

B.Sc. DEGREE EXAMINATION
NOVEMBER 2011
Nautical Science
ENGLISH AND COMMUNICATION SKILLS
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

All questions carry equal marks.

1. (a) Read the passage carefully and answer the questions given below :
- Have you ever told a joke, and discovered that your listeners didn't laugh? Don't you know people who never seem to laugh, while others always smile or laugh? We laugh not because of a mechanical process in our body, but to express our feelings. These feelings may be joy, lightness of heart or amusement. There is one 'mechanical' cause of laughter-tickling. This is a reflex action on the part of our body to a certain kind stimulation. It is not related to other kinds of laughter we enjoy.
- When we laugh, we spontaneously express certain feelings that are brought on by seeing, remembering, imagining, or thinking of something. Now, that something has to provoke laughter in us. Why does it create that reaction in us? One such idea is that laughing is a kind of 'social' act. If you are watching TV alone and see something funny, you might not laugh very loudly. But if there are a group of friends watching with you, you might laugh loudly together. We all know, in a general way, the kind of things that make us laugh. If somebody does something, If somebody does something like slipping and falling we might laugh. This may be because we feel superior at the moment and are so pleased about it that we laugh.
- Even the kind of laughter we engage in may vary, depending on the cause. Humour creates one kind of laughter, the ridiculous another, and the conic still another. It is even possible for us to laugh scornfully at someone. So, laughter is an expression of our feelings, a way of reacting to something.
- Questions
- (i) Why do we laugh? (2)
 - (ii) What are the certain feelings do we express when we laugh?
(3)
 - (iii) 'Laughing is a kind of 'social' act'. Explain. (2)
 - (iv) Why do we laugh when somebody fall or slip?
(3)
 - (v) Explain the meaning of the following words. (5)
 - (1) Mechanical
 - (2) Stimulation
 - (3) Remember
 - (4) Spontaneously
 - (5) Scornfully.

Or

- (b) Read the following passage and the questions given below :
- From early times man believed that gods and devils controlled his life. In his view, disasters like storms, attacks by enemies, a bad harvest and diseases happened because the gods were angry or the devils were strong. Naturally, the

best way to stop these disasters was to please the gods or fight the devils. Therefore, the first doctors were priests also. Their methods seem very strange to us today. Suppose the doctor thought that a devil was causing the illness then in order to make him leave the body, he spoke to the devil. In addition, he gave some very unpleasant medicines to the patient. The idea was to would want to go away.

Questions

- (i) Why did disaster happen, according to the men of early times? (2)
 - (ii) What were the ways to stop these disasters? (3)
 - (iii) Who were the first doctors? (2)
 - (iv) What were the strange methods adopted by the first doctors?
(3)
 - (v) Explain the meanings of the following words.
(5)
 - (1) Devil
 - (2) Disaster
 - (3) Harvest
 - (4) Priest
 - (5) Strange
2. Essay writing. (15)
- (a) "Reading habit is in a deplorable stage" – Discuss.
Or
 - (b) Kashmir's problems and solutions – Discuss.
3. Letter writing. (15)
- (a) Write a letter of application with your resume to the Director of Education for the post of a teacher in the Educational service.
Or
 - (b) Write a letter to the Executive Engineer of Periyar Dam asking permission for the students to visit the hydroelectric plant.
4. Report writing. (15)
- (a) You are the staff reporter of 'The Hindu'. Report the incidents to 'The Hindu' Newspaper about 'THE TAMIL SEMMOZHI CONFERENCE' recently held at coimbatore.
Or
 - (b) You are a witness to a grand function organised for blood donation by a group of students. Write a detailed report to be sent to a magazine.
5. Communication : (15)
- (a) What are the objectives of media in Mass Communication?
Or
 - (b) Mass communication is a key to change the attitude of a society. Discuss.

Nautical Science
NAUTICAL MATHEMATICS – I
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Answer **five** questions.

All questions carry equal marks.

(5 × 20 = 100)

1. (a) Prove that $[\bar{a} \times \bar{b}, \bar{b} \times \bar{c}, \bar{c} \times \bar{a}] = [\bar{a}, \bar{b}, \bar{c}]^2$.
- (b) The contents of 3 Urns are as follows.
 Unit I : 1 white, 3 red, 2 black balls
 Unit II : 3 white, 1 red, 1 black balls
 Unit III : 3 white, 3 red, 3 black balls
 Two balls are chosen from a randomly selected Urn. If the balls are 1 white and 1 red, what is the probability that they come from Urn II?
 Or
- (c) Find the regression lines for the following data and find the height of the son when the height of father is 164 cms.
- (d) Fit a straight line to the following data.
- | | | | | | | |
|-------|----|----|----|----|----|----|
| x : | 20 | 25 | 30 | 35 | 40 | 45 |
| y : | 14 | 17 | 21 | 22 | 26 | 28 |
2. (a) Show that the circles $x^2 + y^2 - 2y - 19 = 0$ and $x^2 + y^2 + 3x - 8y - 43 = 0$ touch internally. Find the point of contact and common tangent.
- (b) Write down the properties of conics for application to navigation.
 Or
- (c) Find the capacity of a conical tank of height 7 m and radius 2 m in litres.
- (d) A curve is drawn to pass through the points given by the following table.
- | | | | | | | | |
|-------|---|-----|-----|-----|---|-----|-----|
| x : | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 | 4 |
| y : | 2 | 2.4 | 2.7 | 2.8 | 3 | 2.6 | 2.1 |
- Estimate the area bounded by the curve, the X-axis and the lines $x = 1$, $x = 4$ using Simpson's $\frac{1}{3}$ rule.
3. (a) Define the following :
- (i) Great circle
 - (ii) Pole of a circle
 - (iii) Small circle
 - (iv) Spherical angle.
- (b) In the spherical triangle ABC, prove that $\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}$.
 Or
- (c) Define quadrant spherical triangles and write down any five of its properties.
- (d) Define polar triangle, prove that the sides and angles of the polar triangle of a given spherical triangle are supplementary to the angles and sides of the given triangle.
4. (a) Find $\frac{dy}{dx}$ if $(\cos x)^y = (\sin y)^x$.

- (b) Prove that the volume of the real formed by the revolution of the cycloid $x = a(\theta + \sin \theta)$; $y = a(1 - \cos \theta)$ about the tangent at the vertex is $\pi^2 a^3$.

Or

- (c) If $y = \frac{1}{2}(\sin^{-1} x)^2$, prove that $(1 - x^2)y_2 - xy_1 - 1 = 0$.

- (d) Evaluate $\int_0^{\frac{\pi}{2}} \frac{(\sin x)^{\frac{3}{2}}}{(\sin x)^{\frac{3}{2}} + (\cos x)^{\frac{3}{2}}} dx$.

5. (a) Reduce the following matrix to normal form and hence find its rank

$$A = \begin{bmatrix} 2 & 1 & -3 & -6 \\ 3 & -3 & 1 & 2 \\ 1 & 1 & 1 & 2 \end{bmatrix}.$$

- (b) Prove that the following matrix is orthogonal $A = \begin{bmatrix} -\frac{2}{3} & \frac{1}{3} & \frac{2}{3} \\ \frac{2}{3} & \frac{2}{3} & \frac{1}{3} \\ \frac{1}{3} & -\frac{2}{3} & \frac{2}{3} \end{bmatrix}$.

Or

- (c) Find the characteristic roots and the characteristic vector of the matrix

$$A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

- (d) Using Cayley-Hamilton theorem, find the inverse of the following matrix

$$A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}.$$

Nautical Science
NAUTICAL PHYSICS AND ELECTRONICS — I
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer ALL questions.
All questions carry equal marks.

(5 × 15 = 75)

1. (a) Explain centre of gravity.
(b) Discuss the system of coplanar forces acting at a point.
(c) State and explain Lami's theorem.
Or
(d) Explain direct and oblique impact with examples.
(e) State the principle of projectile? Give its uses.
(f) List the applications of hodograph.
2. (a) Explain the care and precautions to be followed in batteries.
(b) Write a note on simple electric lighting circuits.
(c) Define RMS and peak values.
Or
(d) Explain the principle and types of transformers.
(e) Discuss the magnetic elements of the earth.
(f) Write a note on dip and isoclinic lines.
3. (a) State and explain Bernoulli's equation and discuss its applications.
(b) Describe the working of Bourdon pressure gauge.
Or
(c) Describe the method of determining the viscosity of fluid using Stoke's method.
(d) Explain the working of marine hydrometer.
4. (a) What are photometers? Mention its uses.
(b) State the laws of photoelectric effect.
(c) Give the applications of photodiode.
Or
(d) Discuss the phenomenon of diffraction in circular aperture.
(e) Explain the resolving power of a telescope.
(f) Write a note on optical pyrometer.
5. (a) Discuss the role of semiconductors in the field of electronics.
(b) Describe the construction and working of a bridge rectifier.
Or
(c) Explain how a zener diode can be used as a voltage regulator.
(d) Explain the three different characteristics of a transistor and state the relation between them.

Nautical Science
NAVIGATION — I
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

All questions carry equal marks.

(5 × 15 = 75)

1. (a) Define the following terms : (15)
- (i) Latitude
 - (ii) Departure
 - (iii) DMP
 - (iv) Nautical mile
 - (v) Rhumb line.
- Or
- (b) Explain the following with suitable sketches : (15)
- (i) Occultation
 - (ii) Winter solstice
 - (iii) Equinox
 - (iv) Visible horizon
 - (v) Conjunction and opposition.
2. (a) Find the course and distance by using plane sailing method:
- (i) From 36 deg 11.7 min N 05 deg 12.6 min E
To 40 deg 18.6 min N 080 deg 11.5 min E. (7)
 - (ii) Starting Position 60 deg 11.2 min N 120 deg 18.6 E, course 250 deg
distance: 312.4 M. (8)
- Or
- (b) A vessel observes her position to be 40 deg 30 min N. 035 deg 15 min W.
She steams the following courses and distances:
- | | | | |
|--------------------|--------------------|-------------------|----------|
| 056 deg, | distance 45 miles: | 020 deg, | distance |
| 20 miles: | 335 deg, | distance 35 mile: | 300 deg, |
| distance 50 miles. | | | |
- Find the Position arrived. (15)
3. Using Traverse tables find the course and distance:
- (a) From 60 deg 11.6 min N, 076 deg 44.3 min W
To 55 deg 10.3 min N, 080 deg 16.8 min W (15)
- Or
- (b) Find the position arrived using Traverse tables :
Initial Position 30 deg 00 min N, 179 deg 15 min W, course 240 (T) speed 15 kts.
Find the position of the vessel after 24 hours of steaming.
(15)
4. (a) Explain the properties of a Spherical Triangles and additional properties of
Quadrantal spherical triangle.
(15)
- Or
- (b) In a spherical triangle ABC, a = 49 deg 08 min,
b = 58 deg 23 min and C = 71 deg 20 min. Calculate A and B.
(15)
5. (a) In the Equinoctial system define the following : (15)

- (i) Declination
- (ii) SHA
- (iii) Right ascension (RA)
- (iv) LHA
- (v) GHA

Or

- (b) Write detailed notes on charts used for navigation on board ships.
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Nautical Science
SHIP OPERATION TECHNOLOGY — I
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

1. (a) Write short notes on :
 (i) Crude oil Tanker
 (ii) Heavy lift Carrier. (10)
- Or
- (b) Explain the following terms :
 (i) Poop Deck
 (ii) Bulbous Bow
 (iii) Panama Fairlead
 (iv) Rudder
 (v) Draft. (10)
2. (a) Enumerate the compass points anticlockwise from South to North East of a Compass. (10)
- Or
- (b) Draw a ship which is made fast alongside a berth and show the mooring pattern. Briefly explain the use of each mooring line. (10)
3. (a) (i) What is "Lookout" and Situations when extra out Lookout on the bridge is employed? (5)
 (ii) Explain the following anchor terms :
 (1) Short Stay
 (2) Anchor Underfoot
 (3) Brought Up
 (4) Nipped Cable
 (5) Surge cable. (5)
- Or
- (b) (i) Safety precautions and preparations to be taken for Anchoring the vessel. (5)
 (ii) 'Arming of Lead' when taking soundings by lead line. (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) Explain the launching procedures of a Life raft. (5)
 (ii) What is the purpose and working of Hydrostatic release unit (HRU) with respect to Life raft? (5)
5. (a) Explain the characteristics, Care and maintenance of Synthetic fiber Ropes. (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) (i) Explain the following with respect to deck maintenance :
(1) Sand Blasting
(2) Hydo Blasting. (5)
(ii) Preparation of metal surfaces for painting. (5)
Or
(b) (i) Explain any 5 painting defects. (5)
(ii) Explain the electromagnetic log. (5)
7. (a) Draw the diagram of Union Purchase and label its parts.
(10)
Or
(b) Briefly explain what is Hand lead line. Name the marking of the hand lead line.
(10)
8. (a) What are Hatch Covers, draw the diagram ? (5)
Or
(b) Briefly explain the following terms : (2 × 2.5 = 5)
(i) Annealing
(ii) Rope stopper.
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NOVEMBER 2011

Nautical Science

VOYAGE PLANNING, COLLISION PREVENTION AND MARINE
COMMUNICATION — I

(2008 onwards)

Time : 3 Hours

Maximum : 25 Marks

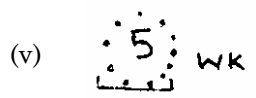
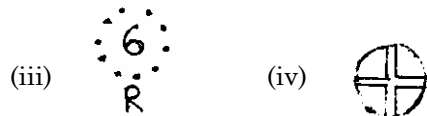
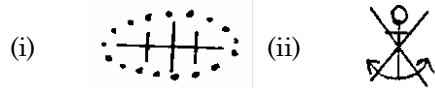
Answer **all** questions.

(5 × 5 = 25)

1. (a) Explain the following :
- Date of publication of chart (1)
 - Chart Blocks (2)
 - What are the types of projection available on navigation charts, which area are they normally used? (2)

Or

- (b) Explain the meaning of the following chart symbols : (5)



2. (a) Explain the following :
- Difference between Mercator Chart and Gnomonic Chart (3)
 - Explain the caution to be taken while using small scale charts. (2)

Or

- (b) Explain the following :
- To find the date the chart was last corrected upto date (2)
 - Use of sector lights in laying course. (3)
3. (a) Given that variation in a location was 3 deg East and the deviation for ships head was 2 deg west if the bearing taken of an object was 280 deg (M). Calculate the true bearing and compass bearing. (5)

Or

- (b) Explain the following :
- True meridian and Magnetic meridian (3)
 - What is deviation card? (2)
4. (a) Explain the following :
- What is Set and Drift? (3)
 - What is Estimated position? (2)

Or

- (b) Explain the following :
- What is dead reckoning position? (2)

- (ii) What is Leeway? (1)
 - (iii) What is observed position? (2)
 - 5. (a) Define the following as per COLREGS :
 - (i) Vessel engaged in fishing (2)
 - (ii) Vessel not under command (2)
 - (iii) Seaplane (1)
 - Or
 - (b) Explain safe speed and what are the factors that should be taken into account
 - (i) by all vessels
 - (ii) additionally by vessels with operational radar. (5)
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B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

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**Nautical Science
NAVIGATION — III
(2008 onwards)**

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

All questions carry equal marks.

(5 × 15 = 75)

1. Explain any Five : (5 × 3 = 15)
- (a) Civil Twilight
 - (b) Neap Tides
 - (c) Composite Sailing
 - (d) Refraction and Parallax in altitude
 - (e) SMT
 - (f) Rational Horizon
 - (g) Dip.
2. (a) Explain moon's orbit and axial rotation. What is the Sidereal period of the moon? (15)

Or

- (b) Explain the use of any Three of the following : (15)
- (i) Admiralty list of radio signals
 - (ii) M & MS notices
 - (iii) Navtex data printouts
 - (iv) Ocean passages of the world
 - (v) T&P notices in Admiralty notices to mariners.
3. (a) On 31st Aug 1992, PM at ship in DR 10⁰¹¹, S 000° 00', the sextant altitude of the Sun's LL was 39° 15' when the chron. (Error 01m 30s fast) showed 03h 11m 20s. If IE was 2.5' on the arc and HE was 17m, find the direction of the PL and a Position through which to draw it. (15)

Or

- (b) On 4th March 1992, in DR 45° 10'N, 120° 30'W, the sextant Meridian altitude of the star ANTARES was 18° 26.2'. If IE was 3.2m of the arc and HE was 10m, find the Latitude and State the direction of the PL. (15)

4. (a) Explain Solar Tide. (7)
- (b) Define — MHWS, MLWN, Tidal Stream and Flood Tide. (8)

Or

- (c) Find the Initial course, Final Course, Distance and the Position of vertex along the GC track from 10° 00.0'S 150° 00.0'W to 40° 00.0'N 160° 00.0'E. (15)

5. (a) To an observer in a certain Latitude, the Sun (Dec 1, $13^{\circ} 24'N$) bore 078° (T) at theoretical rising. Required the observed Latitude. (7)

(b) On 12th October 1992, required the LMT of Upper and Lower transits of Star CANOPUS for an observer in Longitude $82^{\circ} 30'E$. (8)

Or

(c) On 22nd Sept 1992, AM at ship in, DR $10^{\circ} 02'S$ $76^{\circ} 50'E$, the sextant altitude of the moon's. LL was $44^{\circ} 31.7'$ at 00h 17m 21s, chron time (Error 07m 28s Slow). If IE was 0.6' on the arc, and HE was 14m, find the direction of the PL and the Longitude where it cuts the DR Lat. (15)

B.Sc. DEGREE EXAMINATION
NOVEMBER 2011
Nautical Science

SHIP OPERATION TECHNOLOGY — III
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer any FIVE questions.

(5 × 15 = 75)

1. (a) Explain the following in terms related turning circle diagram.
 - (i) Transverse
 - (ii) Advance. (7 $\frac{1}{2}$)
- (b) What all the checks you will do as OOW when U/L is Arriving Port?
(7 $\frac{1}{2}$)
2. (a) Explain the terms :
 - (i) Shankles marking
 - (ii) Ranging the lable. (5)
- (b) How do you go about doing the hanging of Anchor?
(10)
3. (a) What effect of wind, current and draft in maneuvering the U/L? (7 $\frac{1}{2}$)
- (b) Explain different types of Moor with diagram. (7 $\frac{1}{2}$)
4. (a) List the precaution you take before facing the heavy weather.
(7 $\frac{1}{2}$)
- (b) What all the bridge equipment, which will show that you are going to face heavy weather? (7 $\frac{1}{2}$)
5. (a) What is vertical and horizontal screening of navigation lights?
(7 $\frac{1}{2}$)
- (b) What procedure you follow when you abandon the ship?
6. (a) What is your action when you are dragging Anchor?
(7 $\frac{1}{2}$)
- (b) What action you carry out when the near by vessel is dragging Anchor?
(7 $\frac{1}{2}$)
7. (a) Your ship is due for safety construction survey. How do you prepare for it?
(7 $\frac{1}{2}$)
- (b) What safety precaution you will take before docking and before undocking?
(7 $\frac{1}{2}$)

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B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

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Nautical Science
VOYAGE PLANNING, COLLISION PREVENTION AND MARINE
COMMUNICATION — III
(2008 onwards)

Time : 3 Hours

Maximum : 25 Marks

Answer **all** questions.

(5 × 5 = 25)

All questions carry equal marks.

1. (a) Define the following with respect COLREGS :
- (i) Vessel not under command
 - (ii) Vessel constrained by draft
 - (iii) Trawler
 - (iv) Prolonged blast
 - (v) Underway.
- Or
- (b) (i) Vessel aground
- (ii) Sailing vessel
 - (iii) Short blast
 - (iv) Non displacement craft
 - (v) WIG.
2. (a) Describe the following the Region B buoys :
- (i) Starboard end buoy
 - (ii) Preferred channel to Port
 - (iii) Preferred channel to starboard.
- Or
- (b) (i) East cardinal buoy
- (ii) West cardinal buoy
 - (iii) Safe water Mark.
3. (a) What are the factors to be taken into account while navigating in TSS?
- Or
- (b) Salient features of Rule to applied in restricted visibility.
4. (a) List the information you will find in Ocean Passages of the world.
- Or
- (b) List the information you will find in .ALRA volume VI.
5. (a) What are the GMDSS equipments requirements for vessel trading in Area ONE Area TWO?
- Or
- (b) Discuss about VHF communication and reporting to VTIS.

Nautical Science
NAVAL ARCHITECTURE — I
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Neat and meaningful sketches add up values.

Answer **all** questions.

1. (a) Define the following : (5 × 3 = 15)
- (i) Freeboard
 - (ii) Camber
 - (iii) Rise of floor
 - (iv) Light weight displacement
 - (v) Moulded breadth.
- Or
- (b) Draw and explain the elevation and Midship section of a Bulk carrier with clear constructional details. (15)
2. (a) Explain the special features of RO-RO and Lash Ships. (10)
- Or
- (b) Draw and explain Engine Room and its subdivisions of a merchant vessel. (10)
3. (a) Write short notes on the following use sketches : (3 × 5 = 15)
- (i) Duct keel
 - (ii) Stern
 - (iii) Cargo gears.
- Or
- (b) (i) Draw and explain Aft arrangement of a merchant vessel showing compartment and out fittings. (10)
- (ii) Draw and label the structural arrangement in a cargo hold having tween deck. (5)
4. (a) Write short notes on the following : (10)
- (i) Deep tank
 - (ii) Quarter deck
 - (iii) Electric Arc welding.
- Or
- (b) Discuss on various stresses set up due to welding and how to relieve these stresses using various welding techniques. (10)
5. (a) Explain various test that carried out on the ship building material at production and building stages. (15)

- (b) Draw and explain methods of edge preparation carried out.
(15)
6. (a) Define the following : (10)
- (i) Block co-efficient
 - (ii) Midship area coefficient
 - (iii) DWA
 - (iv) Buoyancy.
- Or
- (b) Explain various stages of equilibrium showing their specific characteristic of behaving. (10)
7. (a) Define the following : (5 × 3 = 15)
- (i) Centre of buoyancy
 - (ii) Metacentric height
 - (iii) Tender ship
 - (iv) Heel
 - (v) Free surface moment.
- Or
- (b) A ship displacing 9000 t has km 8.7 m, KG 7.2 m. She is now listed 8° to port. She has port and starboard deep tanks each 10 m long 10 m wide and 8 m deep. The port side deep tank, which was full of SW, is pumped out until its sounding is 2m. Assuming that no other tanks on the ship are slack, find the final list.
(15)
8. (a) Differentiate the following : (2 × 5 = 10)
- (i) Stiff and tender ship.
 - (ii) Arc and gas welding.
- Or
- (b) Ship of 2000t displacement and KG 3.66 m loads 1500 t (kg : 5.5m), 3500 t (kg = 4.60 m) and takes 1520t of bunkers (kg = 0.60 m). She discharges 2000t cargo (KG = 2.44m) and consumes 900t of bunkers (kg = 0.40 m). Find the KG at the end of the voyage. (10)
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Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

All questions carry equal marks.

(5 × 15 = 75)

1. (a) Define the terms given below :
- Modulus of elasticity
 - Compressive stress
 - Tensile stress
 - Strain. (8)
- (b) A cantilever beam 2m long carries a concentrated load of 20 kN at the free end and another of 40 kN at 0.5 m from the wall. Draw the bending moment and shearing force diagram. (7)
- Or
- (c) Define the following :
- Parallelogram law of forces.
 - Lami's theorem.
 - Elasticity
 - Force. (8)
- (d) A hollow cylinder 2m long has an outside dia of 60 mm and inside dia of 40 mm. If the cylinder is carrying a load of 30 kN. Find the stress in the cylinder and also find the deformation of the cylinder. Take $E = 100 \times 10^3 \text{ N/mm}^2$. (7)
2. (a) State the assumptions made in the derivation of Bernoulli's equation. (4)
- (b) Define the following terms :
- Specific volume
 - Specific gravity
 - DATUM
 - Incompressible flow. (6)
- (c) Sketch and describe one hydraulic equipment used in the ships. (5)
- Or
- (d) Water is flowing through a pipe having a diameter of 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm^2 and the pressure at upper end is 9.81 N/cm^2 . Determine the difference in the datum head if the rate of flow through the pipe is 40 ltrs/sec. (9)
- (e) Define the following terms :
- Viscosity
 - Specific weight
 - Discharge. (6)
3. (a) The ratio of compression in a petrol engine is 9 : 1. Find the temperature of the gas at the end of compression if the temperature at the beginning is 24°C assuming compression to follow the law $PV^n = \text{constant}$ where $n = 1.36$. (5)
- (b) The volume and temperature of gas at the beginning of expansion are 0.0056 m^3 and 183°C at the end of expansion the values are 0.0238 m^3 and 22°C

respectively. Assuming expansion follows the law $PV^n = C$. Find the value of n .
(5)

(c) Define the following term :

- (i) Sensible heat
- (ii) Latent heat. (5)

Or

(d) Briefly explain the following laws :

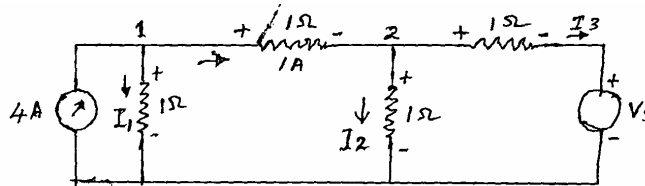
- (i) Boyle's law
- (ii) Zeroth law. (5)

(e) AIR is expanded adiabatically from a pressure of 800 kN/m^2 to 128 kN/m^2 . If the final temperature is 57°C . Calculate the temperature at the beginning of expansion, taking $\gamma = 1.4$. (5)

(f) 0.04 m^3 of gas at a pressure of 1482 kN/m^2 is expanded isothermally until the volume is 0.09 m^3 . Calculate the work done during expansion. (5)

4. (a) Explain the wheatstone bridge with a diagram and what parameters can be measured using the above. (10)

(b) Find I_1 and V_S in the following resistive circuit. (5)

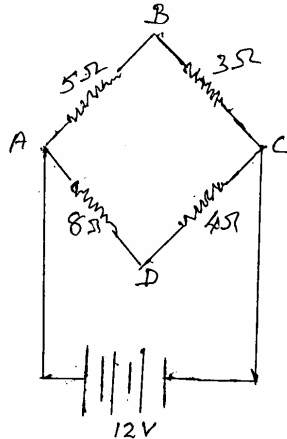


Or

(c) State Flemings left hand and right hand rule. (5)

(d) Define magnetic field strength. (5)

(e)



In the bridge circuit shown above. Calculate the reading of voltmeter connected across

- (i) AB
- (ii) BC
- (iii) AD
- (iv) DC. (5)

5. (a) State the uses of the following Machineries :

- (i) Aux Boiler
- (ii) uv sterilizer
- (iii) Fuel oil heater
- (iv) Stern tube L.O. system.
- (v) Purifier. (10)

(b) State Machineries required to keep diesel generator engine running smoothly.
(5)

Or

(c) Why do we require a sewage treatment plant on board? What regulations govern it? (7)

(d) Classify ships as per propulsion plant. (4)

(e) Mention various types of heat engines. (4)

Nautical Science
ENVIRONMENTAL STUDIES
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Answer **all** questions.

All questions carry equal marks.

1. (a) Explain briefly the structure of the atmosphere with diagram. (10)
- (b) Write about the forest resource uses and its value. (10)
- Or
- (c) Write about the various natural disasters and its management with suitable examples. (20)
2. (a) Explain and differentiate the food chain and food web with diagram. (10)
- (b) Explain the structure and function of an ecosystem. (10)
- Or
- (c) Briefly explain the forest, grassland and desert ecosystem. (20)
3. (a) Briefly explain the different value and uses of bio-diversity. (20)
- Or
- (b) Explain the following: (4 × 5 = 20)
- (i) Marine pollution
 - (ii) Water pollution
 - (iii) Solid Waste Management
 - (iv) Thermal pollution
4. (a) Give a brief account of Global warming. (10)
- (b) Write about the sustainable development and explain its concepts. (10)
- Or
- (c) Write about the scientific explanation of HIV/AIDS. (10)
- (d) Write about the problems and issues of population growth in developing countries. (10)
5. (a) Illustrate the role of information technology in environmental protection. (15)
- (b) Explain about the renewable energy resources and their significance. (5)
- Or
- (c) What is the importance of environmental studies for our each and every stage of the curriculum? Give your own ideas. (20)

Nautical Science
COMPUTER PROGRAMMING AND UTILITIES
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.
 All questions carry equal marks.

(5 × 15 = 75)

1. (a) List and explain I/O devices. (7)
- (b) Enumerate the types of memory. (8)
- Or
- (c) Summarize the characteristics of computer. (7)
- (d) Explain the types of computer languages. (8)
2. (a) Explain the components of database. (7)
- (b) Write a note on data dictionary. (8)
- Or
- (c) What are the different database models? Explain each one of them. (7)
- (d) Explain the role of database administrator. (8)
3. (a) Explain any three control statements in 'C' with suitable example for each one of them. (15)
- Or
- (b) Write a 'C' program to find the smallest among 100 numbers using arrays. (7)
- (c) Write a 'C' program to check whether the given number is prime or not. (Note : If a number is divided only by 1 and itself, then the number is a prime number) (8)
4. (a) Explain the various types of network. (7)
- (b) Write a note on Internet service provider. (8)
- Or
- (c) Explain : Internet search. (7)
- (d) Mention the importance of Internet security and discuss the methods for the same. (8)
5. (a) Describe the steps involved in program development life cycle. (15)
- Or
- (b) Explain the procedure involved in creating graph. Assume suitable spread sheet with data on your own. (7)
- (c) Write any four statistical and four mathematical functions with meaning. Give suitable example for each one of them. (8)

Nautical Science
NAVIGATION – V
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

All questions carry equal marks.

(5 × 15 = 75)

1. (a) Explain the Errors associated in Gyro compass. (10)
- (b) Explain the properties of a free gyro scope. (5)
- Or
- (c) With a suitable diagram explain the principle of “Precession”. (10)
- (d) Explain briefly the methods used to make the gyro point in the Northerly direction. (5)
2. (a) Sketch the simple block diagram of Radar set briefly explain functions of each. (15)
- Or
- (b) Explain the principle of Range and Bearing determination. (15)
3. (a) What are the facilities available in an ARPA. (10)
- (b) List alarms associated with ARPA. (5)
- Or
- (c) Draw an information flow chart to the computer for a radar to acquire ARPA data. (10)
- (d) Write notes on care checks to be carried out for course recorder. (5)
4. (a) Explain in detail the working of an AIS. (15)
- Or
- (b) Explain the use of IAS in collision avoidance situations. (10)
- (c) List the information broadcast from a class “A” AIS. (5)
5. (a) Explain the principle of working of a Auto Pilot. (15)
- Or
- (b) With suitable sketch explain the working of a Navigation light alarm system. (15)

CP-3878

B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

53

**Nautical Science
VOYAGE PLANNING, COLLISION PREVENTION AND MARINE
COMMUNICATION — V**

(2008 onwards)

Time : 3 Hours

Maximum : 25 Marks

Use Admiralty Tide Tables 1992.

Answer **all** questions.

(5 × 5 = 25)

1. (a) What are the basic GMDSS equipment requirements to be carried by SOLAS ships for various sea areas? (5)

Or

(b) What is DSC? How do you cancel an inadvertent DSC distress alert? How do you test DSC equipment? (5)

2. (a) What is a Safetynet? Draw a flow chart and explain. Which publication gives information w.r.t safetynet? (5)

Or

(b) What is NAVTEX? Describe the structure of the NAVTEX system by means of a flow chart. (5)

3. (a) State the Rule 10 of COLREGS and Explain. (5)

Or

(b) State the Rule 21 of COLREGS and Explain. (5)

4. (a) What are the basic principles of passage planning? Write in brief. What type of Buoyage would you see when entering different regions? Explain with the diagram. (5)

Or

(b) Under the Bridge Procedure Guide under what situations the Master must be called to the Bridge. (5)

5. (a) Find the tidal predictions for the secondary port-Sultanpur (4344-ATTII) listed under the standard port of Bhavnagar for 1st Feb 1992. (5)

Or

(b) Explain the causes of tides. (5)

CP-3879

B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

54

**Nautical Science
SHIP MASTER'S BUSINESS
(2008 onwards)**

Time : 3 Hours

Maximum : 100 Marks

Answer any **five** questions.
All questions carry equal marks.

(5 × 20 = 100)

1. State the procedure for transferring the registry of an Indian ship from one Indian port to another.
2. What are the provisions of MSA 1958 as regarding Certificate of Registry w.r.t
 - (a) Change of Master or Owner
 - (b) Defaced or Lost Certificate
 - (c) Alteration to ship affecting her tonnage and description.
3. What are the provisions of MSA 1958 w.r.t. desertion and absence without leave of a seaman from his ship?
4. Discuss the customs house facilities which have to be observed before a vessel can
 - (a) Discharge import cargo
 - (b) Load export cargo
 - (c) Depart port.
5. What is included under the definition of 'Wreck' under MSA 1958? What are the provisions of MSA 1958 as regards to the preservation of Life and Property of a vessel wrecked on or near the Indian Coast?
6. Explain the following terms :
 - (a) Note of protest. Under what conditions are these made?
 - (b) Notice of readiness.
 - (c) Cancellation date.
 - (d) Demurrage and dispatch.
7. (a) What are the obligations of the owner? (10)
 - (i) As a carrier as per the Hague/Visby rules
 - (ii) As a member of a P & I club.
(b) What is Multimodal transport system? What are the documents required for a shipper to submit to Multimodal Transport Operator to send a container from one dry port to another foreign sea port? Explain in brief. (10)

B.Sc. DEGREE EXAMINATION
NOVEMBER 2011
Nautical Science
MARINE MANAGEMENT AND COMMERCE
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Answer any **five** questions.

All questions carry equal marks.

(5 × 20 = 100)

1. (a) Explain the managerial implications of the study OB in marine management.
(b) Discuss the importance of communication in shipping company.
Or
(c) State the need for safety management in marine services.
(d) Explain MIS. State the prerequisites to design MIS in shipping company.
2. (a) Explain the various methods of cargo handling.
(b) Discuss the evolution and growth of Indian fleet.
Or
(c) Write the essentials to be considered in manpower planning in shipping.
(d) Explain briefly the cargo ship management.
3. (a) Write notes on different types of ports.
(b) Discuss the functions of various ship boards.
Or
(c) Write a note on Tamil Nadu shipping and port management.
(d) Explain the relationship between shipping and the national product.
4. (a) Briefly explain the various types of ship industry in India.
(b) Discuss cargo handling ports organisation in India.
Or
(c) Write an essay on port management.
(d) Explain the types of research vessels in India.
5. (a) Explain the ship operation and documents.
(b) Write notes on port location, functions and its financial aspects.
Or
(c) State the points of comparison between liner trade and tramp trade.
(d) Write short notes on the following :
 - (i) Bill of lading
 - (ii) Lay time
 - (iii) Cargo plan
 - (iv) Load line.

Nautical Science
NAUTICAL MATHEMATICS - II
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Answer **all** questions.

(5 × 20 = 100)

1. (a) (i) If n is a positive integers then prove that $(1+i)^n + (1-i)^n = (\sqrt{2})^{n+2} \cos \frac{n\pi}{4}$.

(ii) Show that the product of the four values of $(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3})^{3/4}$ is 1.

Or

(b) (i) Expand $\sin^7 \theta$ in a series of sines of multiple of θ .

(ii) If $\text{Sin}(A+iB)=x+iy$ prove that $\frac{x^2}{\text{Sin}^2 A} - \frac{y^2}{\text{Cos}^2 A} = 1$ and

$$\frac{x^2}{\text{Cosh}^2 B} + \frac{y^2}{\text{Sinh}^2 B} = 1.$$

2. (a) Find $f'(3)$ and $f''(3)$ from the following data:

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) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ with $h = \frac{1}{6}$ by Trapezoidal rule.

3. (a) Verify Green's theorem for the function $\vec{f} = (x^2 + y^2)\vec{i} - 2xy\vec{j}$ and C is the rectangle in the xy plane bounded by $y=0, y=b, x=0$ and $x=a$.

Or

(b) (i) Evaluate $\iint_S \vec{f} \cdot \vec{n} \, ds$ when $\vec{f} = (x+y)^2\vec{i} - 2x\vec{j} + 2yz\vec{k}$ and S is the surface of the plane $2x+y+2z=6$ in the first octant.

(ii) Find the work done by the force $\vec{F} = (2xy+z^3)\vec{i} + x^2\vec{j} + 3xz^2\vec{k}$ when it moves a particle from $(1, -2, 1)$ to $(3, 1, 4)$ along any path.

4. (a) Solve:

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

(ii) $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$.

Or

(b) Solve :

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

(ii) $(x^2 + y^2 + x)dx + xydy = 0$

5. (a) Solve :

(i) $(D^2 + 2D + 2)y = \text{Sin}hx$

(ii) $(D^2 + 3D + 2)y = \text{cos}x$.

Or

(b) Derive the solution of Damped oscillation.

B.Sc. DEGREE EXAMINATION
NOVEMBER 2011
Nautical Science
NAUTICAL PHYSICS AND ELECTRONICS – II
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) How nuclear wastages differ from conventional wastages?
(3)
- (b) Outline the role of satellite in weather forecasting.
(5)
- (c) Explain how nuclear energy is used to power a ship.
(7)
- Or
- (d) Mention any three impacts of charge formation in an oil tanker.
(3)
- (e) List down the effects of oil mixing with water. (5)
- (f) Write notes on :
(i) Oil splashing
(ii) Remedial measure for charge formation in oil tanker.
(7)
2. (a) Define impedance. (3)
- (b) Explain the significance of resonance in communication. (5)
- (c) Explain the working of LCR series circuit. (7)
- Or
- (d) What is critical frequency? (3)
- (e) Write a note on ionosphere. (4)
- (f) Explain the principle and working of Marconi Antenna.
(8)
3. (a) Design NAND gate using NOR gate. (4)
- (b) State and prove de Morgan's theorem. (5)
- (c) Convert the following decimal number into binary number.
(6)
- (i) 24
(ii) 365
(iii) 74.
- Or
- (d) With necessary diagram, explain the working of JK flipflop.
(7)
- (e) Discuss the working of astable multivibrator. (5)
- (f) Write the truth table and symbol of NOR gate. (3)
4. (a) Define power gain. (3)
- (b) Compare voltage and power amplifier. (5)

- (c) Explain the input and output characteristics of a transistor in common emitter configuration. (7)
- Or
- (d) What is intrinsic stand off ratio? (3)
- (e) Explain the working of TRIAC. (5)
- (f) What is SCR? Explain its working. (7)
5. (a) Define fidelity. (3)
- (b) What is carrier wave? Explain its significance. (4)
- (c) List down the advantages of AM and FM. (8)
- Or
- (d) Write a note on basic transmitter. (5)
- (e) Explain the principle and working of super heterodyne receiver. (10)
-

B.Sc. DEGREE EXAMINATION
NOVEMBER 2011
Nautical Science
NAVIGATION — II
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Nautical Almanac and Graph paper to be used
 Graph paper to be used if required

Section A

(2 × 15 = 30)

Answer **all** questions.

1. (a) Explain any
- five**
- of the following terms with diagrams:

(5 × 3 = 15)

- (i) SHA.
- (ii) Geographical Position
- (iii) Prime meridian
- (iv) Sidereal time
- (v) Inferior planets
- (vi) LMT.

Or

- (b) Explain any
- five**
- of the following terms with diagrams:

(5 × 3 = 15)

- (i) RA
- (ii) Prime vertical
- (iii) Solar time
- (iv) Angle of Elongation
- (v) Superior planets
- (vi) Mean sun.

2. (a) A star bore due East at an altitude of 45 deg for an observer in latitude 30 deg N. Draw a RH diagram to scale. State the True Alt of the Star when it crosses the observer's meridian (15)

Or

- (b) (i) The LAT sunrise for an observer in lat 35 deg N was 05h 45m. Find the duration of the day for the observer. Also find the time at which the true sun crosses the observers meridian (10)

- (ii) What is equation of time? Where do you get this information.

(5)

Section B

(3 × 15 = 45)

Answer any **three** questions.

3. (a) The GHA sun was 60 deg 12 min when the GHA aris was 255 deg. Find the SHA sun at the instant when 1
- st
- point of aris crosses the meridian of an observer in 085 deg E. (10)

- (b) Calculate the speed at which the Geographical position of a star with a declination of 28 deg N travels across the Earth's surface. (5)

4. In Latitude 37 deg S. the time of theoretical sunrise was 05h 04 m LAT. Find the LAT at which a sight of Sun should be obtained so that the longitude obtained would be the same, irrespective of the DR latitude used. (15)
5. Simultaneous observation of two stars were taken. Star A gave an intercept of 10 min (T) with an Az of 120 deg (T). Star B gave an intercept of 7 min (A) with an Az of 045 deg(T). DR position of observer was 37 deg 12 min N, 179 deg 58 min W. Find the observer's position. Use graph paper provided (15)
6. On 1st Sept 1992, in DR Equator, longitude 50 deg 27 min E, the sextant meridian altitude of the Sun's UL was 82 deg 10.4 min H.E was 17 mtrs, I.E was 2.4 on arc. Find the latitude and state the direction of the position line. (15)
-

NOVEMBER 2011

Nautical Science

SHIP OPERATION TECHNOLOGY — II

(2008 – onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions

(5 × 15 = 75)

1. (a) Define the following:
 (i) Bale capacity
 (ii) Grain capacity
 (iii) Stowage factor
 (iv) Broken stowage.
 (v) Ullage. (10)
- (b) Sketch the Plimsol (Load line) marks on port side of a vessel and label them.
 (5)
- Or
- (c) How will you prepare a cargo hold for loading cargo in bulk?
 (8)
- (d) How will you check the weather tightness of hatch covers on bulk carriers?
 (7)
2. (a) A rectangular tank 20 mtr (L) x 20 mtr (B) x 12mtr (D). Find how many tones of Oil of specific gravity of 0.8 can it hold, if it was required to leave 02% of the Volume of oil loaded for expansion. Find the mass of oil and the tonnage on loading. (10)
- (b) List the types of fire extinguishers available on board and their uses.
 (5)
- Or
- (c) Describe the procedures and instructions for lowering the Life Boat.
 (10)
- (d) List atleast 10 life boat equipments and its uses. (5)
3. (a) Discuss the care and maintenance of LIFE BOAT for weekly and monthly and List the items to be checked during routine maintenance.(15)
- Or
- (b) Discuss the following as per SOLAS requirement. (8)
 (i) Life Jacket (Types, required no's, items to be checked during maintenance)
 (ii) Line Throwing Apparatus (Renewal period, Length, Method of firing and amount to be carried onboard)
- (c) Draw a simple diagram of LIFE BUOY and name the parts and give the dimensions. (7)
4. (a) Define following: (10)
 (i) Oxidation
 (ii) Flash point
 (iii) Ignition point
 (iv) Spontaneous combustion
 (v) Radiation.
- (b) State how will you prevent spreading of fire to the another compartment during fire accident. (5)

Or

- (c) List the precautions to be carried out while carrying hot work.
(15)
 - 5. (a) Outline the knowledge of SOLAS requirement for the following LSA equipment.
 - (i) Life boats (10)
 - (ii) Life rafts
 - (b) List the checks to be carried out for SCBA set. (5)
- Or
- (c) Draw a Muster list for FIRE FIGHTING purpose with 15 persons on board.
(15)
-

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) Define the following :
 - (i) Mast Head Lights
 - (ii) Side Lights
 - (iii) Stern Lights. (5)

Or
- (b) Write notes on the following :
 - (i) Ocean passages of the world
 - (ii) List of Radio signals. (5)
2. (a) What are the lights and shapes exhibited by a vessel in restricted Visibility?
(5)

Or
- (b)
 - (i) Lights and shape exhibited by a fishing vessel.
 - (ii) Lights and shape exhibited by a Mine Sweeper. (5)
3. (a) Write brief notes on the following :
 - (i) Notice to Mariners.
 - (ii) Chart catalogue. (5)

Or
- (b)
 - (i) Sailing directions.
 - (ii) List of Lights. (5)
4. (a) Explain low passage planning is advantageous for safe navigation.
(5)

Or
- (b) As an officer of watch what are the preparations you will make to make a land fall after a long ocean passage.
(5)
5. (a) Explain the meaning of the following alphabetic flages
 - (i) Flag (C)
 - (ii) Flag (S)
 - (iii) Flag (Z)
 - (iv) Flag (F)
 - (v) Flag (Q). (5)

Or
- (b) Write short notes on the following :
 - (i) At the dip and at the Hoist
 - (ii) Courtesy Flag

- (iii) Dressing of Flags
 - (iv) Penalty for not using or wrongly using an Ensign
 - (v) Saluting a Naval Vessel While passing.
-

Nautical Science
NAVIGATION – IV
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) On 23rd Sept 1992 in Estimated position 58° 02'N 178° 50'W, the Sextant Altitude of the Moon's UL near the meridian was 40°38.5' at 09h 52m 10s chronometer time. If Chronometer Error was 11m 04s fast, IE was 0.7' on the arc and HE was 17 mtr. Find the direction of the PL and the Lat where it cuts the DR Long. (15)

Or

(b) On 2nd March 1992, PM at ship in DR 16° 12'N 092° 10E, the Sextant altitude of star Spica near the meridian was 060° 29.4' at 00h 30m 12s chronometer time, error being 02m06s slow. If HE was 48m and IE was 2.0' on the arc. Find the direction of PL and position through which it passes. (15)

2. (a) Find the earliest time on a rising tide on 10th Feb 1992 the ship drawing a max draft of 7.0 mtrs will have an under keel clearance of 1.0 mtrs over a shoal patch marked 3.5 m on the chart in Antwerp (Prosperpolder) ATT – I. (15)

Or

(b) A vessel having a draft of Fwd 6 mtr, Aft 7 mtr wants to clear a bar charted depth 6 m at Bombay on 15th Feb 1992 with a UKC of 2 mtr. Find the earliest time in the evening when the vessel can do so? (15)

3. (a) Write short notes on :

- (i) Equation of time
- (ii) Visible horizon
- (iii) Sensible horizon.

(3 × 5 = 15)

Or

- (b) (i) Why eclipses do not occur at every new moon or full moon.
- (ii) What are the conditions that must be satisfied for an Exmeridian sight?
- (iii) What conditions must be satisfied for an observer to have a heavenly body above the horizon all the time. (3 × 5 = 15)

4. (a) With the help of block diagram explain phasing of a marine echo sounder. (15)

(15)

Or

(b) Write short notes on causes of errors in Echo sounder.

- (i) Cross noise
- (ii) Beam width
- (iii) Maintenance and checks of echo sounder.

(3 × 5 = 15)

5. (a) Gyro compass which damped in tilt will not settle on the meridian except at equator. Explain why? (15)

Or

(b) With respect to Gyro Compass

- (i) What is damping Factor and % damping? (8)
 - (ii) What is latitude and speed error? (7)
-

Nautical Science
SHIP OPERATION TECHNOLOGY – IV
(2008 onwards)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) Define EACH of the following:
- (i) Ignition point of an oil (4)
 - (ii) Volatile liquid (3)
 - (iii) Flash point (3)
 - (iv) Explosimeter. (5)
- Or
- (b) (i) List the precautions to be observed prior making a tank entry. (10)
- (ii) What entries are made in the Oil record book? (5)
2. (a) Provide a sketch of EACH of the following container types
- (i) Open top container. (3)
 - (ii) Bulk tainer. (4)
 - (iii) Ventilated container. (3)
- (b) Describe the Markings on a container. (5)
- Or
- (c) What is Certificates of Fitness for carriage of dangerous goods in packaged form? (8)
- (d) List the main entry found under an EmS entry. (7)
3. (a) What are the precautions to be taken while loading the following cargoes as a duty officer:
- (i) Coal (5)
 - (ii) Iron ore fines (5)
 - (iii) Sulphur. (5)
- Or
- (b) What are the requirements to be complied prior loading Wheat cargo on a bulk carrier? (9)
- (c) Explain the following
- (i) Heavy density cargo. (3)
 - (ii) Hygroscopic cargo. (3)
4. (a) Explain with a diagram Running moor. (10)
- (b) What are the maintenance to be carried out on Anchor & Cables? (5)
- Or
- (c) What are the precautions to be taken onboard a ship before entering a heavy weather area? (8)
- (d) What are the precautions to be taken onboard a ship to prevent pollution while in port? (7)
5. (a) Write short notes on following:
- (i) Hand tool cleaning (3)
 - (ii) Power discing (4)
 - (iii) Pigments (4)
 - (iv) Antifouling paint. (4)
- Or
- (b) Write short notes on following with ref to Painting defects.

- (i) Blistering (3)
 - (ii) Cracking. (3)
 - (c) Explain in brief about the Cathodic protection system.
(9)
-

Nautical Science
NAVAL ARCHITECTURE — II
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Answer **all** the questions.

1. (a) Draw and explain various types of Beams used in ship building process.
(15)
Or
(b) Draw and explain the construction and stiffening of collision bulkhead.
(15)
2. (a) Draw and explain the midship section of the Dry Cargo Ship.
(10)
Or
(b) Draw and explain the closing arrangement of Cargo Hatchways on board a ship.
(10)
3. (a) Draw and explain the oil cooled stern tube used on board a vessel.
(15)
Or
(b) Draw and explain the launching process carried out by various methods of doing.
(15)
4. (a) Draw and explain the propeller shafting arrangement followed on board a ship.
(10)
Or
(b) Explain various local stresses that is experienced by the ship in still water and seaway. (10)
5. (a) A ship of 6000 tonne displacement has its C.G. 5.9 m above the keel and transverse metacentre 6.8 m above the keel. A rectangular double bottom tank 10.5 m long 12 m wide and 1.2 m deep is now half-filled with sea water. Calculate the metacentric height.
(15)
Or
(b) A ship of 5000 tonne displacement 96 m long floats at draughts of 5.60 m forward and 6.30 m aft. The TPC is 11.5, GM_L, 105 m and the centre of flotation 2.4 m aft of midships.
Calculate :
(i) The MCTC
(ii) The New end drafts when 85 tonne are added 31 m fwd. of midships.
(15)
6. (a) Explain the various effects on stability of a ship when carrying the deck cargo as timber on a voyage.
(10)
Or
(b) Construct the curve of statical stability for m.v. cargo-carrier when the displacement is 35,000 t. and KG is 8 m. From the curve find. (10)
(i) The range of stability
(ii) The angle of Vanishing stability
(iii) The statical moment at 50° Heel.
Take :

θ :	5°	10°	15°	20°	30°	45°	60°	75°	90°
KN :	0.9	2	3.2	4.4	6.5	8.8	9.7	9.4	8.4
7. (a) Explain the inclining experiment on the following :
(10)

- (i) conditions applied
- (ii) need to conduct
- (iii) conduct of experiment.

Or

- (b) A ship of 7200 tonne displacement has $KG = 5.2$ m $KB = 3.12$ m and $KM = 5.35$ M. 300 tonne of fuel at kg 0.6 m are now used. Ignoring free surface effect and assuming the km remains constant. Calculate the angle of loll to which the vessel will heel. (10)
8. (a) A box barge 100 m long 12 m beam and 4 m draft has a compartment at the extreme aft end 8 m long, sub-divided by a horizontal watertight flat 2 m above the keel. The centre of gravity is 3m above the keel. Calculate the end draughts if the compartment is bilged below the flat. (15)

Or

- (b) A box-shaped barge of uniform construction is 32 m long and displaces 352 tonnes when empty, is divided by transverse bulkhead into four equal compartment. Cargo is loaded into each compartment as follows :
- No 1 Hold – 192 t No. 2 Hold – 224 t
 No.3 Hold – 272 t No. 4 Hold – 176 t.
- Construct the SF and BM diagram for scale. (15)
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Nautical Science
MARITIME LAW
(2008 onwards)

Time : 3 Hours

Maximum : 100 Marks

Answer any **five** questions.

1. (a) What is jurisdiction? What are the various kinds of jurisdiction?
(10)
- (b) What's Contract Act? Explain the principles of Contract Act.
(10)

Or

- (c) What is writ? What are the various kinds of writs?
(10)
- (d) What are the main sources of international maritime law? What are the various international agencies playing role for the sources of international maritime law?
(10)
2. (a) List the UNCLOS provisions concerning duties and enforcement by flag states.
(10)
- (b) State the provisions of MSA 1958 concerning. (10)
 - (i) Change of Master or Owner
 - (ii) Ships purchased/constructed abroad for an Indian owner.

Or
- (c) List the exclusive rights of the coastal states and inclusive rights of the flag state in the following coastal zones : (10)
 - (i) Territorial Sea
 - (ii) Contiguous Zone
 - (iii) Exclusive Economic Zone.
- (d) What are the UNCLOS stipulations concerning ships flag and Nationality.
(10)
3. (a) Distinguish between (10)
 - (i) Expressed Warranty and Implied Conditions.
 - (ii) Demurrage and Dispatch
 - (iii) Actual possession and Contractual possession.
- (b) List the duties of the owner and the salvor under the 1989 convention on salvage. (10)

Or

- (c) Distinguish between : (10)
 - (i) Laytime and Laydays.
 - (ii) Constructive Total Loss and Partial Loss.
 - (iii) Maritime lien and Possessory Lien.
- (d) Enumerate and explain the implied warranties in a maritime insurance policy.
(10)
4. (a) Explain the following Marine insurance terms with suitable examples.
(10)
 - (i) Insurable interest
 - (ii) Doctrine of proximate cause.
- (b) Explain 'deviation' in a marine insurance policy and under what circumstances are they excused. (10)

Or

- (c) Explain the following institute time clauses : (10)
(i) Inchmaree clause.
(ii) Deductibles.
- (d) Explain the following institute time clauses : (10)
(i) Termination
(ii) Classification.
5. (a) What is a shipping casualty and the provisions under the MSA 1958 for reporting it? What is included under the definition of wreck under MSA 1958?
(20)
- Or
- (b) What are the obligations of the master under the MSA 1958 as regards to rendering assistance
(i) To a vessel in distress
(ii) In case of collision with another vessel. (20)
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CP-4017

B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

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**Nautical Science
MARINE ENGINEERING AND CONTROL
SYSTEMS — III
(2008 onwards)**

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) Sketch and describe fuel piping system starting from fuel storage tank to main engine fuel injector.

(6)

(b) Mention provision provided for cleaning fuel filters with engine running.

(5)

(c) How are Windlass Gypsy engaged and disengaged? Show with sketch.

(4)

Or

(d) Describe a domestic FW Hydrophore system with a sketch.

(7)

(e) Define the following properties of fuel : (8)

(i) Viscosity

(ii) Pour point

(iii) Density

(iv) Flash point.

2. (a) Mention two types of turbo charging with suitable sketch.

(5)

(b) Sketch the complete combustion cycle of a four stroke diesel generator engine with valve opening diagram.

(10)

Or

(c) Define the following : (6)

(i) Thermal efficiency.

(ii) Mechanical efficiency.

(iii) Power to weight ratio.

(d) Sketch the complete combustion cycle of a 2 stroke diesel engine with valve timing diagram. (9)

3. (a) Sketch a biological sewage treatment plant and explain its working.

(9)

(b) Sketch and describe an oil discharge monitor using direct light.

(6)

Or

(c) Mention the advantages and disadvantages of a reaction turbine.

(6)

(d) Sketch and describe a chemical sewage treatment plant.

(9)

4. (a) Describe a rotary vane steering gear moved hydraulically.

(9)

(b) Describe a controllable pitch propeller and a hydraulic actuator. (6)

Or

- (c) Describe a bow thruster driven electrically. (6)
 - (d) Sketch and describe a hydraulic transmitter and receiver used in steering gear operation. (9)
5. (a) Explain with a sketch a sprinkler system used for putting of accommodation fires. (9)
- (b) Describe a smoke detector for hold fires with provision for CO₂ flooding. (6)
- Or
- (c) Sketch and describe a CO₂ flooding system for engine room. (9)
 - (d) Describe the various fire detectors in engine room. (6)
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Nautical Science
SHIP OPERATION TECHNOLOGY — IV
(Up to 2007 Batch)

Time : 3 Hours

Maximum : 75 Marks

Answer **all** questions.

Illustrate with suitable diagram.

1. (a) What are the advantages and disadvantages of Aluminum in ship building industry? (10)
 Or
 (b) Discuss the effect of Fire and heat on steel, aluminum, Wood, used in ship building. (10)
2. (a) Explain the principle of cathodic protection and impressed current system. (10)
 Or
 (b) Draw the Stbd. Side load line of Timber cargo vessel of length 90 mtrs. (10)
3. (a) What are the different sources of Marine corrosion of metal surfaces? (10)
 Or
 (b) What are the methods adopted on a ship to combat marine corrosion? (10)
4. (a) What is maneuverability diagram? Draw a diagram to illustrate the “advance, Transfer, tactical diameter for a Port and Stbd. Turn. (10)
 Or
 (b) Explain the terms :
 (i) Crash stop distance
 (ii) Turning circle. (10)
5. (a) Explain the following terms with respect to tonnage measurement of ships :
 (i) Gross tonnage
 (ii) Net tonnage. (10)
 Or
 (b) What information will get from the following ship’s plan :
 (i) General arrangement plan
 (ii) Capacity Plan. (10)
6. (a) Write notes on the following paints :
 (i) Anti fouling paints
 (ii) Epoxy. (10)
 Or
 (b) Explain the methods used for derusting on board ship for normal maintenance and during Dry docking. (10)
7. (a) What are GMDSS equipment carriage requirement for AREA-A1, AREA-A2, AREA-A3. (15)

Or

- (b) Procedure for sending an Distress message on GMDSS equipments equipped on
for a Vessel trading AREA- 3. (15)
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