

3. (a) (i) What rise of tide will be required to give her a clearance of 2.0 m over a shoal on a day of LW 0.5 m ?

(ii) What will the echo sounder reading if transducer is 5.8 m below water ?

(10)

(*Or*)

(b) (i) What is "LUNISOLAR tide" and SPRING tides ?

(ii) Find the height of tide at Ullapool on 25th February 1987 at 1419 GMT.

(10)

Answer **all** questions.

4.   (a)   Find the distance, initial co. and final co. along

the composite G.C. track from A : 45 degree 54'S

170 degree 45′ E To B : 49 degree 06′S 075 degree

50′ W, Maximum limiting lat : 55 degree S.

(*Or*)

(b)   Find the G.C. distance, initial co. and final co.

from

A : 10 degree S 150 degree W to B : 40 degree N

and 160 degree E.

5. (a) Using DR 60 degree N 090 degree 30′E, star Polaris gave an obs. Lat. Of 59 degree 58.4′N bearing 002 (T). With this Obs. Lat, star BETULGEUSE gave an Obs. Long. Of 090 degree 38′E and an AZ of 045 (T). Find the position of the ship.

(*Or*)

(b) A ship in DR 24 degree 12′S, 102 degree 04′ E obtained a sight which gave azimuth 074 (T), intercept 3.5 miles TOWARDS. She then sailed 355 (T) × 16 miles when another sight worked with the DR position carried forward gave AZ 335 (T), intercept 6 miles AWAY. Find the ship position at the 2nd observation.

6. (a) On 25th February AM at ship in DR 20 degree 04′S 090 degree 04′W the sextant altitude of the moon's UL was 52 degree 26.8′ at 02h 56 m 17s chron. Time (error 04 m 01s fast) If HE was 19 m and IE was 0.6' off the arc, calculate the direction of PL and a position through which it passes.

(*Or*)

(b) On 30th Novermber, AM at ship in DR 34 degree 57′ S 119 degree 50′E, the sextant altitude of MARS near the meridian was 13 degree 23.1′ at 08h 00m 39s chron. Time (error 05 m 01 s slow). If HE was 17m and IE was 0.4′ on the arc, Find the direction of the PL and a position through which it passes.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010
Nautical Science
SHIP OPERATION TECHNOLOGY–III

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

$(5 \times 15 = 75)$

1. (a) Write down the any two major ports of India and explain the cargo handled by them.

    (15)

(*Or*)

(b) You are going to load steel billets. How do you go about stowage and securing of steel billets.

    (15)

2. (a) (i) Explain the principle and errors of sextant.

(12)

(ii) Explain the uses of Azimuth mirror.

(3)

(*Or*)

(b) (i) Explain different types of purchases with suitable diagrams.

(10)

(ii) Mention any five knots and briefly explain their uses.

(5)

3.   (a)   What checks you will carry out prior departure
           from a port.

(10)

    (b)   Define the following terms (with diagram) :

         (i)   Advance.

         (ii) Transfer.

         (iii) Tractical diameter.

(5)

(Or)

3   CP-3395

(c) Manover board in your v/l. What procedures you will follow ?

(9)

(d) Explain standing moor with diagrams. (6)

4. (a) Your v/l is in a port and you are OOW. S' man is reporting you that he saw smoke coming out from one of the cabins. Action ?

(15)

(*Or*)

(b) (i) Explain IAMSAR. (10)

(ii) What are the various alarms on board a ship ?

(5)

5. (a) Your ship is on her way to Dry dock. What safety precautions you will observe prior entering drydock ?

(15)

(*Or*)

(b) What is classification society ? What is the role of classification society in enhancing the safe operation of ships ?

(15)

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CP-3395

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

MARINE MANAGEMENT

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.   (5 × 15 = 75)

All questions carry equal marks.

1. (a) Explain various types of decision making and process of decision making.

(*Or*)

    (b) Give short note on :

        (a) Monopoly.

        (b) Perfect competition.

        (c) oligopoly.

2. (a) Critically evaluate different marketing concepts followed by a business organisation.

(*Or*)

(b) Explain the merits and demerits of written and oral communication.

3. (a) Explain selection process.

(*Or*)

(b) Discuss various types of maintenance.

4. (a) Explain the importance of operation research techniques in business decision making.

(*Or*)

(b) "Industrial relation is very weak in Indian industries"–Comment.

5. (a) Explain the usefulness of management policy in strategy formulation.

(*Or*)

(b) "Concentration of economic power in the hands of few"–Do you Agree ? Justify.

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3

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

MARITIME LAW—II

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 100 Marks

Answer any **five** questions.

All questions carry equal marks

$(5 \times 20 = 100)$

1. (a) Discuss the major differences in the contract of carriage of goods as per the Hague, Hague-Visby and Hamburg rules.

(*Or*)

(b) What is a "Note of protest" ? List the occasions when a note of protest will be made.

2. List the factors prior to :

   (a) Accepting a salvage tow and offering to tow another vessel on a salvage.

   (b) Discuss as to when a salvage ends and towage begins and, when the towage ends and salvage begins.

   (*Or*)

   (c) Define seaworthiness. Discuss the implications of unseaworthiness viz-a-viz M.S. Act, Marine insurance, Cargo insurance and contract of carriage of cargo.

3. Differentiate between the following :

   (i) Innocent passage and Transit passage as per UNCLOS III.

   (ii) Piracy and Armed robbery.

CP-3397

(iii) Trip charter and Period charter.

(iv) Maritime Lien and Possessary Lien.

(v) Demurrage and Detention.

(*Or*)

(b) List and explain the principles of Marine Insurance

4. (a) What are the advantages of Multimodal transportation ?

(b) Discuss the role of MTO (Multipurpose Transport Operator) and her liabilities and immunities.

(c) Discuss briefly as to how a container from interior of a state is transported to interior of another state.

(*Or*)

State the provision of M.S. Act 1958 concerning the following :

(d) Articles of Agreement for seamen.

(e) Unseaworthy ships and unsafe ships.

(f) Entries to be made in the OLB (Official Log Book)

5. (a) What are the rights and duties of salvor as per International. Salvage Convention 1989 ?

CP-3397

(b) What are the necessities of incorporating Scopic clause in LOF 2000 when special compensation was covered under International. Salvage Convention 1989 ?

(*Or*)

(c) As per UNCLOS explain what is "Freedom of Navigation" at high seas ? Under what circumstances this right ceases ?

6. (a) Explain "Special compensation to salvors as regards Marine Environmental Protection " provided as per LOF 1995.

CP-3397

(b)   What are the conditions when General average can be declared ?

(*Or*)

(c)   What is the difference between Time charter and Voyage charter ?

(d)   Explain the following clauses :

(i)   Ready to berth.

(ii)   Paramount Clause.

(iii)   New Jason clause.

(iv)   P & I bunker deviation clause.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVIGATION—IV

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer any **five** questions.

All questions carry equal marks.

$(5 \times 15 = 75)$

1. Describe the various errors of Gyro compass.

2. Draw a simplified block diagram of echo sounder and explain the principle and errors of echo sounder.

3. What is ARPA ? Explain the various ARPA facilities in collision avoidance.

4. (a) What are the techniques used in measurement of time difference in LORAN-c system ?

   (b) Explain the errors of LORAN–C.

5. What is NNSS ? What are the three main segments of NNSS ? Explain the principle of operation of NNSS.

6. Write short notes on :

   (a) RACON.

   (b) Radar Transponder Beacon (c) Errors of Decca system.

CP-3398

7. Discuss the importance of AIS (Automatic identification system) and its use in collision avoidance.

8. Describe the advantages and disadvantages of the following :

   (a) GPS.

   (b) Sat Nav.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

SHIP OPERATION TECHNOLOGY—IV

(Upto 2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

1. (a) What are the different types of welding practices in the shipbuilding industry ? Briefly outline each.

    (10)

(*Or*)

(b) Explain :

    (i) Water tight Bulkhead.

    (ii) Advantage of Welding over Rivetting.

    (2 × 5 = 10)

2. (a) Explain the terms :

      (i) 'Sacrificial Anode'

      (ii) 'Rusting' of a metal surface.

$$(2 \times 5 = 10)$$

(*Or*)

  b) (i) Explain the method of preventing rust on flat metal surfaces

(7)

      (ii) What are the different types of paints used ?

(3)

3. (a) Explain the terms :

      (i) Net Tonnage.

      (ii) Summer draft.

$$(2 \times 5 = 10)$$

(*Or*)

CP-3399

(b) (i) Deck line.

(ii) Timber load line.

$(2 \times 5 = 10)$

4. (a) Explain the terms :

(i) Advance.

(ii) Transfer.

$(2 \times 5 = 10)$

(*Or*)

(b) Explain the terms :

(i) Summer freeboard.

(ii) Critical period.

$(2 \times 5 = 10)$

5. (a) What is the information derived from a vessel's docking plan ? How does it help a shipyard to prepare for dry docking a ship ?

(10)

(*Or*)

(b) Explain the following shallow water effects.

(i) Bow cushion.

(ii) Smelling the ground.

(2 × 5 = 10)

6. (a) Explain the terms :

(i) DSC.

(ii) NBDP.

(2 × 5 = 10)

(*Or*)

CP-3399

(b) Explain the importance of the following transmission :

(i) PAN PAN.

(ii) sECURITE, SECURITE.

(2 × 5 = 10)

7. (a) (i) What is the GMDSS equipment to be carried by a vessel in sea area A2 ?

(10)

(ii) Explain the turn EGC with respect to GMDSS.

(5)

(*Or*)

(b) Expand the terms : $(5 \times 2 = 10)$

    (i) MMSI number.

    (ii) MF/ GMDSS.

    (iii) SOLAS.

    (iv) NAVAREA

    (v) SOS.

(c) Explain what is 'Distress relay'. (5)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEM—III

(Upto—2007 Batch)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

1. (a) (i) Define the following with respect to fuel density, viscosity, flash point, pour point

(8)

(ii) State the various methods of treating fuels.

(2)

(iii) Explain the working of a fuel oil purifier.

(5)

(*Or*)

(b) (i) Mention the various properties of fuel for motor ships burning HFO and their purpose

(9)

(ii) Explain with a neat sketch the of a fuel oil system from bunker tank to main engine

(6)

2. (a) (i) Describe with a sketch the pre heating of marine diesel engine

(6)

(ii) Mention the difference between two stroke and four stroke engine.

(4)

(iii) What is turbo charging and supercharging with respect to diesel engine.

(5)

(*Or*)

CP-3400
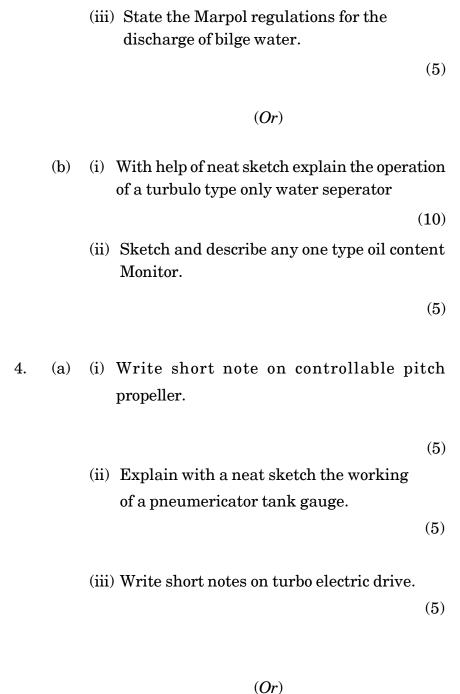
(b) (i) Define the following : Mechanical efficiency, Thermal efficiency, power-weight ratio.

(6)

(ii) Why should a marine diesel engine be preheated prior to starting ?

(4)

(iii) What do you under stand by super charging ? List out its advantages.

(5)

3. (a) (i) What is the purpose of a thrust block ?

(4)

(ii) Write short notes on :

Impulse turbine, Reaction turbine, Gas turbine

(6)

(iii) State the Marpol regulations for the discharge of bilge water.

(5)

(*Or*)

(b) (i) With help of neat sketch explain the operation of a turbulo type only water seperator

(10)

(ii) Sketch and describe any one type oil content Monitor.

(5)

4. (a) (i) Write short note on controllable pitch propeller.

(5)

(ii) Explain with a neat sketch the working of a pneumericator tank gauge.

(5)

(iii) Write short notes on turbo electric drive.

(5)

(*Or*)

CP-3400

(b) (i) State the advantages of pneumatic system and hydraulic system.

(5)

(ii) Sketch and explain a two ram hydraulic steering gear with hunting gear.

(10)

5. (a) (i) Sketch and explain a CO_2 flooding system for engine room.

(5)

(ii) How is the hold monitored for accidental fires.

(6)

(iii) What are the advantages of bridge control of main engines.

(4)

(*Or*)

(b) (i) Explain with sketch the working of high pressure water spray system.

(9)

(ii) Explain the operation of any two types of fire detectors.

(6)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAUTICAL MATHEMATICS—II

(2008 onwards)

Time : 3 Hours   Maximum : 100 Marks

Answer **all** questions.

$(5 \times 20 = 100)$

1.   (a)   (i)   If $x + iy = \dfrac{3}{2 + \cos\theta + i\sin\theta}$ prove that

$$x^2 + y^2 = 4x - 3$$

(ii)   Expand cos 8 θ in terms to sin θ

(*Or*)

(b) (i) Expand $\sin^6 \theta$ in a series of cosines of multiple of θ

(ii) If $\cosh u = \sec \theta$ shows that $u = \log \tan \left(\dfrac{\pi}{4} + \dfrac{\theta}{2} \right)$

2. (a) Find $f'(3)$ and $f''(3)$ if

x	3.0	3.2	3.4	3.6	3.8	4.0
$f(x)$	−14	−10.032	− 5.296	−0.256	6.672	14

(Or)

(b) Dividing the range into 10 equal parts, find the value of $\displaystyle\int_{0}^{\pi/2} \sin x \, d x$ by

(i) Trapezoidal rule.

(ii) Simpson's rule.

2

3. (a) (i) Evaluate $\int_C \vec{F} \cdot d\vec{r}$ where $\vec{F} = x^2\,\vec{i} + y^3\,\vec{j}$ and C is a portion of the parabola $y = x^2$ in the xy plane from $(0,0)$ to $(1,1)$.

(ii) Evaluate $\iint_S \vec{F} \cdot \hat{n}\,d\,S$ where $\vec{F} = z\,\vec{i} + x\,\vec{j} - y^2\,z\,\vec{k}$ and S is the surface of the cylinder $x^2 + y^2 = 1$ included in the first octant between the planes $z = 0$ and $z = 2$.

(Or)

(b) Verify the Gauss divergence theorem for

$\vec{F} = 4\,xz\,\vec{i} - y^2\,\vec{j} + yz\,\vec{k}$ over the cube bounded by $x = 0,\ x = 1,\ y = 0,\ y = 1,\ z = 0,\ z = 1.$

CP-3401

4. (a) Solve

(i) $$\frac{dy}{dx} = \frac{y + \sqrt{x^2 + y^2}}{x}$$

(ii) $$x\frac{dy}{dx} + y \log x = e^x \ x^{1 - \frac{1}{2}\log x}$$

(*Or*)

(b) Solve

(i) $$(y^2 e^x + 2 x y) \, d \, x - x^2 \, dy = 0$$

(ii) $$x\frac{dy}{dx} + y = y^2 \log x.$$

5. (a) Solve :

(i) $(D^2 - 8D + 9)y = 8 \sin 5x$

(ii) $(D^2 + 16)y = e^{-3x} + \cos 4x$

(*Or*)

(b) Solve :

(i) $(D^2 - 3D + 2)y = 2x^3 - 9x^2 + 6x$

(ii) $(D^2 - 2D + 4)y = e^x \sin x$

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5

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAUTICAL PHYSICS AND ELECTRONICS—II

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

Answer any **five** questions.

All questions carry equal marks.

$(5 \times 15 = 75)$

1. (a) Discuss the use of nuclear energy as power for ships.

    (b) Explain the electrostatic charging produced in the flow of oil in a pipeline.

2. (a) Describe a parallel LCR circuit.

   (b) Mention its uses.

   (c) Explain the radiation pattern of Marconi antenna.

3. (a) Describe binary to decimal conversion.

   (b) Convert the decimal number 105 into binary, form.

   (c) Explain the addition of two binary numbers.

4. (a) Define OR gate and AND gate with truth table.

   (b) State and prove De. Morgan's theorem.

   (c) With necessary circuit explain the working of a half adder.

CP-3402

5. (a) Distinguish between Astable and Monostable multivibrators.

   (b) Explain the working of a R-S flip flop circuit.

6. (a) What are the various modes of transistors ? Explain.

   (b) How will you determine the characteristics of a transistor in common emitter configuration ?

   (c) What is a power amplifier ?

7. (a) What is amplitude modulation ?

   (b) How is amplitude modulation achieved ? Explain.

   (c) Mention the advantages and disadvantages of AM.

8. (a) Give the block diagram of a basic transmitter and explain its working.

   (b) Explain the working of a super hetrodyne receiver.

   (c) Give a note on the characteristics of a radio receiver.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVIGATION—II

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

EXTRACT OF NAUTICAL ALMANAC 1992 AND NORIE'S TABLES PERMITTED

Section - A   (2 × 15 = 30)

Answer any **two** questions from this section.

All questions carry equal marks.

1. Explain any **five** of the following terms with diagrams as required :

(15)

(a) Equinoctial.

(b) Sensible horizon.

(c) Prime vertical.

(d) Observer's Zenith.

(e) Greenwich hour angle (GHA)

(f) First point of Libra.

2. Explain any **five** of the following terms with diagrams as required :

(15)

(a) harvest moon and Hunter's moon.

(b) Conjunction and opposition.

(c) Vernal equinox.

(d) index Error.

(e) Dip.

(f) Waxing and waning.

CP-3403

3. (a) (i) Find the set and drift of current :

(10)

DR : Lat : 00 deg. 11.6'N   FIX   Lat 00deg. 40.3'S

Long : 179 deg. 50.2'W   Long : 178 deg. 40.1' W

(ii) What are the advantages and disadvantages of Gnomonic chart ?

(5)

(*Or*)

(b) (ii) On January 20th 1992, in DR 54 deg. 20'S 046 deg. 27' W, the sun set bearing 234 deg (C). If variation was 3 deg. W, find the deviation of the compass.

(10)

CP-3403

(ii) Why stars rise, culminate and set 4 minutes earlier every day ?

(5)

Section - B

Answer any **three** questions from this section.

All questions carry equal marks.   (3 × 15 = 45)

4. On 13th September 1992, in Dr 30 deg. 46'N 090 deg. 36' W, the star RASALHAGUE bore 275 deg. (C) at 04 h 36 m GMT. If variation was 5 deg. W, find the deviation of the compass.

5. On 2nd March 1992, PM at ship in DR 16 deg. 12 'N 092 deg. 10E, the sextant altitude of the star SPICA neat the meridian was 60 deg. 29. 4' at 00h 30m 12 s chron. time (error 02m 06 s slow). If He was 48 m and IE was 2.0' off the arc, find the direction of PL and a position through which it passes.

CP-3403

6. On 6ᵗʰ March 1992, at 0200 ship's time in DR 20 deg. 37′ N 000 deg. 00' the pole star bore 356 (C) If variation was 3.7 deg. W, find the deviation of the compass.

7. (a) Explain the significance of international date line.

(5)

(b) Briefly explain the phases of the moon ?

(5)

(c) What are inferior planets and superior planets ? Name them.

(5)

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CP-3403

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

SHIP OPERATION TECHNOLOGY—II

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

1. (a)   What factor will you consider prior making stow plan ? What do you understand by loading / discharging sequence ?

(10)

(*Or*)

(b)   On what basis will you segregate the cargoes ? Describe the precautions need to be considered during cargo operations ?

(10)

2. (a) What are the various attachments with life jacket ? What are the markings on it ?

(10)

(*Or*)

(b) Describe the various life boat fittings with sketch.

(10)

3. (a) Explain different equipments of Life raft and its uses.

(5)

(*Or*)

(b) What is the SOLAS requirement of LTA ?

(5)

4. (a) What precautions will you take to prevent fire on board ship during various ship board operations ?

(10)

(*Or*)

(b) Draw a foam type portable fire extinguisher and explain its operations.

(10)

5. (a) What are the care and maintenance will you carry out on SCBA.

(10)

(*Or*)

(b) What are pre checks to be carried out before wearing SCBA set ?

(10)

CP-3404

6. (a) What is the different between TPA and Immersion Suit ? Explain its purposes ?

(10)

(*Or*)

(b) What are the food rations available on a survival craft ? How will you distribute it ? What type of food should be avoided in survival craft, why ?

(10)

7. (a) Explain the components of fire with the help of fire triangle ? What are the methods of extinguishing fire ?

(10)

(*Or*)

CP-3404

(b) What is intrinsically safe lamp ? Why CO2 system is preferred for fighting fire over other agents ?

(10)

8. (a) What are the various emergencies you may face on board and describe your action after collision.

(10)

(*Or*)

(b) What do you mean by Abandon ship ? What is the signal for abandon ship ? What are the alternates available for survival when the ship is abandoned ?

(10)

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CP-3404

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

**VOYAGE PLANNING, COLLISION PREVENTION
AND MARINE COMMUNICATION—II**

(2008 onwards)

Time : 3 Hours   Maximum : 25 Marks

Answer **all** questions.

(5 × 5 = 25)

1. (a)   Describe the lights and shapes exhibited by the
          following vessels :

     (i)   A vessel A ground.

     (ii) A Vessel engaged in Fishing.

                                                     (5)

(*Or*)

(b) Define the following :

      (i)   Mast Head lights.

      (ii) Side Lights.

      (iii) Stern Lights

(5)

2.   (a) As per rule 34 of R.O.R list the various Manoeuvring Signals used.

(5)

(*Or*)

(b) List the various Sound Signals used in restricted visibility.

(5)

3. (a) Write short notes on the following :

    (i) Ocean passage of the world.

    (ii) Admiralty list of Radio signals.

(5)

(*Or*)

(b) Admiralty list of lights.

(c) Chart catalogue.

(5)

4. (a) What are the various stages of passage planning ? Write brief notes on each of them.

(*Or*)

(b) While approaching a port how will you select a suitable anchorage for anchoring the vessel ?

(5)

CP-3405

5. (a) Explain the five types of buoyage systems under IALA.

(*Or*)

(b) Draw and explain the buoyage system under " CARDINAL SYSTEM ".

(5)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

METEOROLOGY AND OCEANOGRAPHY—I

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

All questions carry equal marks.

(5 × 15 = 75)

1. (a) Give a detailed account on the ozone depletion and its effects.

(*Or*)

(b) Explain in detail on the different types of radiation.

2. (a) Explain the following :

   (i) Dew point temperature.

   (ii) Variation of water vapour.

   (*Or*)

   (b) Discuss in detail on the weather analysis.

3. (a) Explain in detail on the different types of Condensation forms.

   (*Or*)

   (b) Briefly explain on the cloud development.

4. (a) Elaborate the protocol used for the salinity measurements.

(*Or*)

(b) Explain in detail on the density VS pressure.

5. (a) Give a detailed notes on the psychrometer and thermometer.

(*Or*)

(b) Explain in detail on the different types of anemometers.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

NAVIGATION—IV

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

EXTRACT OF NAUTICAL ALMANAC 1992 AND NORIE'S TABLES PERMITTED

Section - A

Answer any **two** questions from this section.

All questions carry equal marks.

$(2 \times 15 = 30)$

1. (a) Under what conditions will the sun rise bearing true East ?

(2)

    (b) What is amplitude and how it is named ?

(4)

    (c) In what latitude will the amplitude be equal to the declination ?

(2)

(d) Observe in Lat 11 deg. 12′ N (V/l's latitude at the time of observation) observed amplitude of setting sun 295 deg. (G) and sun's declination 21 deg 14′S. Find the error of the gyro compass.

(7)

2. On 22nd September 1992, AM at ship in DR 10 deg. 02′ S 076 deg. 50′ E, the sextant altitude of the moon's LL was 44 deg 31.7′ at 00h 17 m 21s chron. Time (error 07 m 28 s slow). If IE was 0.6′ on the arc and HE = 14 m, find the intercept and PL.

3. On March 6th 1992, AM at ship in DR 30 deg. 30′N 140 deg. 11′ W the moon bore 105 deg (C) at 07 h 35 m 02s chron. Time (error 04 m 06 s fast). If variation was 2 deg. E, find the deviation.

Section - B   (3 × 15 = 45)

Answer any **three** questions.

4. (a)   Explain North seeking gyroscope.   (5)

    (b)   Name the three degrees of freedom of a Gyro. Explain briefly the gyroscopic inertia and precession.

    (5)

    (c)   Explain the principle and errors of Echo sounder

    (5)

5.   In DR 68 deg. 12.5′N 044 deg. 18′W an astronomical observation gave an obs. Long of 44 deg. 10.6′W whilst bearing 281 (T). After steaming for 112 M on a course of 327 (T), an observation of Polaris gave Obs. Lat. 69 deg. 53. 3′ N bearing 358 (T), using EP long worked from earlier Obs. Long. Find the position of the ship at second observation.

6. (a) On 2nd March 1992, PM at ship in DR 16 deg. 12′ N 092 deg. 10 E, the sextant altitude of the star SPICA near the meridian was 60 deg. 29.4′ at 00h 30 m 12 s chron. Time (error 02 m 06 s slow). If HE was 48 m and IE was 2.0′ off the arc, find the direction of PL and a position through which its passes.

(*Or*)

(b) On 25th February 1992, AM at ship in DR 20 deg. 04′S 090 deg. 04′ W, the sextant altitude of the moon's UL was 52 deg. 26.8′ at 02h 56 m 17 s chron. Time (error 04 m 01 s fast). If HE was 19 m and IE was 0.6′ off the arc, calculate the direction of the PL and a position through which its passes.

7. On 1st September 1992, AM at ship in DR 18 deg. 00′ N 178 deg. 11′ E, the sextant altitude of the polestar was 18 deg. 47.4′ at 05 h 21 m 08 s by chro. (error 01 m 18 s slow). HE = 12.5 m. IE = 1.6′ on the arc. Find the direction of PL and a position through which to draw it. If the AZ was 001 deg. (C), and Var was 1.3 deg. E, find the deviation.

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

SHIP OPERATION TECHNOLOGY—IV

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

1. (a) Define each of the following terms :

    (i)   Flash point ;   (3)

    (ii) Flammable range (also known as explosive range)

                                            (3)

    (iii) Static electricity.   (3)

    (iv) Non-volatile cargo.   (1)

(*Or*)

(b) (i)   List the items of ship / shore safety check list of an oil tankers.

(10)

2. (a)   Explain, with the aid of a sketch, the purpose and operation of any pressure / vaccum (PV) valve that may be found on a tanker.

(15)

(Or)

(b)   A tanker is fitted with an inert gas system.

Explain the following components of the above system.

(i)   the deck water seal.   (5)

(ii)   the scrubber tower.   (5)

(c) List four alarms that should be fitted in an inert gas system.

(5)

3. (a) Provide a sketch of each of the following container types :

(10)

    (i) Half height container ;

    (ii) Dry bulk container ;

    (iii) Tank container.

(Or)

(b) List at least five container securing gears and explain the usage.

(10)

CP-3408

4. (a) A container vessel is designed to carry 2460 T.E.U. Define the term T.E.U.

(2)

(b) State the meaning of each of the following :

(i) IMDG. (2)

(ii) EmS No.: (2)

(iii) MFAG Table No ; (2)

(iv) UN No. (2)

(Or)

(c) List with detail the classes of IMDG cargo. (10)

5. (a) Define the term hygroscopic cargo. (2)

CP-3408

(b) (i) List SIX hygroscopic cargoes : (6)

(ii) List TWO non-hygroscopic cargoes. (2)

(Or)

(c) Vessel is loading coal cargo. What precautions will you considered as a duty officer during cargo operation : (10)

6. (a) Define the following anchoring terms :

(i) Anchor aweigh. (2)

(ii) A cockbill. (2)

(iii) Foul anchor. (2)

(iv) Surge. (2)

(v) Walk back the anchor. (2)

(Or)

(b) A fully loaded tanker vessel grounded in the river channel during their passage. List the actions you will take ? (10)

7. (a) As an officer of watch you have received a NAVTEX message and you are going to encounter a heavy weather. List the precautions you will take.

(10

(Or)

(b) How will you prepare the metal surface prior painting.

(5)

(c) Write short notes on different factors affecting corrosion.

(5)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

VOYAGE PLANNING, COLLISION PREVENTION AND MARINE COMMUNICATION—IV

(2008 onwards)

Time : 3 Hours   Maximum : 25 Marks

(5 × 5 = 25)

Answer **all** questions.

All questions carry equal marks.

1. (a) Under what situations the officer of the Watch can be the sole look out ? How would you take over a navigation watch in confined waters ?

(*Or*)

    (b) How would you take over watch in port during cargo operations ? List out all the checks you would carry out.

2. List out the factors to be considered when

   (a) Anchoring a large vessel.

   (b) How would you determine if you are dragging anchor and what actions would you take in case you are dragging ?

(Or)

   (c) Your vessel is approaching a port and going to anchor. Write how you would go about anchoring the vessel and checks you would carry out after anchoring.

3. (a) What are the four main basic principles of passage planning ?

(Or)

CP-3409

(b) What is a TSS ? What are the advantages of it ?

(c) Briefly explain the following :—

    (i) Ebb tide.

    (ii) MHWS.

    (iii) Chart Datum.

    (iv) Bench Mark.

4. (a) State Rule Number 6 of COLREGS and explain.

(Or)

(b) State Rule Number 10 of COLREGS and explain.

CP-3409

5. (a) Your vessel has sighted a derelict, send a message from the vessel informing about it ; you can assume it to be in any lat / long.

(Or)

(b) What are region A and region B IALA bouyage system ? State what marks are seen when you are approaching a port in these regions.

(c) List out the main contents of the Admiralty tide table.

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CP-3409

B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS—II

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** questions.

$(5 \times 15 = 75)$

1. (a) (i) Differentiate Grey cast iron and White cast iron.

(3)

   (ii) Explain uses of ceramics on board   (2)

   (b) Describe with a neat sketch the working of a Cupola furnace.

(10)

(*Or*)

(c) Define the following

    (i) Elasticity.

    (ii) Plasticity.

    (iii) Hardness.

    (iv) Ductility.

    (v) Tempering.

    (vi) Case hardening.

(7)

(d) Define Tensile, Compressive, Bending and Twisting loads, giving an example for each type of load in an engine.

(8)

2. (a) Why do we treat boiler water ? Explain three tests for finding the conditions of boiler water.

(7)

CP-3410

(b) What do you understand by economiser and describe how it is started and stopped ?

(8)

(*Or*)

(c) How do you raise steam in a fire tube boiler after repairs/survey.

(8)

(d) Sketch ad describe the working of an air compressor 2 stage- what press is required for starting of main engine. What are the uses of compressed air ?

(7)

3. (a) Explain diagrammatically a direct expansion system of domestic Reefer unit and how different rooms are maintained at different temperature.

(10)

(b) Describe how you will start a centrifugal pump and reciprocating pump. What checks you carry out before starting and whilst running of pumps ?

(5)

(*Or*)

(c) Describe an Air condition system as fitted on board with suitable diagram.

(7)

(d) What is the function of the following :

(i) Expansion valve.

(ii) Magnetic liquid stop valve.

(iii) Oil separator.

(iv) Drier.

(8)

4. (a) What do you understand from a 4-stroke and 2-stroke cycle ? What are the constructional differences of a 4-stroke engine and 2-stroke engine ?

(8)

(b) What is an indicator diagram ? What is draw card ? Explain.

(7)

(*Or*)

(c) Draw the valve-timing diagram of a four stroke diesel engine and explain briefly.

(9)

(d) Name the cycle on which petrol engine works and explain. Write the use of piston rings.

(6)

5. (a) Describe how an incoming generator can be taken on load with a running generator.

(7)

(b) What do you understand by load sharing ? How is the load being distributed in parallel running generator engines ?

(8)

(*Or*)

(c) What is the function of Wheatstone bridge ? Explain with a line diagram the functioning of the same.

(8)

(d) Explain with a sketch an Air Circuit Breaker

(7)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2010

Nautical Science

OCEANOGRAPHY AND METEOROLOGY—II

(2008 onwards)

Time : 3 Hours   Maximum : 75 Marks

Answer **all** Questions.

All questions carry equal marks.

(5 × 15 = 75)

1. (a) Describe in detail on the Wind Driven currents of the sea surface.

(*Or*)

(b) Write a detailed account on the Atmosphere motion scales.

2. (a) Write short notes on the following :

    (i) Divergence.

    (ii) Convergence.

    (iii) Vertical motion.

(*Or*)

    (b) Explain about Single-cell model and Three-cell model.

3. (a) Briefly explain about the natural hazards and their effects on the atmosphere.

(*Or*)

    (b) Determining the movement of weather system.

4. (a) Give an elaborate notes on tropical oceans circulation.

(*Or*)

(b) Explain elaborately about dynamic theory of tides.

5. (a) Give detailed account on the Seismic waves and their effects and measurement.

(*Or*)

(b) Comment on the recent Cyclone effects in coastal area.

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CP-3412