C–0134

Sub. Code
11613

B.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Nautical Science

NAUTICAL MATHEMATICS – I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Find $\overline{a} \times \overline{b}$ if $\overline{a} = \overline{i} + 2\overline{j} - \overline{k}$ and $\overline{b} = \overline{i} + \overline{j} + \overline{k}$.

2. Define random experiment and sample space.

3. What is the standard form of the equation of an ellipse?

4. Give any two properties of conic.

5. State the cosine formula in spherical triangle.

6. Define Napier's rule.

7. If $y = x \log x$, find $\frac{dy}{dx}$.

8. Evaluate $\int_0^{\pi/2} \cos^2_{x/2}\, dx$.

9. Multiply the matrices $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$.

10. Define eigen values of a matrix.

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) State and prove Baye's theorem.

Or

(b) Find the mean, medium, range and standard deviation for the following marks of 10 students.

20, 22, 27, 30, 40, 48, 45, 32, 31, 35.

12. (a) Find the point at which the curve $x^2 + y^2 = 5$ parallel to the line $2x - y + 6 = 0$.

Or

(b) Explain the focus, eccentricity and directrix of the parabola $y^2 = 4ax$.

13. (a) Given a spherical triangle with a = 72°18', b = 51°38', c = 59°56', find C by means of cosine formula.

Or

(b) If two sides of a spherical triangle be supplementary, prove that the median passing through their intersection is a quadrant.

14. (a) If $\sin y = x \sin(\alpha + y)$, prove that $\frac{dy}{dx} = \frac{\sin^2(\alpha + y)}{\sin \alpha}$.

Or

(b) Evaluate $\int \frac{x\,dx}{(x-1)(x-2)(x-3)}$.

15. (a) Solve the following system of equation, if consistent $x + y + z = 3$, $x + y - z = 1$, $3x + 3y - 5z = 1$.

Or

(b) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Find the coefficient of correlation between industrial production and export using the following data.

Production x:	54	55	56	59	60	60	62
Export y:	35	38	37	39	44	43	44

Or

(b) Find the area of a plate in the form of a quadrant of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

17. (a) In any spherical triangle ABC, prove that $\frac{\sin A}{\sin a} = \frac{\sin B}{\sin b} = \frac{\sin C}{\sin c} = \frac{2n}{\sin a \sin b \sin c}$, where $2n = \sqrt{1 - \cos^2 a - \cos^2 b - \cos^{2c} + 2\cos a \cos b \cos c}$.

Or

(b) Evaluate $\int \frac{x\,dx}{\left(x^2 + 2x + 2\right)^2}$.

18. (a) Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 0 \\ -1 & 0 & 2 \end{bmatrix}$.

Or

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

C–0135

Sub. Code
11614

B.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Nautical Science

NAUTICAL PHYSICS AND ELECTRONICS - I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Impact.

2. State Newton's experimental law.

3. What is toroid?

4. Draw the simple electric lighting circuit.

5. Define stoke's law.

6. Write any two applications of Bernoulli's.

7. What are semi conductors?

8. Give the application of diodes.

9. Define range.

10. What is Azimuth mirror.

Part B (5 × 5 = 25)

Answer all questions

11. (a) State and explain Kepler's law.

Or

(b) Derive the expressions of surface tension.

12. (a) Discuss the characteristics of battery.

Or

(b) Briefly explain the toroid and solenoid.

13. (a) Derive the Bernoulli's equation.

Or

(b) Explain about marine hydrometer.

14. (a) Explain about optical pyrometer with a diagram.

Or

(b) Write the applications of a photo-diode.

15. (a) Explain in detail the thermistor characteristics and application.

Or

(b) Discuss radar altimeters and be cones.

Part C (3 × 10 = 30)

Answer all questions.

16. (a) What is coplanar forces. Derive the expression of coplanar forces acting at a point.

Or

(b) Discuss in detail, R.M.S and peak values of AC theory.

17. (a) Discuss in detail about the photoelectric effect with diagram.

Or

(b) Describe the construction and working of Plimsoll mark.

18. (a) Discuss the construction and working of a bridge rectifier.

Or

(b) Explain in detail about radar altimeters and be cones.

———————

C–0136

Sub. Code
11615

B.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Nautical Science

NAVAL ARCHITECTURE – I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is stability of ship?

2. What is density? Mention units and density of SW and FW.

3. What is TPC? Mention formula.

4. Explain Archimedes principle.

5. What is dead weight?

6. What is the purpose of Load line?

7. Explain Bilge keel.

8. Where Bilge tanks are located?

9. Explain Draft and freeboard.

10. What are the safety precautions to be taken while welding?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Write a short note on

(i) Pump Room.

(ii) Wheel house.

Or

(b) What are the types of cargo carried in bulk carrier?

12. (a) Write a short note on shell plating.

Or

(b) Explain types of keel.

13. (a) A box shaped vessel 20 × 6 × 4.5 m floats in DW of RD 1.010 at a draft of 2.4 m. Calculate the percentage reserve buoyancy in DW of RD 1.020.

Or

(b) A ship floating in SW at a draft of 8 m is 110 m long and 14 m wide at the water line. If the block coefficient is 0.72, find the present displacement. If the load displacement is 12000 t, find the DWT available?

14. (a) A ship is floating at a draft of 8.2 m in DW of RD 1.010. If the TPC in SW is 40, find how much cargo can be loaded to bring the draft in the same DW to 8.4 m.

Or

(b) The length and breadth of the water plane of a ship are 100 m and 12 m. If the coefficient of fineness of water line is 0.7 m, find TPC in SW and in FW.

15. (a) In a vessel of 7850 t displacement , KG 8.4 m, 150 t of cargo is loaded on the UD (KG = 10 m). Find the final KG.

Or

(b) Given the following particulars of a ship, calculate her fluid GM : W = 10000 t, KG = 9.0 m, KM = 9.8 m, moment of interia of surface of tank about its centre line = 1242 m 4 RD heavy of fuel oil in the tank = 0.95.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Define the following

(i) APT perpendicular.

(ii) TPC.

(iii) Reserve buoyancy.

(iv) FWA.

(v) Draft moulded.

Or

(b) Draw and explain the following parts of a ship.

(i) Steering gear compartment.

(ii) Hatch covers of a cargo hold.

17. (a) Define the following using diagram.

(i) Metacenter.

(ii) Centre of gravity.

(iii) Centre of buoyancy.

(iv) Metacentric height.

(v) Righting lever.

Or

(b) A ship of 4000 t displacement has KG 5.1 m, KB 2.1 m, KM 5.5 m. Find the moment of statical stability. When she heels 24°, assuming that she is wall-sided.

18. (a) A ship's derrick, whose head is 22 m above the keel, is used to discharge a weight of 20 t (KG 5 m), lying on the centre line. If the ship's displacement and KG before discharging were 6000 t and 8 m calculate the KG (i) when the derrick lifts the weight and (ii) after discharging.

Or

(b) Write the difference between stiff ship and tender ship.

———————

C–0137

Sub. Code
11616

B.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Nautical Science

SHIP OPERATION TECHNOLOGY — I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Holiday in paint?

2. Write down the timing of navigation watch on board?

3. How many navigation lights on ship

4. Write down the types of compass on board.

5. Write down the marking of the life jacket.

6. What is TPA and its use?

7. Draw the fire triangle.

8. Write down the types of fire extinguisher on board.

9. What is SCBA and when it is used?

10. What is SWL and where you find it?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Draw the ship and name the parts from forward to AFT.

Or

(b) Painting defects and prevention.

12. (a) Boxing of compass from South West to north.

Or

(b) Write down ten PPE and its uses.

13. (a) Write down the life raft equipments.

Or

(b) Explain the launching of life raft manually.

14. (a) Write down the fireman outfit equipments.

Or

(b) Explain the maintenance of fire fighting equipment.

15. (a) Write down the difference between natural fiber rope and synthetic fibre rope.

Or

(b) Explain about the care and maintenance of ropes.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Write down the definitions of above :

(i) Vessel

(ii) Sailing Vessel

(iii) Fishing Vessel

(iv) Restricted visibility

(v) Wig craft.

Or

(b) How will you take over duties on bridge?

17. (a) How will you lower the life raft manually and by HRV?

Or

(b) Marking of life boat and life raft.

18. (a) Explain the making of nature fibre rope and synthetic rope.

Or

(b) Write down the types of knots, hitches wipping and its uses.

———————

C–0138

Sub. Code
11623

B.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nautical Science

NAUTICAL MATHEMATICS — II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Verify $\frac{1+i}{1-i} = i$.

2. Find the modulus of $\frac{2+i}{4i + (1+i)^2}$.

3. What is the order of error in the Trapezoidal rule?

4. Define numerical integration.

5. Define solenoidal vector.

6. Show that $\bar{f} = (\sin y + z)\,\bar{i} + (x \cos y - z)\,\bar{j} + (x - y)\,\bar{k}$ is irrotational.

7. Eliminate c from $y = cx + c - c^3$.

8. Solve : $e^x \tan y\,dx + (1 - e^x)\sec^2 y\,dy = 0$.

9. Discuss oscillatory electric circuit.

10. Solve : $(D^2 - 2D - 8)y = 0$.

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Find the square roots of $1 + i$.

Or

(b) Find the expansion of $\sin n\theta$, n being positive integer.

12. (a) Determine $\frac{dy}{dx}$ from the following table :

x :	0	1	2	3	4	5
y :	0	1	8	24	64	125

Or

(b) Evaluate $\int_0^1 \frac{dx}{1 + x^2}$, using Trapezoidal rule with $h = 0.2$.

13. (a) Show that $\bar{f} = (y^2 + 2xz^2)\bar{i} + (2xy - z)\bar{j} + (2x^2z - y + 2z)\bar{k}$ is irrotational.

Or

(b) If $r = |\bar{r}|$, where $\bar{r}$ is the position vector of the point (x, y, z), prove that $\nabla^2 (r^n) = n(n + 1)r^{n-2}$.

14. (a) Solve : $(x^2 + y^2)\frac{dy}{dx} = xy$.

Or

(b) Solve : $\frac{dy}{dx} - y \tan x = e^x \sec x$.

15. (a) Solve : $(D^2 - 4D - 5)y = e^{2x}$.

Or

(b) Solve : $(D^2 + 5D + 6)y = \sin 4x$.

Part C $(3 \times 10 = 30)$

Answer **all** questions.

16. (a) Prove that $(\cos\theta + i\sin\theta)^n = \cos n\theta + i\sin n\theta$.

Or

(b) Prove that :

$\sin h5x = 16\sin h^5 x + 20\sin h^3 x + 5\sin hx$.

17. (a) Evaluate $\int_0^2 \frac{dx}{x^3 + x + 1}$ to 3 decimals, dividing the range of integration into 8 equal parts using Simpson's rule.

Or

(b) Verify Stoke's theorem for $\bar{f} = xy\bar{i} - 2yz\bar{j} - 2x\bar{k}$ where S is the open surface of the rectangular parallelopiped formed by the planes $x = 0$, $x = 1$, $y = 0$, $y = 2$, $z = 0$, $z = 3$ above the $x \circ y$-plane.

18. (a) Solve :

(i) $(y^2 e^x + 2xy)dx - x^2 dy = 0$

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

Or

(b) Solve : $(D^4 - 4D^2 - 5)y = x\,e^x + e^x \cos x$.

———————

C–0139

Sub. Code
11624

B.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nautical Sciences

NAUTICAL PHYSICS AND ELECTRONICS — II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Give any two uses of Nuclear energy as a power for the Submarines.

2. Define remedial measures in Electrostatics.

3. Explain Impedance.

4. What is meant by ground waves and sky waves?

5. Define NAND gate with symbol, Circuit diagram and the truth table.

6. Give any two differences between Astable and Bistable multivibrators.

7. Give any two applications of Switching transistors.

8. Explain power gain in transistors.

9. Describe the concepts of MCW.

10. Define the principle of Super heterodyne receiver.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Describe about satellite for weather forecast identification.

Or

(b) Describe briefly about oil splashing and its applications.

12. (a) Explain briefly about the effect of ionosphere on radio waves.

Or

(b) Give a short notes on half adder and full adder circuits.

13. (a) Explain about the working of RS flip flop and JK flip flop with suitable diagrams and their truth tables.

Or

(b) Describe the basic modes of using transistors in common emitter configuration with its input and output characteristics.

14. (a) Give a short notes on switching transistors.

Or

(b) Give a short notes on AM and FM.

15. (a) Describe the Basic transmitter and its functions.

Or

(b) Explain the advantages and disadvantages of super heterodyne receiver.

Part C (3 × 10 = 30)

Answer all questions.

16. (a) Describe the construction and working of a nuclear reactor. When is the reactor said to be Critical?

Or

(b) Write a brief notes on electrostatic charging to oil in pipeline flow and its remedial measures.

17. (a) (i) Explain the uses of electrical resonance in radio Communication.

(ii) Write a short notes on skip distance and skip zone.

Or

(b) Write a short notes on binary addition and binary Subtraction.

18. (a) (i) Differentiate between voltage amplifier and power amplifier in transistors.

(ii) Define modulation. Write a short notes on various modulation techniques and its applications.

Or

(b) Describe briefly about the principle and working of super heterodyne receiver with functional organization .

———————

C–0140

Sub. Code
11625

B.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nautical Science

SHIP OPERATION TECHNOLOGY — II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the meaning of short stay and long stay?

2. What is foul anchor and what is foul hawse?

3. What is the use of bow stopper? Name the different types of anchors.

4. Define weighing anchor. What is veer cable?

5. What is anchor aweigh clear hause?

6. What is the use of the chart?

7. What is immersion suits and TPA?

8. What is the use of hydrostatic release unit?

9. Write down the safety precaution while repairing radar?

10. What is track each and head reach?

Part B (5 × 5 = 25)

Answer **all** questions

11. (a) Explain the weighing anchor.

Or

(b) Write down the notes on securing anchor for sea.

12. (a) Write down the procedure of starting life boat engine.

Or

(b) Write down procedure of launching life raft in case of emergencies.

13. (a) Write down (PPE) Personal Protective Equipment on board.

Or

(b) What are the safety precaution while entering battery room?

14. (a) Write down the starting procedure for emergency fire pump.

Or

(b) What is the advantages and disadvantages of a (i) smoke helmet party (ii) scaba set?

15. (a) What is squat and what is shallo water effect? Draw the diagram and explain it.

Or

(b) Calling master by OOW, give the reasons.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Write down the notes about anchor ready for letting go.

Or

(b) Explain about the standing moor with suitable diagram.

17. (a) What is the action for manover board? and write down the "Williamson turn circle" with diagram.

Or

(b) Write down fire detection system and its uses.

18. (a) What is the duty of the OOW when vessel is at anchor?

Or

(b) Anchor is dragging towards shore, what is your action?

———————

C–0141

Sub. Code
11626

B.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nautical Science

NAVIGATION — I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is great circle?
2. Define the term 'Poles'.
3. What is parallel of latitudes?
4. Define parallel sailing.
5. Define Rhumb Line sailing.
6. What do you understand by 'Mean Latitude'?
7. What is DR position?
8. Define the term 'variation'.
9. What is sextant?
10. Define the term 'DIP'.

Part B $(5 \times 5 = 25)$

Answer **all** questions

11. (a) (i) What do you understand by latitude and longitude? Explain with neat diagram.

(ii) What is geographical miles?

Or

(b) (i) What is compass?

(ii) Draw boxing of compass and mark all cardinal points.

12. (a) (i) Find the gyro error and fill the gyro compass error and name them.

	①	②	③
Rdg (T) :	275° (T)	126° (T)	044° (T)
Rdg (G) :	276° (G)	124° (G)	044° (G)
Gyro Err :	–	–	–

(ii) Fill with Gyro course in the following table.

	①	②
True course :	144° (T)	186° (T)
Gyro error :	1° (H)	2° (L)
Gyro course :	–	–

Or

(b) (i) Fill the variation in the given table.

	①	②
Brg (T) :	245° (T)	002° (T)
Brg (M)	246° (M)	350° (M)
Var :	–	–

(ii) Find magnetic bearing and fill in the following table.

	①	②	③
Brg (T)	275° (T)	147° (T)	004° (T)
Var	15° E	12° W	6.5° E
Brg (M)	–	–	–

13. (a) (i) What do you mean by 'course'?

(ii) Find true course from given quarantal course.

	①	②	③
Q. Course :	N 62° W	S 07° E	S 42° W
True course :	–	–	–

Or

(b) (i) Find d'lat and name the correct direction.

	①	②	③
Lat from :	20°32' S	36°27' N	32°41' S
Lat to :	18°20' N	49°25' N	43°20' S
d'lat :	–	–	–

(ii) Find mean latitude (M'lat)

	①	②
Lat A	00°10' S	79°14' S
Lat B	66°59' N	62°23' S
M lat	–	–

14. (a) (i) What do you understand by 'Meridional parts'.

(ii) Find DMP for the below given latitudes.

	①	②	③
Lat A	10°19' N	00°04.0' S	40°18' N
Lat B	02°12' S	12°05.2' N	68°00' N

Or

(b) (i) Define the term 'Azimuth'. Explain with sketch.

(ii) What is Parallax correction? Explain with diagram.

15. (a) Find the course and distance from

Position A : Lat 40°24' N Long : 086°38' E

To Position B : Lat 40°24'N Long : 093°41' E

Or

(b) Find the position arrived

Position : Lat : 36°12' N 089°18' E

Course : East : Distance : 300 m (parallel sailing)

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Find the course and distance from the following :

Posn A : 04°16' S 177°37' W

Posn B : 02°29' S 179°24' E (plane sailing)

Or

(b) Find the position arrived in the following case

Posn left : 50°00.6' N 081°10.4' W

Course : 132°(T) : Distance : 290 M (Plane sailing)

17. (a) Find the course and distance using TT

A : 20°30.0' N 179°36.0' E

B : 16°18.0' N 173°32.0' W.

Or

(b) Find the position arrived from the given information

Posn left : 36°48' N 085°53'W

Course : 241° (T), Distance : 1897 M (Mercator)

18. (a) Find the course and distance the mercador sailing.

From : 24°00' N 074°15' W

To : 46°00' N 053° 45' W

Or

(b) On 6th March a ship in position 46°36' S 175°34' E steamed as follows (Days work)

	Time	Co (c)	Dev	L' Way	Wind	Speed kn
6th	1200	150°	5°E	3°	5 W × W	8
	1600	140°	4°E	5°	SW	8
	2000	120°	3°E	Nil	SW	7.5
	2400	120°	3°E	Nil	SW	6.5
	0400	100°	1°E	Nil	S	8
	0800	095°	Nil	Nil	S	8
7th	1200	095°	Nil	Nil	S	8

Variation 10°E throughout. Find out DR position at noon on 7th March and if the observed position then was 48°14.3'S 178°06.5'E. Find the set drift of current.

C–0142

Sub. Code
11632

B.Sc. DEGREE EXAMINATION, APRIL 2019

Third Semester

Nautical Science

CARGO HANDLING AND STOWAGE – I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Grain capacity.

2. Proof load.

3. Bale capacity.

4. Load density.

5. Mechanical advantage.

6. Name the difference between fore and drafts and that of mid ships drafts.

7. Mention any two conditions of hose test on a bulk carrier.

8. Enumerate or name the types of pumps used in VLCC for discharging oil cargo.

9. Mention any two reasons that contribute in the explosion on a tanker.

10. Name any two gas carriers.

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Define :

(i) Flow moisture point.

(ii) Flow state and

(iii) Moisture migration.

Or

(b) (i) Angle of repose.

(ii) Moisture content and.

(iii) Transportable limit.

12. (a) Enumerate the audible and visual alarms of 1 G system.

Or

(b) Describe tank washing atmosphere.

(i) Flammable range

(ii) Lower flammable limits (LFL) and Upper flammable Limit (UFL).

13. (a) Describe the building method as required by grain code regulations.

Or

(b) What are the stability criteria required by code of carriage of grain?

14. (a) What are the guide lines and precautions, recommended by IMSBC code is achieve maximum permissible cargo in a given cargo hold of a bulk carrier?

Or

(b) Dimension of Cargo hold is 17 m × 15 m × 10 m. Summer drafts is 12.8 mts. Stoware factor cargo to be loaded is 1.68 m^3/ tonne. Find maximum permissible cargo as per IMSBC code.

15. (a) Name the types of bulk carriers as per the size of the bulk carriers.

Or

(b) Describe operating procedures for cooling a tank prior loading in a LNG carrier.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Draw a neat diagram of inert gas plant and label and explain each part.

Or

(b) Write down the procedures in detail to prepare the cargo hold for loading on a bulk carrier.

17. (a) Describe the procedure of loading and securing of heavy weight on deck on general cargo ships.

Or

(b) Enumerate the describe any four types of gas carrier.

18. (a) Enumerate the guidelines loading timber deck cargo.

Or

(b) Describe the advantages and disadvantages of union purchase system.

———————

C–0143

Sub. Code
11633

B.Sc. DEGREE EXAMINATION, APRIL 2019

Third Semester

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEM — I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is hardening?
2. What is the use of air compressor on board?
3. What is demister?
4. What are safeties in boiler?
5. Write the components used in refrigeration cycle.
6. Define power factor.
7. What is compression Ignition engine?
8. What are the strokes involved in 4-stroke engine?
9. What is preferential trip?
10. Write any six parts in two-stroke engine?

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Write short notes on :

(i) Smelling

(ii) Refining

(iii) Quenching.

Or

(b) Describe the various metals and alloys used onboard.

12. (a) What is the use of air battle onboard and its mountings and safeties?

Or

(b) Describe the Hydrophone fresh water system.

13. (a) Sketch and describe the water tube boiler.

Or

(b) Explain the mountings of boiler with it's safeties.

14. (a) Describe the refrigeration cycle.

Or

(b) Write short note on :

(i) NPSH

(ii) Positive displacement pump

(iii) Priming.

15. (a) Define :

(i) Voltage

(ii) Current

(iii) Apparent power

(iv) Reactive power.

Or

(b) Write the procedure for paralleling of two alternates.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Sketch and describe various types of scavening for two-stroke engine.

Or

(b) Draw the trimming diagram of four-stroke and two-stroke engine.

17. (a) Explain the construction of transformer and mention it's application.

Or

(b) With neat sketch, explain the working of fresh water generator.

18. (a) Explain the working and construction of four-RAM steering system.

Or

(b) Sketch and describe the boiler working system and write the various application of steam.

———————

C–0144	Sub. Code 11634

B.Sc. DEGREE EXAMINATION, APRIL 2019

Third Semester

Nautical Science

VOYAGE PLANNING AND COLLISION PREVENTION – I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define natural scale.

2. What is the use of BA 5011?

3. What is the purpose of a leading light?

4. What do you mean by degree of reliability?

5. From where will you find variation of a given place?

6. What is deviation?

7. Explain DR position.

8. Show course madegood (CMG) using a simple diagram.

9. Define P.D. V/L according to COLREGS.

10. Explain what is a C.B.D V/L.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Give brief details what you will obtain from a nautical chart.

Or

(b) Give symbols for the following as per BA 5011.

(i) Wreck with mast seen

(ii) Depth contour 10 m

(iii) Racon

(iv) Light V/L

(v) Pilot station.

12. (a) Explain about notice to mariner.

Or

(b) How do you use vertical sextant angle to soil around an arc?

13. (a) How will you convert compass bearing to true bearing?

Or

(b) What is Gyro Error? How will you convert Gyrocourse to true course?

14. (a) Explain the following with suitable diagrams.

(i) Set and Drift

(ii) Leeway.

Or

(b) Define the terms estimated position and observed position.

15. (a) What is a 'RAM' V/L? Explain briefly according to COLREGS.

Or

(b) What do you mean by 'LOOKOUT'?

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) What are the various types of charts? Explain any three of them briefly.

Or

(b) What is an Admiralty chart catalogue? What are the salient features of it?

17. (a) Explain briefly about T.S.S according to COLREGS.

Or

(b) What is crossing situation? What do you mean by stand on V/L and give way V/L according to COLREGS?

18. (a) What are the responsibilities between vessels according to COLREGS?

Or

(b) What does 'RULE 19' of COLRtG Sery? Explain action by vessels in this rule.

———————

C–0145

Sub. Code
11635

B.Sc. DEGREE EXAMINATION, APRIL 2019

Third Semester

Nautical Science

NAVAL ARCHITECTURE —II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is shell expansion plan?

2. What is T_{PC} and its formula?

3. What are the two main catheodic protection system installed on ship?

4. State Simpson's 3rd rule.

5. What is LCB?

6. What is Free surface effect?

7. What is the prime function of Bilge keel?

8. What are sounding pipes and Air pipes fitted on Board?

9. What is the use of longitudinal framing and tranverse framming system in ship construction?

10. Define MCTC and formula.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Give a brief note on the testing of materials in ship building industry.

Or

(b) A ship of 4000 tonnes displacement has KG : 5.5 m and KM : 6.0 m. Calculate the moment of statical stability when keeled 10°?

12. (a) Give a brief note on shell planning and deck plating.

Or

(b) A box shaped vessel in 24 m × 5 m × 5 m and floats on even keel at 2 m draft. KG = 1.6 m calculate the initial metacentric height.

13. (a) Explain casting and forging process.

Or

(b) Purpose and construction of sounding pipe and Airpipe.

14. (a) What are the functions of water tight bulkhead?

Or

(b) When a ship of 12000 tonnes displacement is keeled $6\frac{1}{2}$ degree, the moment of statical stability in 600 tonnes m. Calculate the initial metacentric height.

15. (a) State any seven classification societies.

Or

(b) A ship 150 metres long has a displacement of 7200 tonnes, and infloating upright on an even keel. When a height of 60 tonnes, already on board, is shifted 24 metres forward, the trim is changed by 0.15 metres. Find the longitudinal metacentric height.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Explain the construction of AFT peak tank along with a neat sketch and label all the parts.

Or

(b) A box shaped vessel 65 m × 12 m × 8 m has KG 4m and in floating in salt water upright on a even keel condition at 4m draft forward and Aft. Calculate the moments of statical stability at (i) 3 degree keel and (ii) 8 degree keel (iii) 5 degree keel.

17. (a) Explain the functions, construction and stiffening of water tight bulkhead.

Or

(b) A ship's water plane is 72 metres long and the lengths of the half coordinates commencing from forward are as follows :

0. 2, 2.2, 4.4, 5.5, 5.8, 5.9, 5.9, 5.8, 4.8, 3.5 and 0.2 m respectively.

Calculate Area of water plane.

18. (a) 'Mr. Hindship' is floating at condition No. 2 loads 400 tonnes of cargo is No. 1 TD and on the voyage consumes the entire oil in No.2 DB tanks P & S.

Calculate GM (solid and fluid). As change of displacement is negligible, assume FSC constant.

Or

(b) Explain about Hawse pipe and securing arrangement.

———————

C–0146

Sub. Code
11636

B.Sc. DEGREE EXAMINATION, APRIL 2019

Third Semester

Nautical Science

SHIP OPERATION TECHNOLOGY — III

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write down the name of the safety equipments on board.
2. What is planned maintenance system and give the use of it?
3. What is "Corrosion" and how can it be prevented?
4. What is the use of anti-fouling paints?
5. Why should we remove the rust and scale before painting?
6. What is the use of sart? Which radar will interact with sart?
7. What is the use of TPA and Immersion suits?
8. What is the meaning of SMCP? What is the use of it?
9. Write down meaning of "Risk assessment".
10. Why we need to maintain the crew accommodation?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Write down the notes on painting procedure.

Or

(b) List out the contents of muster list.

12. (a) Write down the procedure for abondoning a ship.

Or

(b) Write down the procedures for sending a distress message in voice procedure by VHF and MF/HF sets.

13. (a) Write down how the sart is working with X-band radar?

Or

(b) Write notes on basic components of paints. (i) base pigment (ii) vehicle or binder (iii) solvent or thinner (iv) drier (v) extender.

14. (a) Explain the working method of emergency steering incase of main steering failure.

Or

(b) How will you send an urgency message by voice procedure in VHF & MF/HF units?

15. (a) Write about the personal health and hygiene on boardship.

Or

(b) What is work permit? Explain the procedure for entry in enclosed space.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Explain about permit system, work permit, cold work permit, entry in enclosed permit and working aloft permit.

Or

(b) Explain the procedure for abondoning ship.

17. (a) What is the use of emergency steering and explain the function clearly?

Or

(b) Explain how will you remove the rust and scale and painting method with primer?

18. (a) Man over board. What is your action and explain the "Williamson turn"?

Or

(b) Explain the epirb function, sarts function and gmdss walkie talkies.

———————

C–0147

Sub. Code
11637

B.Sc. DEGREE EXAMINATION, APRIL 2019

Third Semester

Nautical Science

NAVIGATION – II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is 'Ecliptic' on the celestial sphere?

2. Define the term 'Hour Angle'.

3. Define the term 'Amplitude' of the sun.

4. Explain the relationship between GMT, LMT, Longitude (E/W) and LIT.

5. Explain with vertical circles Zenith and Nadir.

6. Define 'V' and 'd' corrections.

7. Explain with rational horizon, sensible horizon and visible horizon.

8. What is 'Dip'?

9. Define 'Refraction Correction'.

10. Explain 'Solstices and Equinoxes'.

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) (i) What is International Date Line?

(ii) Convert the time $9^h\ 23^m\ 14^s$ to are without use of tables and verify the result using the conversion table.

Or

(b) (i) Why stars rise? Culminate and set 4 minutes earlier than the sun each day.

(ii) Find LMT at a place in longitude 66°W, the time zone of which is $+04^h\ 00^m$ at $18^h\ 40^m$ standard time.

12. (a) (i) Define the term 'Equation of time'.

(ii) On certain day the LMT meridian passage of the sun is tabulated as $11^h\ 56^m$. What is the approximate value and sign of equation of time?

Or

(b) (i) Define 'Zone Time' and standard time.

(ii) Find the GMT, when LAT in longitude 46°30' west is $17^h\ 28^m$, if the equation of time is $+7^m\ 15^s$.

13. (a) (i) Define 'local mean time'.

(ii) Convert the following LIT to longitude.

(1) $09^h\ 40^m\ 48^s$

(2) $11^h\ 45^m\ 36^s$

(3) $03^h\ 25^m\ 00^s$.

Or

(b) (i) Define Inferior and superior Meridian.

(ii) Calculate the date of reach to 'B' from 'A'.

	①	②	③
Long A :	178°36'E	177°32'W	173°22'E
Long B :	179°22'W	178°28'E	178°19'E

14. (a) (i) What is the meaning of 'sun at meridian passage'?

(ii) Find the GP of the moon at GMT, March $04^{d}\ 10^{h}\ 11^{m}\ 13^{s}$.

Or

(b) (i) Differentiate the, term the celestial body at 'Before Meridian' and at 'after meridian'.

(ii) Find the GP of Venus on Sept. 2008 at GMT $12^{d}\ 04^{h}\ 23^{m}\ 04^{s}$ in position 41°21S 142°27.2'W.

15. (a) (i) Explain the term 'Intercept' with diagram.

(ii) Find the correct GMT date and time. On 2^{nd} March PM at ship in DR 16°12'N 092° 10'E chron time $00^{h}\ 30^{m}\ 12^{s}$ and error $02^{m}\ 06^{s}$ slow.

Or

(b) (i) What is the relationship between true attitude and true zenith distance? Explain.

(ii) Find the deviation form the following :

True Azimuth : 231.5°(T)

Compass Azimuth : 230.0°(C)

Variation : 1.5°W.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) On 20th July 2008, AM at ship in DR. 44°31'N 069° 42'E, the Azimuth of the Sun was 100°(C) when chron showed $04^h\ 01^m\ 52^s$. If chron error was $04^m\ 20^s$ slow and variation was 8°E, find the deviation for the ship's head.

Or

(b) On 27th April 2008, AM at ship in DR 30°30'N 140°11'W, the Moon bore 204.0°(G) at $16^h\ 30^m\ 56^s$ by GPS clock. Calculate the Gyro error and state if is high or low.

17. (a) On 5th March 2008, in position DR 32°12'N 178°16'E, the rising sun bore 100°(C). If the variation was 30°E, find the deviation of the compass.

Or

(b) On 28th April 2008, in DR 25°20'N 075°00'E, the sextant Meridian attitude of the Moon's LL was 42°05.8'. If IE was 1.5' off the arc and the HE was 25m. Calculate the latitude and the LOP.

18. (a) On 29th Nov. 2008, in DR 26°27'N 130°27'W, the sextant attitude of the Sun's UL, East of the meridian was 28°11', when the chron (error $01^m\ 31^s$ fast) showed $05^h\ 49^m\ 20^s$. If HE was 10^m and IE was 2.3' off the arc, calculate the direction of the LOP and the Intercept.

Or

(b) On 23rd Aug. 2008, PM at ship in DR. 34°31's 003°30'W the sextant attitude of the star 'SPICA' was 45°38.7' when the chron (error $02^m\ 19^s$ slow) showed $06^h\ 15^m\ 00^s$. If HE was 11_m and IE was 2.1' on the arc. Calculate the direction of the LOP and the longitude when it cuts the DR latitude.

C–0148

Sub. Code
11642

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nautical Science

CARGO HANDLING AND STOWAGE – II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the types of crude oil?
2. Name some container securing gears.
3. What is an Angle of Repose?
4. Give examples of cargo in IMSBC code.
5. What is IMSBC code?
6. Give some equipments used for hold cleaning.
7. What is DOA?
8. Explain what do you mean by TRIMMING.
9. Expand :
   (a) SOP
   (b) SMPEP.
10. What is Ullage?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Draw a container and label its parts.

Or

(b) What is the purpose of recording temperature in Refrigerated Cargo?

12. (a) What is TML and FMP?

Or

(b) What precautions do you take for deck machinery from dust in a bulk carrier?

13. (a) How do you test a Hatch Lover for weather tightness?

Or

(b) What is a BLU Lode?

14. (a) What is Fumigation? Why it is necessary?

Or

(b) Different methods of securing grain in compartment.

15. (a) Draw a flammability diagram.

Or

(b) Explain what is an 'VTI' Guage.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) What are the different types of containers? Explain atleast three types of container briefly.

Or

(b) What are the precautions required prior during and after loading of coal?

17. (a) Write about ship shore safety checklist as per BLU Code.

Or

(b) Explain briefly on Grain stability Criteria.

18. (a) Explain I.G. system with a diagram.

Or

(b) What is 'LOW'? Why do you need to carry out Low? Explain in detail dangers involved in it.

———————

C–0149

Sub. Code
11643

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS — II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the oils are using onboard?
2. What are the types of pumps?
3. Difference between crane and derrick.
4. What is Scavenging?
5. What is lubrication?
6. What is Engine?
7. Define Slip.
8. What is UMS?
9. What are the types of detectors onboard?
10. Define IG system.

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Describe the function of auxillary machineries onboard ships.

Or

(b) With neat sketch, explain the bilge line system onboard.

12. (a) Compare a 2-stroke and 4-stroke Engine.

Or

(b) What is the purpose of turbocharger and types of scavenging?

13. (a) With neat sketch, explain the Fresh water cooling system for 2-Stroke Engine.

Or

(b) What are the safety arrangements placed in cranes onboard?

14. (a) Write short notes on

(i) Preheating of Engine

(ii) Types of lubrication in Engine

(iii) Safeties of Engine.

Or

(b) What do you understand by Cylinder head mountings and its importance.

15. (a) Draw and explain the oily water separator.

Or

(b) What do you understand by Sprinkler System Onboard and explain its use.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Draw and explain the CO_2 Flooding System.

Or

(b) With neat sketch, explain sewage treatment plant onboard.

17. (a) Write short notes on:

(i) Draw card

(ii) Power card

(iii) Pitch

(iv) Fixed pitch propellor

(v) Controllable pitch propeller.

Or

(b) Explain the ballast and deballasting system with simple sketch.

18. (a) Describe the working of 2-stroke Engines with its timing diagram.

Or

(b) With Simple sketch, explain the main Fire line System Onboard.

———————

C–0150

Sub. Code
11644

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nautical Science

VOYAGE PLANNING AND COLLISION PREVENTION — II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the arc of visibility of Navigation Lights?

2. State the day and night signal for NUC and Versel of Anchor.

3. What is 'MS' Notices?

4. What are the uses of Mariner's Hand Book NP-100?

5. What do you understand by Halyard?

6. State the uses of 'Plot Flag hoisting'.

7. What is the basic concept of the Passage Planning?

8. Define the term buoys.

9. Define depth Contour.

10. What is the difference between tide and tidal stream?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) (i) What is the range of Visibility of Navigation Lights for a Vessel greater than 50 metres in length as per the Rule No.22.

(ii) Define all round light.

Or

(b) (i) What is the difference between a power driven vessel 'Underway' and 'Making way'?

(ii) Define 'Sailing Vessel'.

12. (a) (i) Define Morse Code Signalling.

(ii) Give the meaning of the below given flags hoisting.

(1) Bravo

(2) Golf

(3) Hotel.

Or

(b) (i) Define Flag Signalling.

(ii) State the Sound signal and the meaning for the following:

(1) One Short Blast

(2) Two Short Blast

(3) Three Short Blast.

13. (a) (i) What is 'Guide to Port Entry'?

(ii) How many volumes are there in Guide to Port entry and state the information available for safe Navigation and Loading/ discharging?

Or

(b) (i) What is 'Sailing Directions'?

(ii) How many SD publication around the World? State the information available for Navigation.

14. (a) What is the Meanings of the followings:

(i) Bunting

(ii) At the Dip

(iii) Close up

(iv) Half Mast

(v) Hoist.

Or

(b) What is the meanings for the followings:

(i) Fly

(ii) Tack line

(iii) Courtesy flag

(iv) Jack flag.

15. (a) (i) What is Radar? How does it works?

(ii) What is ECDIS?

Or

(b) (i) How do you know a chart is updated corrections?

(ii) What do you understand by Raster chart and Vector chart?

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) (i) What is 'Estimated Position'?

(ii) What are the principles of passage planning? Explain all publications required for Passage Planning and information available.

Or

(b) Define the followings:

(i) Ship Routeing

(ii) Traffic Separation Scheme

(iii) Separation Zone

(iv) Traffic lane

(v) Inshore Traffic Zone.

17. (a) Describe the following publications

(i) ALL

(ii) ALRS

(iii) Mariner's Weekly Notices

(iv) Chart Catalogues

(v) Symbols and Abbreviations.

Or

(b) Explain under the terms 'Recognize', 'Responsibility' and 'Action' in the following situation and define with applicable COLREG Rules.

(i) A power driven vessel Right Ahead

(ii) At night-power driven vessel crossing from starboard and crossing from port.

18. (a) Find the height of tide and depth of water at 1430 Hours on March 2nd at a position off Singapore, where charted depth is 4 metres. Extract from the table for the day under reference are given below. (Use Tide Chart).

Extract from ATT

Zone Time – 0800

0014	2.7 m
0603	0.8 m
1209	2.9 m
1830	0.6 m

Or

(b) Find the height of tide off Singapore Harbour at 1100 Hourse (ST) on 3rd February. The following Extracts from the tide tables for the date under reference are given below.

Extract from ATT

Zone Time – 0800

Time	Height
0123	2.7 m
0703	0.9 m
1302	2.9 m
1930	0.5 m

C–0151

Sub. Code
11645

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nautical Science

NAVAL ARCHITECTURE — III

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Use Hydrostatic particulars for solving M.V. Hindship Problems

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is launching?
2. What is lines plan?
3. What are different types of joints?
4. Define net tonnage and gross tonnage.
5. What is centre of pressure?
6. What is a bilge compartment?
7. Give a note on grounding.
8. Define LCB and LCF.
9. What is list and heel?
10. What is known as sea trials?

Part B $(5 \times 5 = 25)$

Answer **all** questions.

11. (a) Describe process control and prefabrication in skip construction.

Or

(b) Sketch the different types of joints in welding.

12. (a) Give a brief note on load line regulation.

Or

(b) Sketch the standard load line marking and describe about deck line and plimsol live.

13. (a) A ship of 6000 tonnes displacement enters a drydock trimmed 0.3 m by the stern $KM = 7.5\,m$, $KG = 6\,m$ and MCTC = 90 tonnesm. The centre of floation in 45 m from aft. Find the effective metacentric hight at the critical instant before the ship takes the blocks overall. Use either method (a) or method (b) to calculate the new LRM.

Or

(b) Brief note on testing and inspection of welds.

14. (a) What are the effects of bilging of compartment and give a note on permeability of a compartment along with derived formula.

Or

(b) A box shaped vessel is 50 meters long and is floating on an even keel at 4 meters draft. A amidships compartment is 10 meters long and is empty. Find the increase in draft if this compartment is bilged see figure 1.1 (follow below)

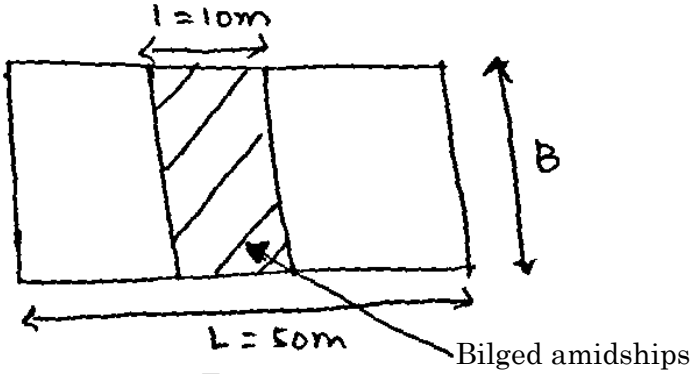

Figure – 1.1

15. (a) What are the functions of classification societies?

Or

(b) What are the classes of fire divisions and describe?

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) A ship is floating in salt water on an even keel at 6 meters draft. TPC is 20 tonnes. A rectangular-shaped compartment amidships is 20 meters long, 10 meters wide and 4 meters deep. The compartment contains cargo with permeability 25 percent. Find the new draft if this compartment is bilged.

Or

(b) Explain lines prior construction of versel, process control and prefabrication. Launching and sea trails?

17. (a) Write all the classification societies and explain the function.

Or

(b) M.V. hindship floating in condition No. 4 A consignment of cargo weighting 500 tonnes in shifted from 3 hold to the upper deck, Kg 13.28 m. Find the final GM (solid and Fluid).

18. (a) Will a homogeneous log 6m × 3m × 3m and relative density 0.4 float in fresh water with a side perpendicular to the waterline? If not, what will be the angle of loll?

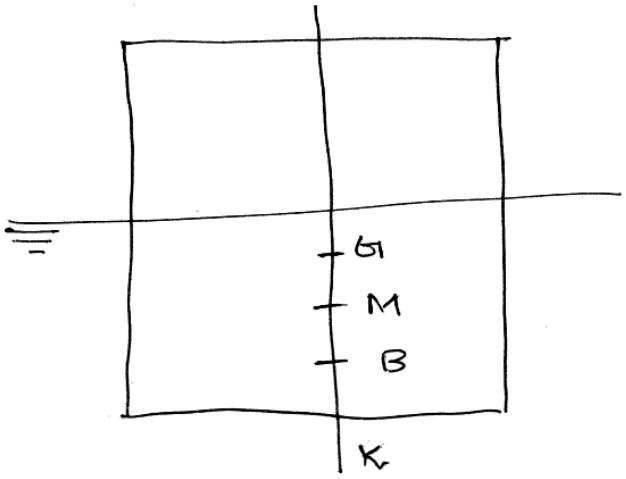

Figure – 1.2

Since the log is homogeneous the CoG must be at half depth (i.e) KG = 1.5 m. Now calculate the angle of loll?

Or

(b) Define Angle of loll and derive the equation to determine the formula of Angle of loll, When the ship is wall sided between upright and inclined water.

———————

C–0152

Sub. Code
11646

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nautical Science

NAVIGATION – III

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is a Great Circle Track?

2. What is Lunar Month?

3. Explain about Circumpolar bodies.

4. What is the Nautex frequency of Operation?

5. What is the use of an ARPA?

6. Why cannot POLARIS be seen from the southern hemisphere?

7. What is a free gyroscope?

8. Name some uses of a VDR.

9. What is a Transducer?

10. What is GDOP?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Write about SOLAR and LUNAR Eclipses.

Or

(b) What are the conditions for a celestial body to be circumpolar?

12. (a) Write about phases of the moon.

Or

(b) Write short notes on

(i) Orbit of Moon

(ii) Liberation of Moon

13. (a) What is DGPS? Explain briefly.

Or

(b) Give some uses of ARPA.

14. (a) Write briefly on the errors of Gyro.

Or

(b) What factors affect the accuracy of GPS?

15. (a) Write short notes on AIS.

Or

(b) What care and checks you should take while using a course recorder.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Find the G.C distance, Initial course and final course from

$A: 06°00'N \quad 079°00'W$

To

$B: 38°00'S \quad 179°00'E$

Or

(b) Draw a block diagram of a Radar and explain the parts briefly.

17. (a) On 28th April 2008 in DR $37°22'N \quad 96°36'W$ the sextant meridian altitude of the moon's LL was 31°58.8'. If IE was 0.4' off the arc and HE was 17m, required the Latitude and Lop.

Or

(b) On 4th MARCH 2008 DR $27°18'N \quad 168°11'W$ the sextant altitude of the sun's LL Near the meridian was 56°19.8'. When the chrono showed 11h 13m 24s. If chrono error was o/m 20s slow HE was 12m and IE was 2.8' on the arc, find the direction of the Lop and a position through which it passes.

18. (a) On 23rd SEPTEMBER 2008 in DR $23°40'N \quad 161°56'E$ the sextant Meridian altitude of the Sun's LL was 66°10.6'. If IE was 2.3 on the arc and He was 10.5m. Find the latitude and the Lop.

Or

(b) On 1st SEPTEMBER 2008, AM at ship in DR $18°00'N \quad 178°11'E$ the sextant altitude of the pole star was 18°47.4' at 05 h 21m 08s by chrono (error 01m 18s slow) H.E was 12.5m, IE 1.6' on the arc. Find the direction of Lop and a position through which to draw it. If Azimuth was 001°(c) and variation was $1.3°E$, find the deviation for that course.

———————

C–0153

Sub. Code
11651

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Nautical Science

CARGO HANDLING AND STOWAGE – III

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the loadline used when carrying Timber Deck Cargo?

2. What are the lashing materials used while carrying Timber on deck?

3. What are the different Charter Parties?

4. What does 'IMDG' stand for?

5. What is MFAG?

6. State the purpose of IBC code.

7. What is the use of a vapour Return Line.

8. Name some hazards associated with chemical tankers.

9. What are the types of chemical tanker?

10. Why do you require a high level alarm?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) What is the effect on stability due to Ice accretion on Timber Deck Cargo?

Or

(b) How is the arrangement done on a Timber Deck Cargo?

12. (a) What are the procedure for a cargo claim.

Or

(b) Explain

(i) Matis Receipt

(ii) B/L

13. (a) What are the effect of heavy lifts on seaworthiness.

Or

(b) What are the precautions to be taken while loading heavy lifts?

14. (a) What is Dangerous Cargo Manifest?

Or

(b) What are the precautions for handling of explosives?

15. (a) Write briefly about P and A manual.

Or

(b) What is a Re-liquefaction plant?

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) What are the contents/salient features of code of safe practice for ships carrying Timber Deck Cargo.

Or

(b) What is note of protest? Write down the conditions when note of protest is done. Why does the master extends the Note of Protest.

17. (a) What are the different classes of IMDG. Give with an example.

Or

(b) Write about seggregation of Dangerous goods. Explain with suitable diagram.

18. (a) What are the entries made on Cargo record book?

Or

(b) Write about various types of Gas tankers.

———————

C–0154

Sub. Code
11652

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Nautical Science

VOYAGE PLANNING AND COLLISION PREVENTION – III

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are the frequencies for distress MF and HF calling?

2. Define radio communication.

3. Describe the use of ITU publication.

4. What do you understand by colregs?

5. What do you mean by "NUC" and What is the day and night signals?

6. Define restricted visibility.

7. What is IALA system of buoyage? Mention the region of IALA system and characteristics.

8. Define geographical range.

9. Abbreviate the following

   (a) NBDP

   (b) SART

   (c) EPIRB

   (d) WWNWS

10. What do you understand by "Inspires"

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) State the use of radio communication equipment on board ship.

Or

   (b) What is MF/HF ? State the usage and functions of safe communication.

12. (a) What are the different between significance between Navtex and Safety Net?

Or

   (b) What is distress alert? What is your action on receiving distress alert from other vessel?

13. (a) State the list of GMDSS equipment to carry on boar ship.

Or

   (b) A power driven vessel greater then 150m in length under way and making – What all lights can you seen from your own vessel? Describe the arc of each light.

14. (a) What is your action while main engine failure as a oow?

Or

(b) Define Isolated danger mark and describe the characteristics of lights of isolated danger mark with diagram.

15. (a) What is the rule for a vessel transitting in a narrow channel and explain the light and sound signals in different situations overtaking and crossing.

Or

(b) What do you understand by AMVER? What is the procedure to report and send a sailing plan?

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) What are the four sea areas? List out the table in all radio equipments as per the area to be carried on board ship.

Or

(b) Define WWNWS. What are the warnings receiving from different sea areas?

17. (a) Describe search and Rescue system. Explain different methods of SAR system while a vessel in distress.

Or

(b) What do you understand by ALRS? List all ALRS and State in detail in the information available in each volume.

18. (a) What do you understand by Colregs? From you own vessel as a oow sighted green light in your port bow and the target length greater than 150m in narrow channel. What is your action as a oow to avoid close quarter situation and risk of collision at the situation of the target vessel not taking any action. Apply all applicable rule to avoid collision and use sketch.

Or

(b) Explain the characteristics of shapes and light of safe water marks. Explain the characteristics of shapes and light lateral marks.

———————

C–0155

Sub. Code
11653

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Nautical Science

COMPUTER PROGRAMMING AND UTILITIES

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. List out the characteristics of computer.

2. Write any two types of memory.

3. Define the term Database.

4. Expand the term RDBMS.

5. Write any two keywords in C language.

6. Define the term Array.

7. Name any two protocols you know.

8. Differentiate between internet and intranet.

9. Write the application areas of Excel.

10. Name any two chart types in Excel.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Classify computers.

Or

(b) Classify computer languages.

12. (a) Discuss on the characteristics of Database.

Or

(b) What is the role of Database Administrator.

13. (a) Explain numeric constants in C language through examples.

Or

(b) Write the general structure of a C program.

14. (a) Elaborate on Internet security.

Or

(b) Discuss briefly on different types of networking.

15. (a) Describe the elements on the first screen of Excel Worksheet.

Or

(b) Write short notes on program development life cycle.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) With block diagram, describe the components of a computer system.

Or

(b) Explain in detail about Relational Data Base Management System.

17. (a) Explain the data types and control statements in C language.

Or

(b) Describe OSI Reference model for network.

18. (a) With examples, explain the use of any ten functions in Excel.

Or

(b) Write steps to create bar chart and line chart for five year's sales data of a company.

———————

C–0156

Sub. Code
11654

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Nautical Science

SHIPPING MANAGEMENT

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is maritime fraud?

2. Define organizational behavior.

3. What do you mean by multimodel transportation?

4. What is cargo management?

5. Who is clearing and forwarding agent?

6. Define liner trade.

7. Define bill of lading.

8. Define statistics.

9. What is communication?

10. Classify the role of intermediaries in shipping business.

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Write a short note on shipping services.

Or

(b) Give a note on functions and services of ports.

12. (a) Describe maritime fraud.

Or

(b) Explain customs and documents required for customs clearance.

13. (a) Explain manpower planning.

Or

(b) Describe the uses and importance of Bill of lading.

14. (a) Write a short note on Multimodel Transportation.

Or

(b) Discuss about Decision Making.

15. (a) Explain the steps involved in Freight rate Fixing.

Or

(b) Discuss the short note on Chartering.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) A vessel of NRT 3780 T Arrives in Port at 0600 hrs on wednesday 20th day of october with 8600T of coal. NOR was accepted at 09.00 Hrs that day. C/P reads "Cargo to be discharge at an average rate of 80

DT/weather working Days (WWD)" SHEX (SUNDAYS@ HOLIDAYS EXPECTED) consignees to pay V/L demurrage at the rate of 0.5 dollar/NRT/Day prorata. Time to commence when the V/L to unload and written notice is given. Despatch Money to be paid by the V/L at the rate of 0.2 dollar/NRT/DAY. saved @ Fronata. Discharge commenced at 1200 hrs on 20th october was completed at 17.00 hrs on 4th November. Bad weather stopped work for 6 hrs on 28th October and Further 4 hrs on the afternoon of 3rd November 1st November was declared as a public holiday. Calculate the amount of demurrage and Despatch.

Or

(b) What is nor and statement of facts?

17. (a) Discuss in detail note on inward and outward clearance.

Or

(b) Discuss about the problems of ballast water and its preventive measure.

18. (a) Enumerate the role of Intermediaries in shipping business.

Or

(b) Briefly describe the structure of shipping industries and its services.

———————

C–0157

Sub. Code
11655

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Nautical Science

METEOROLOGY AND OCEANOGRAPHY - I

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer all questions.

1. What do you mean by Barometric tendency.

2. Define condensation.

3. Explain Buys Ballot's law

4. What is Gradient wind?

5. What do you mean by a drizzle?

6. Name some type of FOGS.

7. Define Relative Humidity.

8. What is Dew point Temperature?

9. What is a co-tidal chart?

10. Define a swell.

Part B (5 × 5 = 25)

Answer all questions.

11. (a) Describe briefly about

(i) DALR

(ii) SALR

Or

(b) What is Diornal Variation of pressure.

12. (a) What is a Geographic wind and a cyclostrophic wind.

Or

(b) What is the Impact of weather on maritime Industry?

13. (a) How are fogs formed?

Or

(b) What is saturated and unsaturated state of water vapour?

14. (a) What is the relationship between tides and phases of moon.

Or

(b) What effect does ocean current have on climate?

15. (a) Draw a whirling psychrometer.

Or

(b) Draw a stevenson screen Hydrometer.

Part C (3 × 10 = 30)

Answer all questions.

16. (a) What is true and apparent wind? Explain how vector calculation is carried out.

Or

(b) Explain Green house effect with a suitable diagram. How is Global warming caused.

17. (a) How are classification of clouds done? Explain briefly about them.

Or

(b) How is fog formed? How it affects meteorological condition on visibility.

18. (a) Describe briefly on various ocean currents.

Or

(b) Explain the working of a aneroid Barometer.

———————

C–0158	Sub. Code 11656

B.Sc DEGREE EXAMINATION, APRIL 2019

Fifth Semester

Nautical Science

NAVIGATION — IV

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Instruction:

Year 1992 Almanac should be used for problems in Part – C

Part A (10 × 2 = 20)

Answer **ALL** questions.

1. Name any two error of GPS.

2. Define the amplifier unit of an echo sounder.

3. Mention any two contents of voyage related data of AIS.

4. State the frequencies dedicated for AIS 1 and AIS 2.

5. State the names any two segments of GPS control unit.

6. Neap range.

7. Drying heights in a diagram.

8. Range of a tide.

9. Tidal stream.

10. Define rudder limit alarm.

Part B (5 × 5 = 25)

Answer **ALL** questions.

11. Describe:

(a) Space segment

Or

(b) User segment of GPS.

12. (a) Define the errors in doppler log.

Or

(b) Explain the general principle on which the doppler works.

13. Describe the gyroscopic inertia and precession with

(a) Suitable diagrams

Or

(b) Describe general features of a GPS.

14. (a) State and define the various controls on the auto – pilot panel.

Or

(b) Define proportional and derivate control of GPS.

15. (a) Enumerate the benefits of S – VDR.

Or

(b) Describe any two modules of S – VDR.

Part C (3 × 10 = 30)

Answer ALL questions.

16. (a) On 30th April 1992 PM at ship in DM 34° 18' S 040 20 ' W the sextant attitude of an unknown star bearing 295° (T) was 57° 48.6 at O$h 52 m 05s chrono time (error 00m 42s). if TE was 2.1' off the are and he was 21m. Identify the star chrono error was fast.

Or

(b) What are the internet limitations of AIS?

17. (a) On 6th March 1992 in DR 20° 12'N 075° 30'E. Find which 1st magnitude stars will be within 30° of hour angle from observer's meridian at the end of PM civil twilight.

Or

(b) Standard port : Townsville

Secondary port : RIB Reef

Tides of standard port

Townville on 26 –12 – 2018

0422 1.0

1047 6.2

1634 1.6

2346 6.9

	Time Difference		Height Differences				S'SL
	MHW	MLW	HHW	LHW	HLW	LLW	CHANGES
Townville	.....	.....	3.1	2.3	1.6	0.8	–0.1
RIB Reef	+0022	+0024	–0.3	–0.3	–0.2	–0.2	–0.1

Find the times and heights of 'RIB Reef' on 26–12–2018

18. (a) Describe the segments of GPS in detail.

Or

(b) Describe the gyroscopic interita an precession with suitable diagram.

———————

C–0159

Sub. Code
11661

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

MARINE ENVIRONMENTAL PROTECTION

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define the term 'Crude oil'.

2. What do you understands by 'special Area'?

3. What is the meaning of 'Sludge Tank'?

4. Define 'SOPEP'.

5. What is IMDG code?

6. What is Noxious Liquid Substances?

7. What is Harmful substances?

8. What do you understand by 'Incineration Ashes'?

9. Define the term 'Plastic'.

10. What is 'Emission Control Area'?

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) (i) What are the special Areas as restricted areas under MARPOL Annex – I?

(ii) What is the meaning of Instantaneous rate of discharge of oil content?

Or

(b) What are the discharge criteria for ships other that oil tankers and for machinery spaces of oil tankers wef 6 | 7 | 1998.

(i) Outside special Areas

(ii) Within Special Areas.

12. (a) (i) What is MARPOL? How many Annexes are there?

(ii) Explain the Annexes and state each Annex deals with what?

Or

(b) (i) What are the Enhanced Surveys and which ships are required to have them?

(ii) What is Cargo Record Book and with refer to chemical Tankers?

13. (a) List out all MARPOL certificate to carry on board vessel and table them the duration and validity of those certificate.

Or

(b) (i) What are the pre-wash procedure for tank washing arrangements under MARPOL Annex – II?

(ii) What are the ventilation procedures under Annex – II?

14. (a) (i) Why certain Harmful substances are to be loaded in limiting in quantity? Explain.

(ii) What are the rules in reception of sewage?

Or

(b) (i) What is NOx? How it is affecting the Ozone layer?

(ii) What is Sox? How it is affecting the Ozone layer?

15. (a) (i) What is Packaged form?

(ii) What is the chemical code?

Or

(b) (i) What is the meaning of Garbage?

(ii) Describe different types of Garbages with grouped and mention the areas to be avoided.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Define the following

(i) PSC (ii) Segregated ballast (iii) Category 'X' (iv) VOC (v) Clean Ballast.

Or

(b) (i) What does Annex – IV say?

(ii) What are the criteria for identification of harmful substance in packed form?

(iii) What are the markings in harmful substances packs?

17. (a) (i) What is Garbage Record Book?

(ii) What are the entries to be in Garbage Record Book?

(iii) What are the special Areas which are not to dispose Garbage Under Annex – V?

Or

(b) (i) What is the procedure in dispose of Plastics?

(ii) Define the following

(1) Sludge Tank (2) Oily Bilge Water (3) Slop tank (4) Global Warming.

18. (a) (i) What are the 'Emergency Plan' for Noxious liquid substances?

(ii) What are the procedures for washing oil tanks?

Or

(b) Define the followings

(i) Product Carriers (ii) Category 'Y' (iii) Ballast Water Management (iv) Regulations (v) Anti failing paint pollution.

———————

C–0160

Sub. Code
11662

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

SEAMANSHIP PRACTICES

(2016 Onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. How many ropes are used in ships? And give their names?

2. Draw diagram of Four hitches and name it.

3. What is cathodic protection?

4. What is the use of heaving lines?

5. What is long stay and short stay?

6. What is veer cable (or) walk back and what is surge cable?

7. What is cock bill and what is foul anchor?

8. What is up and down and what is open hawse?

9. What is use of Bosun chair and stages?

10. What is Wind Rude and what is Lee Tide?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) Write down the care maintenance of different types of ropes.

Or

(b) Write down the special safe working practice.

12. (a) What are L.S.A. and F.F.A. items on board?

Or

(b) How will you use the portable fire extinguishers?

13. (a) Write down causes of corrosion.

Or

(b) Draw the diagram of lugless (kenter) shackle and write the use.

14. (a) Write down the details about painting.

Or

(b) How will you prevent the corrosion?

15. (a) Write notes on coir.

Or

(b) Write notes on synthetic – Fibre ropes.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Write down the notes for care and maintenance of ropes.

Or

(b) Describe the surface preparation and painting work.

17. (a) Describe the docking plans and dry docking works for ship.

Or

(b) Describe the berthing procedure to port and Stbd side in clam weather with necessary diagrams.

18. (a) How will you launch a davit life boat? Write all procedures.

Or

(b) Write about the marking of anchor and chain cables.

———————

C–0161

Sub. Code
11663

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

CONVENTION REGULATION

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Expand (a) ILO (b) WHO

2. Name two important conventions.

3. What is a code?

4. What does Annex I deal with according to MARPOL?

5. What does 'SOLAS' deal with.

6. What is the latest STCW amendments named?

7. Explain what is a baseline.

8. What is UNCLOS?

9. What is the certificate required for Loadline? Who issues the certificate.

10. What is the use of PA manual?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) What are the different classification of Maritime Convention?

Or

(b) Explain about ITF role w.r.t. Shipping.

12. (a) Name some certificates required for ship under SOLAS convention.

Or

(b) Write what are the various Conventions related to marine pollution.

13. (a) Explain briefly about Annex V.

Or

(b) Write short notes on STCW convention.

14. (a) What is the legal status at high seas?

Or

(b) Explain EEF.

15. (a) What is a special trade passenger ship?

Or

(b) Explain about INMARSAT system.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) What are the objectives and functions of IMO?

Or

(b) What are different Annexes as per MARPOL 73/78? What it deals and when it came in force.

17. (a) What is a 'SPECIAL AREA' according to MARPOL? Give a list of special areas for various annexes.

Or

(b) Explain in detail on 'SOLAS' convention.

18. (a) According to UNCROS classify various sea areas.

Or

(b) Describe briefly on Tonnage Measurement.

———————

C–0162

Sub. Code
11664

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

MARITIME LAW

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is Civil Law?

2. Where are ships registered in India?

3. What is COGSA?

4. Define agreement based on Indian Contract Act.

5. Name some perils of sea for which insurance is applicable.

6. What is a wreck?

7. Define 'TOWAGE'.

8. Who is a 'STOWAWAY'?

9. What is a 'DOS'?

10. What is the basic objective of 'MLC 2006'?

Part B (5 × 5 = 25)

Answer **all** questions.

11. (a) What is the requirement under MSA 58 for apprentice?

Or

(b) How is investigation carried out as per MSA 58?

12. (a) Write briefly about Multimodal Transport.

Or

(b) Write short notes on P & I Club.

13. (a) What is SALVAGE? Write about LOF.

Or

(b) What is an 'OFFICIAL LOG BOOK'? Name some entries made in it.

14. (a) What are the equipments required under ISPS for maintaining security?

Or

(b) Explain the following w.r.t. ISPS :

(i) SSO

(ii) LSO.

15. (a) How are seafarers engagement done on board?

Or

(b) What do you mean by abandonment of seafarer?

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) How are ships registered as per MSA 58?

Or

(b) Explain following :

(i) Wages

(ii) Allotment

(iii) Advances of wages

(iv) Deduction (Recovery).

17. (a) What are the various charter party? Give brief detail about them.

Or

(b) Write in detail :

(i) Hague Visby rules

(ii) Hamburg rules.

18. (a) Write about various security levels and what measures are to be taken to maintain security of vessel?

Or

(b) What are the causes for disciplinary action and where the entries are to be made?

———————

C–0163

Sub. Code
11665

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

METEOROLOGY AND OCEANOGRAPHY — II

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Sea
2. Gust
3. Veering
4. Backing
5. Isobars
6. Sleet
7. Routeing of ships
8. Pressure gradient
9. Relative humidity
10. If you are facing the direction of the true wind on your right is the low pressure in northern hemisphere. (True or False)

Part B (5 × 5 = 25)

Answer **all** questions

11. Define :

(a) Katabatic winds and anabatic winds.

Or

(b) Sea Breeze and land breeze.

12. Enumerate :

(a) Early warning sings of TRS.

Or

(b) Ideal conditions favourable for the formation of TRS.

13. (a) Why cloudy nights are Warmer?

Or

(b) What are factors to be considered for weather routeing of ships?

14. (a) Describe the Fohn wind effect with suitable diagram.

Or

(b) Define warm and cold currents and give minimum five examples of those currents.

15. (a) Ship's course is 160° (T) and the speed 10 KTS. True wind direction is 090° (T). Apparent wind speed by anemometer is 18 KTS. What is the true velocity of the wind.

Or

(b) Radiation and insolation.

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) Describe any five main ways of low clouds formation with appropriate diagrams.

Or

(b) State the origin, movement and life span of TRS.

17. (a) Compare the Diurnal variation of atmospheric temperature over land and sea.

Or

(b) Define any five basic isobaric patterns.

18. (a) Decode the following :

BBXX ATOT 25033 99004 1 046 6 41593 70510 10 285 20 208 4 0088 53036 70694 84 229 222 42 00 206

Or

(b) Describe with diagrams any five types of clouds.

———————

C–0164

Sub. Code
11666

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

NAVIGATION – V

(2016 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define the term 'coefficient real A'.

2. What is 'magnetic variation'?

3. What is 'Hard Iron Magnetism'?

4. What is radar?

5. What is AIS?

6. What do you understand by GDOP?

7. What is 'NAVSTAR'?

8. Define 'RAMARK'.

9. Define 'S-VDR'.

10. What is 'Transducer'?

Part B $(5 \times 5 = 25)$

Answer **all** questions.

Draw diagram if necessary.

11. (a) What is the angle of dip in Earth's magnetic field? Explain with diagram.

Or

(b) (i) Define coefficient 'D'.

(ii) What are the reasons to change in Earth's magnetism?

12. (a) Deviation due to hard Iron is 10°E, when heading 09° (c). What will be the deviation on a course 030° (c)?

Or

(b) Describe the procedures of switching on/off of a radar as an OOW.

13. (a) (i) Explain the uses of AIS in collision avoidance.

(ii) What are the information received from on AIS?

Or

(b) (i) What is the difference between RACON and RAMARK?

(ii) What is GNSS?

14. (a) What is DGPS? Explain the accuracy of GPS and DGPS.

Or

(b) Explain are the errors affecting the accuracy of soundings of depths by Echo sounder.

15. (a) Define VDR. Explain the information available in VDR.

Or

(b) Calculate the value of coefficient A, if the following deviations were known to exists.

Comp Hdg:	N	NE	E	SE	S	SW	W	NW
Deviation :	8°E	3°E	2°W	5°W	1°W	5°W	2°E	8°W

Part C (3 × 10 = 30)

Answer **all** questions.

16. (a) (i) Define coefficient C.

(ii) Explain ship's permanent magnetism with proper diagram.

(iii) What is the use of radar?

Or

(b) During the course of swing through 360° the following compass bearing of a planet were observed and true bearings calculated as shown below:

Find:

(i) Variation

(ii) coefficient B and C.

Comp Co :	N	NE	E	SE
Comp brg :	069°	064°	064°	065°
True brg:	075°	075 ½°	076°	076 ½°
Comp Co :	S	SW	W	NW
Comp brg :	063°	063 ½°	071°	077°
True brg:	077°	078°	079°	079 ½°

17. (a) Draw a block diagram of an Echno sounder and explain the followings:

(i) Label all controls of the echo Sainder

(ii) Explain all controls of the Echo Sounder

(iii) Explain the 'Phasing'

Or

(b) (i) What is the GPS structured? Explain its segments.

(ii) How many satellite have to be visible for a GPS fix and why?

18. (a) Whilst steering 080° (T) at 10 knots the following observations were made on the radar screen.

Ship's time	Bearing (T)	Range (M)
0610	010°	14.0
0622	013°	11.0

Find :

(i) CAP range and time

(ii) Course and speed of target.

If at 0625, the target reduced speed to 12 knots

Find

(iii) The new CPA range and time.

If at 0640, the target altered course to starboard by 30°, find

(iv) The new CPA range and time.

Or

(b) While on a course of 055° (T) and 15 knots, a target were observed as follows :

Ship's time	Bearing (T)	Range (M)
0930	105°	14.0
0936	105°	11.5
0942	104 ½°	08.9

Find :

(i) CPA and TCPA

(ii) Course and speed of Target

(iii) Aspect at 0942.

The captain of own ship decided to let the target to pass ahead of own ship with CPA 1.5 m by altering course to starboard at 0945.

Find:

(iv) the alternation necessary and

(v) the new CPA time.

C–0165

Sub. Code
11612

B.Sc. DEGREE EXAMINATION, APRIL 2019

First Semester

Nautical Sciences

NAUTICAL MATHEMATICS — I

(Upto 2015 batch)

Time : 3 Hours Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) (i) Prove that

$$\bar{i}\times(\bar{a}\times\bar{i})+j\times(\bar{a}\times\bar{j})+\bar{k}\times(\bar{a}\times\bar{k})=2\bar{a}$$

where $\bar{a}$ is any vector.

(ii) State and prove Baye's theorem.

Or

(b) (i) From the following data find the lines of regression and correlation coefficient between x and y.

(ii) Find (1) the constant k such that the function

$$f(x)=\begin{cases}kx^2 & \text{if } 0<x<3\\ 0 & \text{otherwise},\end{cases}$$

is a probability function (2) compute $P(1<X<2)$ and (3) find the distribution function.

2. (a) Derive the standard form of equation of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$.

Or

(b) (i) An iron cone of radius 9 cm and height 28 cm is melted and spherical iron balls of radius 3 cm is made. Find the number of iron balls made.

(ii) The orbit of the earth around the sun is elliptical in shape with sun at a focus. The semi major axis is of length 92.9 million miles and eccentricity is 0.017. Find how close the earth gets to sun and the greatest possible distance between the earth and the sun.

3. (a) (i) If arcs be drawn from the angles of a spherical triangle to meet the mid-points of the opposite sides, and if α, β be the parts of arc which bisects the side a, show that $\frac{\sin\alpha}{\sin\beta} = 2\cos\frac{a}{2}$.

(ii) Given a spherical triangle ABC with $a = 72^\circ 18'$, $b = 51^\circ 38'$, $c = 59^\circ 56'$, find C by means of cosine formula.

Or

(b) (i) In a spherical triangle ABC, derive the Napier's formula

$$\tan\frac{1}{2}(A+B) = \frac{\cos\frac{1}{2}(a-b)}{\cos\frac{1}{2}(a+b)} \cdot \cot\frac{c}{2}.$$

(ii) Given $a = 160^\circ 13'$, $A = 150^\circ 37'$, $C = 90^\circ$, solve the triangle.

4. (a) (i) Find the derivative of $y = x^2 + \frac{1}{x}$, $y = e^{3x}x^4$, $y = 2x + 3$, $y = x\sin^{-1}x$ and $y = e^x \log(1+x)$.

(ii) Find $\frac{dy}{dx}$ if

(1) $x = t + \frac{1}{t}$, $y = t - \frac{1}{t}$ and

(2) $x = t^{-2}$, $y = \sqrt{t^2 + 12}$.

Or

(b) (i) Find $\int \frac{3x+1}{(x-1)^2(x+3)}dx$ and $\int \frac{dx}{(x+1)(x+2)}$.

(ii) If $y = e^{-x}\cos x$, prove that $y_4 + 4y = 0$ and if $y = ae^{2x} + be^{-x}$, show that $y_2 - y_1 - 2y = 0$.

5. (a) (i) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 1 \\ 1 & 3 & 7 \end{bmatrix}$.

(ii) Verify the Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$.

Or

(b) Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$.

C–0166

Sub. Code
11621

B.Sc. DEGREE EXAMINATION, APRIL 2019

Second Semester

Nautical Science

NAUTICAL MATHEMATICS — II

(Upto 2015 batch)

Time : 3 Hours Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) (i) State and prove De-Movire's theorem.

(ii) Prove that $\frac{\cos 5\theta}{\cos\theta} = 1 - 12\sin^2\theta + 16\sin^4\theta$.

Or

(b) (i) The value of x and y are tabulated below.

x	0	1	3	6
y	18	10	–18	90

Evaluate $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at the point $x = 2$.

(ii) Evaluate $\int_0^1 x^2\,dx$, using Trapezoidal rule and Simpson's rule, by dividing 4 equal intervals.

2. (a) A curve is drawn to pass through the points given by the following data :

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.

Or

(b) Find the work done by the force $\bar{f} = x\bar{i} + 2y\bar{j}$ when it moves a particle on the curve $2y = x^2$ from (0, 0) to (2, 2).

3. (a) Verify Green's theorem in a plane with respect to $\int_C [(x^2 - y^2)\,dx + 2xy\,dy]$, where C is the boundary of the rectangle in the $x \circ y$ - plane bounded by the lines $x=0$, $x=a$, $y=0$, $y=b$.

Or

(b) Evaluate $\int_C (\sin z\,dx - \cos x\,dy + \sin y\,dz)$, by using Stoke's theorem.

4. (a) Verify Gauss divergence theorem for $\bar{f} = x^2\bar{i} + z\bar{j} + yz\bar{k}$ over the cube formed by $x = \pm 1$, $y = \pm 1$, $z = \pm 1$.

Or

(b) Solve :

(i) $e^x \tan y\,dx + (1 - e^x)\sec^2 y\,dy = 0$

(ii) $y\,dx - x\,dy + 3x^2y^2\ e^{x^3}\,dx = 0$.

5. (a) Form the differential equation by eliminating α and β from $(x-\alpha)^2+(y-\beta)^2=\gamma^2$.

Or

(b) Solve : $(1-x^2)\frac{dy}{dx}+2xy=x\sqrt{1-x^2}$ given that $y=0$ when $x=0$.

C–0167

Sub. Code
11644

B.Sc. DEGREE EXAMINATION, APRIL 2019

Fourth Semester

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS — II

(Upto 2015 Batch)

Time : 3 Hours Maximum : 75 Marks

Answer **all** questions.

(5 × 15 = 75)

1. (a) (i) Name the common Engineering materials used onboard. Give one example for each material.

(ii) What are the various heat treatments carried out on steel?

Or

(b) (i) Explain any one of the heat treatment and the properties obtained by that treatment.

(ii) Explain the process of smelting and refining.

2. (a) Write short notes on :

(i) Boiler

(ii) Uses of steam

(iii) Boiler mountings

(iv) Safeties of boiler

(v) Use of gauge glass in boiler.

Or

(b) With neat sketch, Explain in detail about Air compressor.

3. (a) Draw the diagram of fresh water generator and explain the working principle.

Or

(b) Sketch and describe the two ram steering gear system with its safeties.

4. (a) Explain the working and construction of 4-stroke engine.

Or

(b) (i) Draw and explain the timing diagram of 2-stroke engine.

(ii) Difference between the two stroke and four stroke engine.

5. (a) (i) What is the importance of preferential trip?

(ii) What is the use of circuit breakers?

(iii) What is frequency?

(iv) What do you understand by power factor?

Or

(b) (i) Explain the types of transformer.

(ii) Write precautions while entering into a battery room.

———————

C–0168	Sub. Code 11663

B.Sc. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Nautical Science

CONVENTION AND REGULATIONS

(Upto 2015 batches)

Time : 3 Hours Maximum : 75 Marks

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

1. (a) What are the different loadlines? Draw a loadline for a vessel with all measurements.

Or

(b) What are the different classes of materials used for fire protection?

2. (a) What is a ship-shore safety checklist? List out the salient points of the checklist.

Or

(b) What are the various annexes of Marpol 73/78? Write about each one of them, what it deals with and when it came into force.

3. (a) What precautions are to be carried out for carriage of dangerous goods in bulk?

Or

(b) Explain briefly about IMDG. What is EMS schedule and MFAG.

4. (a) Write briefly about Annex-II. What is SMPEP.

Or

(b) What is Indian Dock Labour Regulations?

5. (a) Write in brief about

(i) ISM

(ii) DOC

(iii) SMC

(iv) Non-Confirmities.

Or

(b) Write about the following :

(i) Various security levels

(ii) DOS

(iii) SSO

(iv) CSO

(v) PFSCO.

———————