B.SC. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

OCEANOGRAPHY & METEOROLOGY - II

(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer ALL Questions   (5 x 15 = 75)

All questions carry equal marks

1. a. Describe the circulation of water in atmosphere.

OR

   b. Briefly explain about the determination of winds.

2. a. Give a detailed account on the global wind.

OR

   b. Explain about the westerly winds and the jet stream.

3. a. Write about classification and identification keys of clouds.

OR

b. Explain about Global Warming and its problem to the earth.

4. a. Elaborate in detail on the coastal geomorphological features.

<div align="center">OR</div>

b. Write an essay on anatomy of ocean waves.

5. a. Give a brief account on the following:

  i. Hurricanes
  ii. Earthquakes
  iii. Volcanoes

<div align="center">OR</div>

b. Explain in detail on the disaster management in terms of human value.

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NATUICAL MATHEMATICS - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

$(5 \times 20 = 100)$

Answer any **Five** questions.

All questions carry equal marks.

1 a. If $y = \sin (m \sin^{-1}x)$, Show that $(1-x^2)\, y_{n+2} - (2n+1)\, x\, y_{n+1} + (n^2-m^2)\, y_n = 0$. (12)

  b. Verify Rolle's Theorem for $f(x) = x\,(x+3)e^{-1/2}$ in $[-3,0]$. (8)

2 a. Prove that $\operatorname{Sin} x = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} + \dfrac{x^7}{7!} + ...\infty$ for every value of x.

(6)

  b. Find $\underset{x\to 0}{it}\, (\cos x)\dfrac{1}{x^2}$. (5)

  c. Show that the radius of the right circular cylinder of greatest curved surface which can be inscribed in the given cone is half that of the cone. (9)

3 a. If $u = \tan^{-1} \dfrac{x^3 + y^3}{x - y}$, find the value of

$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x\, \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}.$$

(12)

b. If $u = \log \dfrac{x^2 + y^2}{x + y}$, Prove that $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} = 1$. (8)

4 a. Show that the area of the loop of the curve $a^2 y^2 = x^2 (2a–x)(x–a)$

is $\dfrac{3a^2\pi}{8}$. (10)

b. Find the volume of the solid obtained by revolving one arch of the cycloid $x = a(\theta + \sin \theta); y = a(1 + \cos \theta)$ about x-axis. (10)

5 a. Evaluate $\iint xy\, dx\, dy$ taken over the positive Quaddrant of the Circle $x^2 + y^2 = a^2$. (10)

b. Evaluate $\displaystyle\iiint \frac{dx\, dy\, dz}{(x + y + z + 1)^3}$ taken over the volume bounded by the planes $x = 0, y = 0, z = 0, x + y + z = 1$. (10)

6 a. Solve $\dfrac{dy}{dx} = e^{2x-3y} + 4x^2 e^{-3y}$. (6)

b. Solve $(x^2 – y^2)\, dx – xy\, dy = 0$. (6)

c. Solve $(x + 1)\dfrac{dy}{dx} - y = e^x (x+1)^2$. (8)

7 a. Solve $\dfrac{dy}{dx} + x\sin 2y = x^2\cos^2 y$. (10)

  b. A boat is rowed with a velocity u directly across a stream of width a. If the velocity of the current is directly proportional to the product of the distances from the two banks, find the path of the boat and the distance down stream to the point where it lands. (10)

8 a. Solve $(D^2 + 5D + 6)\,y = e^{-2x}\sin 2x$. (10)

  b. Solve $(D^2 + 5D + 3)\,y = x\,e^{3x}$. (10)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAUTICAL PHYSICS AND ELECTRONICAL - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **ALL** the Questions $(5 \times 15 = 75)$

1. a) Define vector quantity with two examples   (3)

    b) Find the resultant of system of three coplanar forces acting at a point.   (8)

    c) State and explain Lami's theorem   (4)

(OR)

    d) Define Impulse. Give it's SI Unit.   (2)

    e) Derive an expression for the internal bending moment of a beam   (8)

    f) Derive an expression for the excess of pressure inside an air bubble in an oil tank.   (5)

2. a) State and Explain I Law of thermodynamics (3)

   b) Define enthalpy (3)

   c) Derive an expression for the workdone during an isothermal changes (9)

<div align="center">(OR)</div>

   d) Describe an experiment to find the coefficient of thermal conductivity of the bad conductor (8)

   e) Define solar constant. Give its SI Unit. (3)

   f) Explain the working of Hygrometer (4)

3. a) State the laws of transverse vibrations of a string (3)

   b) Describe and experiment for the measurement of velocity of sound in gases (6)

   c) Discuss the applications of reflection of sound (3)

<div align="center">(OR)</div>

   d) Explain the unit used in sound (3)

   e) What is Doppler effect in sound ? Explain it. (5)

   f) Describe an experiment to find the intensity of sound. (7)

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4. a) Explain the magnetic properties of Earth. (4)

   b) Briefly explain hysterisis curve (8)

   c) Explain hysterisis loss (3)

   (OR)

   d) Give the common use of batteries (3)

   e) Determine the magnetic field of toroidal coil (7)

   f) Derive the relation between the RMS and peak value of an AC Voltage (5)

5. a) Explain the working of a P-N Junction diode (6)

   b) Using suitable circuit diagram, explain the working of full – wave rectifier (9)

   (OR)

   c) Give the characteristics of thermistor (5)

   d) Describe an experiment to find the transistor parameters in CE configuration. (10)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical science

NAVIGATION - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Section - A $(2 \times 15 = 30)$

Answer any **Two** questions in this section.

1.   Explain any **five** of the following with suitable sketches :—

   i)   Rhumb Line

   ii) Geographical Mile

   iii) Meridional parts

   iv) First Point of Aries

   v)   D'Long

   vi) Perigee

2.   Explain any **five** of the following (Use suitable sketches)

   i)   Inferior planets

   ii) Course made good

   iii) Prime vertical

   iv) Nodes

   v)   International Date Line

   vi) Aphelion and Perihelion

3. i) Box the compass from 'EAST' to 'SOUTH'   (7½)

    ii) Advantages of Mercator charts over Gnomonic charts   (7½)

Section - B $(3 \times 15 = 45)$

Answer any **Three** questions.

4. By using plane sailing formula, find the set and drift of current.

    DR   FIX

    Lat : 00° 11.6´ (N)   Lat : 00° 40.3´ (S)

    Long : 179° 50.2´ (W)   Long : 178° 40.1´ (E)

5. By Mercator's Principle find the position arrived.

    Starting Posn : Lat : 06° 10´ (S) 176° 47´ (W)

    Course : 333° Dist : 4450 miles.

6. Describe the different phases of Moon.

7. Why venus is called a Morning and Evening star ? Explain with diagram.

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Nautical Science

SHIP OPERATION TECHNOLOGY - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

$(5 \times 15 = 75)$

Answer **All** questions.

1 a.   List the various safety apparel and explain their use.   (10)

(*Or*)

   b.   List the different types of a paint brushes and explain where each
        types is used.   (10)

2 a.   i)   What is rust ? Why does it form ?   (5)

        ii) What are the different types of rust formation ?   (5)

        iii) Explain the different methods of removing rust.   (5)

(*Or*)

   b.   i)   Explain the method of cleaning wooden surfaces   (10)

        ii) Explain what is 'Caulking' with respect to wooden decks. (5)

3 a.   Explain what are the SOLAS requirements for a lifebuoy.   (10)

(*Or*)

b.   Explain what are the SOLAS requirements for a life jacket.   (10)

4 a.   i)   What are the markings on a life raft ?   (5)

ii)   List the different classes of lifeboats and the materials used in each case.   (5)

iii) What are the different types of lifeboat davits ? Briefly outline the salient features of each type.   (5)

(*Or*)

b.   i)   What are the different types of fire hose connections ?   (5)

ii)   Draw and label the parts of an international shore connection. Where and why is it used ?   (5)

iii) Briefly explain the different types of fire hose nozzles.   (5)

5 a.   i)   What are the different parts of a firemans suit.   (5)

ii)   What are the signals used on the lifeline by the wearer of a fireman's suit inside a compartment to the person outside the compartment ?

(5)

(*Or*)

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b. i) Draw the diagram of a double-sleeve block and label all the parts. (5)

    ii) What are the advantages of synthetic fibre rope over natural fibre rope ? (5)

6 a. i) Draw the diagram of a simple derrick rigged with a gun tackle and label all the parts. (10)

    ii) Explain what is meant by 'Annealing' of cargo gear. (5)

(*Or*)

b. Explain the following   (5 × 3 = 15)

    i)   A.W.L.

    ii) Mechanical Advantage.

    iii) Breaking Strength.

    iv) 6/24 with respect to a wire rope

    v)   Tested Shackle.

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

CHART WORK

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 25 Marks

All Questions carry equal marks

Use chart BA 2675

1 (a) Write short notes of on the following: (3)

      (i)   Natural Scale

      (ii)   Gnomonic Projection

      (iii)   Ocean Charts

  (b) Write short notes on the following w.r.t. lights.   (2)

      (i)   Isophase

      (ii)   Occulting

(OR)

  (c) What information can you gather from Admiralty sailing directions.   (2 1/2)

  (d) Give a brief description of any 3 volumes of Admiralty. List of Radio Signals (ALRS)   (2 1/2)

2 (a) Explain the uses of the Compass rose.   (2)

   (b) Explains the following with the help of sketches.   (3)

        (i)   Drying heights.

        (ii)   Wreck (dangerous).

        (iii) Fishing Haven.

                            (OR)

   (c) Define the following with Sketches:

        (i)   True Meridian

        (ii)   Magnetic Meridian.

        (iii) Compass Error.

        (iv)   Variation

        (v)   Deviation

3 (a) From a Particular Observation of the Moon, it was found that
        the compass bearing was of $63.5°$ C and Gyro bearing was
        $061°$(G). At the same time the calculate true bearing was found
        to be $062°$(T). If the Variation $2.5°$ (E). Find:

        (i) Gyro Error

        (ii) Compass Error

        (iii) Deviation   (3)

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(b) On a particulars day the Sun rose bearing 110°(C) and the calculate true bearing at the same time was 124.4°(T). If the Variation is 4°(E). Calculate the Compass Error (or) deviation.

(2)

(OR)

(c) An Observation of Polaris was Observed to be bearing 005°(C) and the true bearing calculated at the same time was 000.9°. If the deviation is 4.6°E. Calculate the variation and compass error.

(2)

(d) On a certain day star 'RASAL HAGUE' bone 275°(C) & 277°(G) on the compass and gyro respectively. If the deviation is O.P.E and the calculated true bearing is 278°(T). Calculate:

(a) Variation

(b) Compass error

(c) Gyro error

(3)

4 (a) A ship steering 115°(C) at 12 kts at 2000 hrs pte de Barfleue light bore. 174°(C) and (a) 2100 the same light bore 238°(C). During this time the current was setting 208°(T) at 2.5 kts. Find the ship's position at 200hrs and 2100hrs (Variation 8°w, Deviation 9.7°w)

(5)

(OR)

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(b) The ship's position at 1300 hrs was found with Start Point Lt Ho bearing 298°(T) at a distance of 8 miles. Find the Compass Course to steer. So as to pass SHAMBLES LIGHT ½ 4 miles off to port counteracting a current known to be setting 285°(M) at 2 knots. Also find the speed made good. (Variation 9°w, Deviation 12°w, ship's speed 10 kts)   (5)

5 (a) At 1600 hrs LEHAVRE LT V/L bore 187°(T) and CAD D'ANTIER LT bore 101°(T). Find the ship's position from this position. Find the true course and distance to a position with Pte D'Ailly Lt bearing 128°(T) at a distance, off 12 miles. Also find the position off Pte D'Ailly light   (5)

(OR)

(b) From a V/L at anchor, the following compass bearings were observed.

Needles pt. light house bore   345°(C)

St. Catherine point Lt Ho bore   015°(C)

Nab Tower Lt Ho bore   039°(C)

Find the ship's position and deviation of the compass for the ship's head. If variation at the place was 7.5°(w)   (5)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NATUICAL MATHEMATICS - II

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

$(5 \times 20 = 100)$

Answer any **Five** questions

All questions carry equal marks

1 a. If n is a positive integer, prove that

$$(1+i\sqrt{2})^n + (1-i\sqrt{3})^n = 2^{n+1} \cos \frac{n\pi}{3}$$

  b. Find all the values of $(1 + i)^{1/6}$

  c. Express $\sin^6\theta$ in a series of cosine multiples of θ.

2 a. Separate into real and imaginary parts of $\tan^{-1}(x + iy)$

  b. If $\cos(\alpha + i\beta) = \cos\phi + i\sin\phi$, prove that $\cos^2\alpha + \cosh^2\beta = 2$

  c. Show that $i^i = e^{-(4n+1)\pi/2}$ where n is an integer.

3 a. Show that $\begin{vmatrix} x + a & x + 2a & x + 3a \\ x + 2a & x + 3a & x + 4a = 0 \\ x + 4a & x + 5a & x + 6a \end{vmatrix}$

b. Solve the equations by using Cramer's rule

$$x + 2y + 3z = 6$$
$$2x + 4y + z = 7$$
$$3x + 2y + 9z = 14$$

4 a. If $A = \begin{pmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{pmatrix}$, show that A satisfies the equation

$$A^2 - 3A = 2I = 0$$

b. If $A = \begin{pmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \\ 1 & 0 & 1 \end{pmatrix}$ find A^{-1}

5 a. Show that the following equations are consistent and solve them.

$$2x - y + z = 7$$
$$3x + y - 5z = 13$$
$$x + y + z = 5$$

b. Find the eigen values of the following matrix $\begin{pmatrix} 2 & 0 & 4 \\ 0 & 6 & 0 \\ 4 & 0 & 2 \end{pmatrix}$

6 a. If $\overline{f} = x^2 y\vec{i} + xt\vec{j} + 2yt\overline{k}$, prove that div curl $\overline{f} = 0$

b. Prove that div $\left(\dfrac{\overline{r}}{r} \right) = \dfrac{2}{r}$

c. Prove that $\nabla x(f \times g) = f\nabla g - g\nabla f - (g \cdot \nabla)f - (f \cdot \nabla)g$.

2

7 a. If $\overline{f} = (3x^2 + 6y)\vec{i} - 14yz\vec{j} + 20xz^2\vec{k}$, evaluate $\int_c \overline{f}.dr$ where C is the straight line joining (0, 0, 0) to (1, 1, 1)

b. Verify Green's theorem in plane for $\int_c (x^2 - xy^3)dx + (y^2 - 2xy)dy$ where C is the square with vertices (0, 0), (2, 0), (2, 2), (0, 2)

8 a. Verify Stoke's theorem for the function $\overline{f} = (x^2 - y^2)\vec{i} + 2xy\vec{j}$ in the rectangular region bounded by the lines $x = 0$, $x = a$, $y = 0$ and $y = b$.

b. Apply Gauss theorem, to evaluate $\iint \overline{f}.\overline{n}\ ds$ where $\overline{f} = 4xy\vec{i} + yz\vec{j} - xz\vec{k}$ and S is the surface of the cube bounded by the planes $x = 0 = y = z$ and $x = y = z = 2$

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3

B.SC. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAUTICAL PHYSICS AND ELECTRONICS - II

Duration : 3 Hours   Maximum 75 Marks

Answer any FIVE Questions   (5 x 15 = 75)

1. a. State and explain Stoke's Law.   (2)

   b. Derive Bernoullie's equation for viscous flow. (8)

   c. Explain the working of Bourdon pressure gauge.   (5)

2. a. What are Binoculars? Explain.   (3)

   b. Explain the working of a reflecting Astronomical Telescopes.   (4)

   c. Discuss Romer's method of determining the speed of light.   (8)

3. a. What is spherical aberration? Explain.   (3)

   b. How is Astigmatism in a lens eliminated?   (3)

   c. Discuss the diffraction at a circular apeture. (9)

4. a. Describe an optical pyrometer and explain its working. (10)

   b. Give an account on photovoltaic cell. (5)

5. a. Describe the Wheatstone net bridge and obtain the condition for the balance. (10)

   b. Discuss remedial measures for removing the charges in an Oil tanker. (5)

6. a. Explain the working of a photo diode. (5)

   b. Give the applications of (i) LDR and (ii) LED. (5+5)

7. a. How are nuclear waste detected? (5)

   b. Give an account on radio activity of water. (5)

   c. Explain the role of satellite in weather forecasting. (5)

8. a. Give the circuit of a common emitter transistor-amplifier and discuss its gain. (7)

   b. Discuss the input and output characteristics of a common emitter configuration of a transistor. (8)

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B.SC. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
COLLISION PREVENTION AND
MARINE COMMUNICATION
(UPTO 2007 BATCH)

Duration: 3 Hours   Maximum: 25 Marks

Answer ALL Questions   (5 x 5 = 25)

1. a. Define the following:

    i.   Vessel

    ii. V/L restricted in their ability to manoeuvre

    iii. Underway

    iv. V/L constrained by her draught

    v.   Sailing vessel

                    (OR)

  b. i.   V/L not under command

    ii. Power driven V/L

    iii. Restricted visibility

    iv. Sea plane

    v.   V/L engaged in fishing

2. i. Define "SAFE SPEED".

   ii. If a V/L is having sufficient sea room as per "Actions to avoid collisions", what will be your action?

   iii. A V/L wanted to cross a TSS. How will she cross the TSS?

(OR)

b. i You are in a V/L in narrow channel. You intend to overtake another V/L. What will you do?

   ii. Briefly explain how the V/L's will conduct at the joining and terminations of TSS?

3. a. How will be the conduct of vessels in "HEAD ON SITUATION"?

(OR)

b. i. You are in a power driven V/L. What is your responsibility as per rule no. 18?

   ii. You are in a give way V/L. What will be your action?

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4. a. i. Rule no.19 applies to which vessels?

   ii. As per rule no.19 you have detected by
       RADAR alone the presence of another V/L.
       What will you do?

<div align="center">(OR)</div>

   b. In restricted visibility you are hearing a fog
      signal forward of your beam. What will your
      action be?

5. a. Explain the meanings of the following flags:
      a. B
      b. G
      c. P
      d. Q
      e. O

<div align="center">(OR)</div>

   b. i. You are entering a foreign country. What are
         the flags your ship will be flying and the
         locations of them?

      ii. What is HOUSE FLAG and COURTESY
          FLAG?

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B.Sc DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAVAL ARCHITECTURE - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

Answer **ALL** the Questions

Use of hindship tables permitted

1   (a)   Define the following with a Diagram   (15)

   (i)   LBD

   (ii)   Moulded Breadth

   (iii)   Flare

   (iv)   Camber

   (v)   Light Displacement

(OR)

   (b)   Draw and Explain container ship having cellular type of cargo
         hold   (15)

2   (a)   Classify and briefly explain the Merchant Vessel based on
         Nature of Cargo Carrying   (10)

(OR)

(b) Draw and label all parts of a bulk carrier by using profile and cross sectional diagram (10)

3 (a) State and Explain various common principle factors that govern the design and construction of all type steel ships (15)

(OR)

(b) Draw the engine room layout indicating flats and Equipmental arrangements. State the specific functions of following engine room floor plate, Bilges, Boiler Flat and Overhead crane railing arrangement

(15)

4 (a) Write short note on : (10)
   (i) Types of steel used in Ship Building
   (ii) Heat treatment of the Steel Plates
   (iii) Types of Welding

(OR)

(b) Discuss the steel as the material of construction used for ship building on their superiority than other materials (10)

5 (a) Explain various tests carried out on welded joints to know their strength and quality (15)

(OR)

(b) Discus various stresses set up due to welding and also explain the various stress relieving methods followed on welding (15)

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6   (a)   Give the meaning of the following by using a diagram   (15)

   (i)   Reserve Buoyancy

   (ii)   FWA

   (iii)   Block Co-efficient of fineness

   (iv)   DWT Aboard

   (v)   Laws of floating body

(OR)

   (b)   Differentiate the following   (15)

   (i)   Heel and List

   (ii)   Stiff and Tender ship

   (iii)   Stable and Unstable Equilibrium

7   (a)   A vessel has a displacement of 6200 tonnes and a KG of 8.0m.
         Distribute 9108 tonnes of Cargo between spaces Kg 0.59 m
         and 11.45 m, so that the vessel completes loading with a
         KG of 7.57 m   (10)

(OR)

   (b)   A ship has a full load draft of 10m. The water plane area of the
         ship, at equal intervals commencing from the keel to the water
         level draft are 865, 1785, 1965, 2040, 2145 and 2210 m^2
         respectively. Calculate: (10)

         (i) Displacement

         (ii) TPC

         (ii) KB

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8   (a)   Find the GM of a box-shaped vessel 120m × 18m when a float at 10 m. SW draft KG is 6.9 m and FSM is 2000 tm.

(10)

(OR)

(b)   Calculate the area and the position of the COF of a ship's water-plane whose half-breadths at 10 m intervals from aft are: 0, 6, 8, 8.5, 7.5, 6.5, 4.5, 2.5 and 0 meters.   (10)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **ALL** the Questions

1   (a)   Define the following: (8)

      (i)   Modular of elasticity

      (ii)   Field point

      (iii)   Shear stress

      (iv)   Ductility

  (b)   (i) Define Newton's laws of motion   (4)

    (ii) Define Hook's law. Show the relationship between

     stress and strain   (3)

(OR)

  (c)   Explain the following: (6)

      (i)   Melting point

      (ii)   Elasticity

      (iii)   Plasticity

(d) A simply supported beam of 7m length is subjected to point loads of 4 KN and 6 KN at a distance of 2 m and 5 m respectively from the right end. Draw the shear force and moment diagram (9)

2 (a) Define the following: (6)

    (i)   Laminar flow and turbulent flow

    (ii)   Viscosity and Kinematic Viscosity

    (iii)   Bernoulli's Theorem

(b) A fluid is flowing through a horizontal pipe of diameter 200 mm at a velocity of 6m/sec. A circular plate of 100mm diameter is placed in the pipeline to obstruct the flow. Find the loss of head due to obstruction if $C_c = 0.65$ (9)

(OR)

(c) Define the following: (9)

    (i)   Density and relative density

    (ii)   Loss of energy of fluids due to bends

    (iii)   Kinematic Viscosity and Dynamic Viscosity

(d) When a test tube float used a variable immersion hydrometer, the depth of immersion in water and a given liquid is 17.5 cm and 16.6 cm respectively. Find the relative density of the liquid. (6)

3 (a) (i) What do you understand by dryness fraction and superheated steam (4)

    (ii)   Define Charle's laws (2)

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(b) The temperature and pressure of air at the beginning of compression are 28'C and 303.9 KN/M² and the pressure at the end of compression is 1013 KN/M². Is the process follows PV$^{1.35}$, find the temperature of air at the end of compression.

(OR)

(c) Define the following: (6)

    (i)   Perfect gas equation

    (ii)   Second law of Thermodynamics

    (iii)   Law of conservation of energy

(d) Explain the formation of wet, dry and superheated steam (9)

4   (a) (i) Define Ohm's law (2)

   (ii) Compare emf and potential difference (4)

(b) Three resistors are placed in series with a 10 V supply as shown in figure. Find the voltage dropped across each resistor and the current. (9)

          5 Ω   3 Ω   2 Ω

                 10v

(OR)

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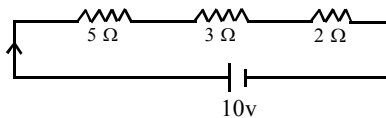
(c) (i) Define Fleming's right hand rule (3)

(ii) Define these terms : Capacitance, Resistance, Conductors, Insulators (4)

(d) Find the current flowing across the three resisters connected in parallel as shown is figure. Also find the effective resistance and total current drawn from the supply (8)
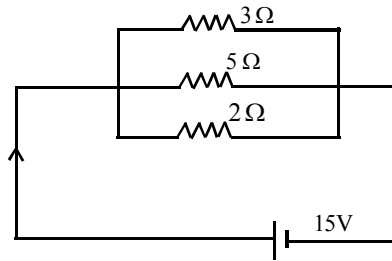
5 (a) Draw a neat sketch of the auxilliary engine platform. Show the various machinery and tanks located in the platform (7)

(b) Give the location and uses of the following (8)

(i) Auxiliary Boiler

(ii) Incinerator

(iii) Sewage treatment plant

(iv) Main air compressor

(OR)

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(c) (i) What are the uses of compressed air onboard a merchant ship ? (3)

(ii) What are the uses of steam onboard a motor vessel ? (3)

(d) Write short notes on the following (9)

    (i)   Oily Bilge separator

    (ii)   Double bottom tanks

    (iii)   Double hull tanks

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

ENVIRONMENTAL SCIENCE - I

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **ALL** the Questions

All Questions carry equal marks

1 (a) Explain about the vertical layers of the atmosphere with diagram ? (7)

(b) Explain the diurnal and seasonal variation of temperature and its causes ? (8)

(OR)

(c) Short Notes: ($3 \times 5 = 15$)

(i) Reflection, Scattering and Absorption

(ii) Heat exchange process

(iii) Environment lapse rate

2 (a) Briefly explain about the humidity and different types of calculations (8)

(b) Write about the cloud formation and various condensation forms ? (5)

(OR)

(c) Short Notes: (3 × 5 = 15)

    (i)   Diurnal and Seasonal variation of water vapour

    (ii)   Dew point of temperature

    (iii) Different change of water and it changes

3 (a) Explain the all physical properties of sea water   (7)

   (b) Write about the Iceberg nomenclature use by the International Ice Patrol ?   (8)

(OR)

(c) Short Notes: (3 × 5 = 15)

    (i)   Water masses formation and movement

    (ii)   Sea ice formation and decay

    (iii) Heat budget of the ocean

4 (a) Write about the principles of fluid dynamic ?   (7)

   (b) Write about the Asian monsoon and its influence to the ocean

              (8)

(OR)

(c) Short Notes: (3 × 5 = 15)

    (i)   Deep sea circulation

    (ii)   Destructive Waves

    (iii) Energy extraction from the sea

5 (a) Write about the construction and use of Barometer, Anemometer, Hygrometer and Thermometer   (10)

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(b) Write about the factors affecting the tidal formation ?   (5)

(OR)

(c) Short Notes: (3 × 5 = 15)

    (i)   Relationship between Tidal height and Tidal stream

    (ii)   Small deep sea tides

    (iii)   Seasonal and long term changes in MSL

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

COMPUTER PROGRAMMING AND UTILITIES

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **ALL** the Questions
All Questions carry equal marks

1   (a)   (i)   Explain the different types of computer languages   (10)

          (ii)   Write a note on general purpose computers   (5)

(OR)

    (b)   (i)   Write a note on special purpose computer   (10)

          (ii)   Discuss about different types of computers   (5)

2   (a)   (i)   Explain the various ways of initializing variables in a program
                                                                         (5)

          (ii)   Name the control and iterative statements defined in
                BASIC. Specify the syntax of each and explain   (5)

(OR)

(a) (i) When do you use the INPUT Statement ? Give advantages over the DATA/ READ Statement for initializing variables (5)

(ii) Define a Subroutine. Can it have arguments ? How are parameters passed into a Subroutine ? (10)

3 (a) (i) Define: i) Data and ii) Information (4)

(ii) Write a procedure to create a data base for the name, place and date of birth of persons. (6)

(iii) List the advantages between CHANGE and REPLACE. (5)

(OR)

(b) (i) State the difference between SEEK and FIND. Give example. (5)

(ii) Give the structure with examples for the following Commands stating when and how they should be used.(10)

i) SAY with @

ii) GET, READ

iii) INPUT

iv) ACCEPT

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4 (a) (i) What is a help menu? How is it useful to the user? (5)

(ii) Define Word wrapping and Hyphenation Procedures (5)

(iii) What is Spell Star? In what way it is useful in Correcting your text? How is on screen menu useful in formatting a text? (5)

(OR)

(b) (i) How is on screen menu useful in formatting a text ? (7)

(ii) Explain the Mail Merge Procedure with suitable example. (8)

5 (a) (i) What Command you must use to take up the range text option? Why is it used? How does it differ from global format text option? (5)

(ii) Contrast between Worksheet titles and work sheet Window. Mention one application for each (5)

(iii) What is the difference between "Count" and "Dcount" functions. Give one application for each. (5)

(OR)

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(b) (i) Explain the major Components of Access System menu (5)

(ii) List any five arithmetic Commands and explains with examples. (5)

(iii) How do you print a file in spreadsheet? Illustrate with suitable examples. (5)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NATUICAL MATHEMATICS - III

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

$(5 \times 20 = 100)$

Answer any **Five** questions

All questions carry equal marks

1 a. Applying Cauchy's general principle of convengence prove that

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

  b. Discuss the convergence of Binomial series

$$1 + \frac{mx}{\lfloor 1} + \frac{m(m-1)}{\lfloor 2} x^2 + ... + \frac{m(m-1)...(m-n+1)}{\lfloor n} x^n + ...$$

2   Find the Fourier series of $f(x) = x^2$ in $(-\pi, \pi)$ and deduce

$$\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + ... = \frac{\pi^2}{6}$$

3 a. Evaluate $\int_0^{\pi/2} \sin^4 \theta \cos^6 \theta \, d\theta$.

  b. Show that $\beta(m, n) = \int_0^1 \frac{x^{n-1} + x^{m-1}}{(1+x)^{m+n}} dx$

4 a. Find (i) $L[\sin^3 2t]$

(ii) $L[t\,e^{-2t}\cos 3t]$

b. Using Laplace transform solve the differential equation
$y'' + 3y' + 2y = e^{-t}$ given that $y(0) = 0,\ y'(0) = 0$.

5 a. Show that $\left\{ J_{-\frac{1}{2}}(x) \right\}^2 + \left\{ J_{\frac{1}{2}}(x) \right\}^2 = \dfrac{2}{\pi x}$

b. Show that $\left(\dfrac{\pi x}{2} \right)^{\frac{1}{2}} J_{\frac{3}{2}}(x) = \dfrac{\sin x}{x} - \cos x$

6 a. Show that (i) $\displaystyle\int_{-1}^{1} P_n(x)\,P_m(x)\,dx = 0,\ n \neq m.$

(ii) $\displaystyle\int_{-1}^{1} P_n^{\,2}(x)\,dx = \dfrac{2}{n+1}$

b. Show that $P_n(x) = \dfrac{1}{\underline{|n}2^n} \dfrac{d^n}{dx^n}[(x^2 - 1)^n]$

7. Find the solution of Two Dimensional Heat flow Equation.

8 a. Find an analytic function whose imaginary part $3x^2y - y^3$.

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

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAUTICAL PHYSICS AND ELECTRONICS - III

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **All** the Questions $(5 \times 15 = 75)$

All Questions carry equal marks.

1   (a)   Give two differences between inductance L of a coil and its inductive reactance X_L.

(b)   Explain the working of purely inductive circuit.

(c)   How much is the inductance of a coil that has a reactance of 1000 at 1000 HZ ? How much will be the reactance be for the same coil at 10 KHZ ?

(OR)

(d)   Define the time constant of a capacitive circuit.

(e)   Explain the working of LCR Parallel resonance circuit. State its characteristics.

(f)   Discuss the use of Resonance in Radio Communication.

2   (a) Describe the effect of current flow in an open conductor.

    (b) Derive the condition for the formation of electromagnetic
         waves.

                        (OR)

    (c) Establish the relation between Velocity, Frequency and
         Wavelength.

    (d) Define Skip Distance and Skip Zone.

    (e) Discuss the ionosphere effects on Radio Waves.

3   (a) Write the function of carrier waves.

    (b) Explain the Transmission of information by modulated carrier
         waves.

                        (OR)

    (c) Define A.M. and F.M.

    (d) Describe the working of F.M. Transmission. Discuss its merits
         and demerits.

    (e) Explain the function of S.S.B Transmission.

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4   (a)   Explain the essential parts of transistor oscillator in detail.

    (b)   Describe the working of colpitt oscillator.

                              (OR)

    (c)   Explain the principle of piezo-electric effect.

    (d)   Mention the uses of Ultrasonic waves.

    (e)   Differentiate Damped and Undamped Oscillations.

5   (a)   Discuss the function of various stages of a Basic Transmitter.

    (b)   Explain the characteristics of polar diagram.

                              (OR)

    (c)   Discuss the advantages and disadvantages of super heterodyne
          receiver

    (d)   Write note on :

          (i)   Electronic navigational aids.

          (ii)   Sensitivity and Selectivity.

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAVIGATION - II

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Extract of Nautical Almanac 1992 and Norie's Tables permitted

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

1. Explain any five terms with suitable sketches. $(5 \times 3 = 15)$

   (a) Prime vertical

   (b) Observer's Zenith

   (c) Greenwich hour angle (GHA)

   (d) Harvest moon and Hunter's moon.

   (e) Conjunction and opposition

   (f) Vernal equinox

   (g) Waxing and waning.

2. (a) i. Explain why stars rise, culminate and set 4 minutes earlier each day.   (9)

      ii. Explain Zone time.   (6)

(Or)

(b)   On 2nd March 1992, PM at ship in DR 16deg. 12' N 092deg.10E, the sextant altitude of star SPICA near the meridian was 60deg. 29.4' at 00h 30m 12s chron. time (error 02m 06s slow). If HE was 48m and IE was 2.0' off the arc, find the direction of PL and a position through which it passes.   (15)

3.   (a)   On 22 sept. 1992, PM at ship in DR 60deg. 10' N 092deg. 27' E. the sextant altitude of star ARCTURUS was 25deg. 01' when chron (error 05m 01s slow) showed 00h 46m 31s. If IE was 0.2' on the arc and HE was 17m, find the direction of the PL and the longitude where it crosses the DR lat.   (15)

(Or)

(b)   On 1st Sept.1992, AM at ship in DR 18deg. 00' N 178deg. 11' E, the sextant altitude of the polestar was 18deg. 47.4' at 05h 21m 08s by chro. (error 01m 18s slow). HE = 12.5m. IE = 1.6' on the arc. Find the direction of PL and a position through which to draw it. If the AZ was 001deg.(C), and Var was 1.3deg.E, find the deviation.   (15)

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4. (a) In DR 68deg. 12.5′ N 044deg. 18′ W an astronomical observation gave an obs. Long of 44deg. 10.6′ W whilst bearing 281(T). After steaming for 112M on a course of 327(T), an observation of polaris gave Obs. Lat. 69deg. 53.3′ N bearing 358(T), using EP Long, worked from earlier Obs. Long. Find the position of the ship at second observation. (15)

(*Or*)

(b) i. GHA Aries is 129deg. SHA star is 258deg. 44.1′ and Long. Of the observer is 127deg(E). Find the LHA star. (5)

ii. Explain undamped (North seeking) Gyroscope. (10)

5. (a) On 21st Sept.1992 PM at ship in DR 43deg. 18′ 140deg. 11′ E, the star CANOPUS bore 150deg (C) at 07h 28m 52s chron time (error 02m 12s slow). If Var was 3deg. (W), find the deviation of the compass. (15)

(*Or*)

(b) i. Briefly explain the limitations of RADAR. (9)

ii. Briefly explain anomalous propagation. (6)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

SHIP OPERATION TECHNOLOGY - II

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **ALL** the Questions

1   (a)   Define   (10)

(i) Gram Capacity and

(ii) "permissible Load Density ".

(OR)

(b)   Define

(i) "Severing "and

(ii)"Storage factor"

2   (a)   With the help of diagrams, explain the different methods of
sequegation of dangerous goods   (15)

(OR)

(b)   Explain in detail the preparation of a cargo hold in a bulk carrier
for loading coal cargo.

3 (a) Draw a diagram of a simple derrick and label all the parts.

(10)

(OR)

  (b) What is the relation between determination of 'Relative Humidity' and Ventilation ?

4 (a) (i) What is the difference between a 'Primer' paint and a finish coat ?   (5)

     (ii) Why should a Primer Paint be applied before a finish coat on a metal surface ?   (5)

(OR)

  (b) Explain the process of grit-blasting to remove rust from shipside surfaces.   (10)

5 (a) What are the indications by which an officer on watch can determine that the vessel in dragging anchor ?   (10)

(OR)

  (b) (i) What are the advantages of having studded links on the anchor cable ?   (5)

     (ii) What is meant by the following terms :
          'Anchor Acolek - bill and 'Anchor Underfoot'   (5)

6   (a)   Explain the process of "Running Moor" with a diagram   (10)

(OR)

(b)   Explain the following shallow water effects :

(i)   Bank Cushion

(ii)   Squat

7   (a)   (i)   List out the boat crew for launching a lifeboat   (5)

(ii)   Enumerate the duties of the stern sheet   (5)

(OR)

(b)   (i)   What are the advantages of the liferaft canopy ?   (5)

(ii)   What are the markings on a liferaft ?   (5)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

SHIP MASTER'S BUSINESS

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

Answer **ALL** the Questions $(5 \times 15 = 75)$

(Q.No. 1 is compulsory)

Answer any **Five** from the rest

1. This question is compulsory   (25)

   MV KARAIKUDI was chartered to load 15,000 tons of grain (10% MOLCO). The agreed rate of loading was 5000 tons per WWD SHEXEIU. Lay-time to commence at 9 AM on the first working day succeeding the day on which NOR is tendered during office hours (i.e. from 0900 to 1700 hrs). Time from 1700 hours on Saturday (or day preceding a holiday) to 0700 hours on Monday (or day succeeding a holiday) is not to count.

   The vessel arrived Kandla Port at 1800 hours on Thursday – 04 May and tendered NOR at the same time. Friday – 05 May was a Holiday.

Work was interrupted due to rain during the following hours :-

1. 2000 hrs to 2300 hrs   on Thursday 04 May

2. 1200 hrs to 1400 hrs   on Friday   05 May

3. 0600 hrs to 1000 hrs   on Saturday 06 May

4. 1700 hrs to 2000 hrs   on Thursday 11 May

5. 0600 hrs to 0800 hrs   on Friday   12 May

The vessel completed loading 16,250 tons of grain at 1200 hours on Friday 12 May.

Demurrage was payable at US$ 12000 per day and pro-rata for part of a day and dispatch at half that rate on all time saved.

Find the Demurrage or Dispatch payable.

2. (a) What documents have to be produced for registering a new ship and who is the Registrar of ships in Indian Ports ?   (10)

   (b) Explain the following terms: (5)

   (i) Special Trade passenger ship

   (ii) Tramping

3. (a) Name the certificates of competency of both deck and engine officers should possess and the minimum numbers required to be onboard a 10,000 ton FG vessel. (5)

(b) Explain: (10)

(i) Freeboard

(ii) Draft

(iii) Deck line

(iv) Load line

(v) Freeing port

4. (a) Write about custody and use of certificate of registry as per M.S. Act (10)

(b) Write about marking of the ship as per M.S.Act (5)

5. (a) What are the various roles of a Master of a Ship ? (10)

(b) Define 'Statement of Facts', what are its uses ? (5)

6. (a) What are the rules about assisting vessels in distress ? Under what conditions can a ship decline ? (10)

(b) Define 'Note of Protest' (5)

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7. (a) What is Salvage ? Explain Lloyds open form. (10)

   (b) What is a certificate of seaworthiness, when it is issued and by whom? (5)

8. (a) Prepare a chart to show at least 10 certificates and documents required to be carried onboard a cargo ship, as required by SOLAS and MARPOL, along with their validity period. (10)

   (b) Explain the procedure for obtaining a Certificate of Competency as per the Indian M.S. Act. (5)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NATUICAL MATHEMATICS - IV

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

$(5 \times 20 = 100)$

Answer any **Five** questions

All questions carry equal marks

1 a. In the spherical triangle ABC, prove that cos a = cos b cos c + sin b sin c cos A.

  b. If AD is the internal bisector of the angle CAB of the spherical triangle ABC, Prove that Cot AD = $\dfrac{1}{2}$ (Cot b + Cot c) Sec $\dfrac{A}{2}$

2 a. Derive the delambre's analogies.

  b. Explain the Napier's rule.

3 a. State and prove Legendre Theorem.

  b. State the four parts formula and write an application of the formula to Navigational problems.

4 a. The population of a town in the decennial census was as given below. Estimate the population for the year 1895.

Year (x)	1891	1901	1911	1921	1931
Population (y) (in thousands)	46	66	81	93	101

b. By Lagrange's interpolation formulae interpolate the value $f(0.4)$ for the following x_K and f_K.

x_K: −1   0   1   2

f_K: 1   3   2   5

5   Solve, by Gauss - Jacobi method of iteration, the equations

$$27x + 6y - z = 85$$
$$6x + 15y + 2z = 72$$
$$x + y + 54z = 110$$

6 a. A function $f(x) = y$ is given in the table below :

x   :   2.94   2.96   2.98   3.00   3.02   3.04   3.06

f(x) :   0.1826 0.1811 0.1797 0.1783 0.1769 0.1755 0.1742

find the second derivative at $x = 3$.

b. Evaluate $\displaystyle\int_0^6 \frac{dx}{1 + x^2}$ by using

i) Simpson's 1/3 rule.

ii) Weddle rule.

7 a. Solve : $y_{x+2} - y_{x+1} - 2y_x = x^2$.

b. Calculate the arithmetic mean, median and mode from the following frequency distribution.

Variable	Frequency
10 - 13	8
13 - 16	15
16 - 19	27

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Variable	Frequency
19 - 22	51
22 - 25	75
25 - 28	54
28 - 31	36
31 - 34	18
34 - 37	9
37 - 40	7

8 a. In a distribution exactly normal, 7% of the items are under 35 and 79% and under 63. What is the mean and standard deviation of the distribution.

   b. Calculate the correlation coefficient between marks in Tamil and Engish from the following data.

Marks in Tamil : 77   54   27   52   14   35   90   25   56   60

Marks in English : 35   58   60   40   50   40   35   56   34   42

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NATUICAL PHYSICS AND ELECTRONICS - IV

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

$(5 \times 15 = 75)$

Answer any **Five** questions

All questions carry equal marks

1 a.   Explain the principle and working of a switching device.   (8)

   b.   Discuss the characteristics of a switching transistor.   (7)

2 a.   What is meant by binary number system ? Explain with example.

(5)

   b.   What is meant by logic gates.   (5)

   c.   Draw the logic diagram for the following expression   (5)

   i) $y = \overline{A \cdot B}$

   ii) $y = \overline{A + B}$

3 a.   What is meant by Counters.   (15)

   b.   Explain the functions of J.K. flip flop circuit with a neat diagram. How it differ from R-S flip flow circuit.

4 a.   What do you mean by full-adder circuit ? What are its uses ? (6)

b. De Morganize the following expression and also draw the logic circuit for the equation

$(A+B) (C+D)$. (9)

5. With necessary diagram, describe the principle and working of a monostable multivibrator circuit to measure frequency. (15)

6 a. Explain how registers and capacitors are fabricated in monolithic IC. (8)

b. Discuss the advantages and limitations of use of I.S. Symbols. (7)

7 a. What is microprocessor ? Explain. (5)

b. Explain the architecture and functioning of 8085 with neat diagrams. (10)

8 a. Discuss in detail about the Traffic light interface. (10)

b. Write short notes on Flaggs registers. (5)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
Nautical Science

COLLISION PREVENTION AND MARINE COMMUNICATION - II

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 25 Marks

Answer **All** questions.

All questions carry equal marks

1. (a) i. What is a tide and tidal stream ?

   ii. Find the height of tide at Darwin (Australia) at 1805hrs Standard time on 20th January.

   (*Or*)

   (b) i. What are the three broad classes of tides ?

   ii. Find the time at which there will be 7 metres of water in the afternoon on the 27th April on a shoal patch off Darwin where the chart shows 3 metres sounding.

2. (a) What are the main 4 distinct stages in the planning and achievement of a safe passage? Explain in brief the salient features followed in each step.

(*Or*)

(b) i. What are the main points discussed during a MASTER/ PILOT information exchange ?

ii. List the different methods by RADIO NAVIGATIONAL warnings can be obtained.

3. (a) Write down the procedures to be followed before taking over a Deck watch (cargo watch)
(*Or*)

(b) What are the factors to be considered in determining the Safe speed of a ship ?

4. (a) i. What are the three main types of messages in GMDSS ?

ii. What are the actions to be taken on a vessel on receipt of distress alert ?

(*Or*)

(b) Write briefly on the sea areas adopted for the purpose of GMDSS.

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5. (a) Draw the Cardinal Marks and briefly describe how a vessel will pass a cardinal mark.

(*Or*)

(b) i. What do you mean by the term restricted visibility ?

ii. Explain the conduct of vessels in Restricted visibility (Rule 19)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAVAL ARCHITECTURE - II

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

Answer **All** questions

1 a. Draw and explain the Hull expansion plan of a ship, with special plates used.

(15)

(*Or*)

b. Draw and explain the following :— (15)

i) Hawse pipe and it's securing arrangement.

ii) Sounding pipe.

iii) Ventilators.

2 a. Draw and explain semi-balanced Rudder with all supporting arrangements.

(10)

(*Or*)

b. Draw and explain the midship section of VLCC having longtitudinal framing system. (10)

3 a. What do you mean by longitudinal bending stress. Classify and explain it with necessary diagram. (15)

(*Or*)

b. What do you mean by corrosion, state and explain various corrosion control measures that followed on board a ship. (15)

4 a. Define the following :— (10)

i) Centre of gravity

ii) Free surface effect

iii) Transverse Metacentre

iv) Trim

(*Or*)

b. A ship of 10,000 tonne displacement has it's centre of gravity 3m above the keel. Masses of 2000, 300 and 50 tonnes are removed from positions 1.5, 4.5 and 6m aboves the keel. Find the New displacement and position of the centre of gravity. (10)

5 a. Construct the curve of statical stability for

Q(Heel)	5°	10°	15°	20°	30°	45°	60°	75°	90°
KN	0.9	2	3.2	4.4	6.5	8.75	9.7	9.4	8.4

of M.V. Cargo Carrier, when the displacement is 35,000 tonnes and KG is 9 metres. From the curve find the following.

i) The Range of positive stability.

ii) The Angle of vanishing stability.

iii) The Maximum Righting lever.

iv) The approximate initial Metacentric height.   (15)

<div align="center">(Or)</div>

b. Explain various factors that influence on stability, when a vessel carrying timber as deck cargo having small initial Metacentric height.

6 a. Define the following :—   (10)

i) FWA

ii) TPC

iii) MCTC

iv) Angle of Loll

<div align="center">(Or)</div>

b. Derrive the formula for finding Angle of Loll by using the Wall-sided formula of Righting lever.   (10)

7 a. Derrive the formula for finding the Transverse BM that is height of Transverse Metacentre above the centre of Buoyancy.   (15)

<div align="center">(Or)</div>

b. A box barge 100m long 12 m beam and 4m draft has a compartment at the extreme fore and 8m long, subdivided by a horizontal watertight flat 2m above the keel. The C.G. is 3m above the keel. Calculate the end drafts if this compartment is bilged above the watertight flat. (15)

8 a. Write the various effects of Beam and Freeboard on the GZ and on stability of a ship. (10)

(*Or*)

b. Explain the Inclining Experiment for finding the light displacement's centre of gravity of a vessel. (10)

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B.Sc DEGREE EXAMINATION, APRIL 2010

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS - II

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **ALL** the Questions   (5 × 15 = 75)

All Questions carry equal marks

1 a (i) Define the following : Malleability Ductility Toughness Strength Plasticity   (5)

   (ii) Enumerate the various types of heat treatment done on Steel. Write the desired properties obtained during the above heat treatments   (10)

(OR)

   b (i) Briefly write the differences between Alloy Steel and Carbon Steel   (5)

   (ii) Sketch and describe the working of a basic furnace used for producing steel   (10)

2 a (i) Explain with a line diagram, how fresh water distribution is done
          on ships   (8)

       (ii) What types of treatment are done to make freshwater suitable
           for drinking   (7)

(OR)

   b (i) Sketch and describe a water tube boiler with its mountings
                                                                     (10)

       (ii) Briefly write short notes about the methods available to generate
           steam at port and during sailing   (5)

3 a (i) Explain the working of a refrigeration system with a line diagram.
                                                                     (10)

       (ii) Name the various types of pumps available on board and their
           applications.   (5)

(OR)

   b (i) Why do we need a steering system in ships ? Name some
           types of the above.   (4)

       (ii) Sketch and describe a pump used to transfer water from sea
           for cooking purposes   (9)

       (iii) Name 4 uses of compressed air onboard a tanker.   (2)

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4   a (i)   Explain a 4 stroke cycle with the help of value timing diagram.(7)

    (ii) Discuss the various types of scavenging and their advantages
          and disadvantages.   (8)

                              (OR)

    b (i) Write sketches showing the position of piston in the cylinder of
          an I.C. Engine the 2 stroke cycle.   (8)

      (ii)Write short notes on any two important parts of an I.C. Engine
          and their use.   (7)

5 a (i)   Define a transformer, write short notes on the types of
          transformers with simple sketches.   (8)

    (ii) Define the following: phase frequency power factor   (6)

    (iii) Name two protections present in a main switch board   (1)

                              (OR)

    b   (i) Why paralleling of alternators should be done ? What checks
          are done before paralleling of alternators ? How paralleling of
          alternators are done ?   (10)

      (ii) Write short note on   (5)

              Overload
              Short circuit

                         ——————***——————
CP-2945

4 . 6

B.Sc. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

Environmental Science - II

(UPTO 2007 BATCH)

Duration : 3 Hours   Maximum : 75 marks

Answer ALL Questions   (5 x 15 = 75)

All Questions Carry equal Marks

1.   a. Explain the fold and its types with suitable diagram ?   (7)
       b. Write about plate tectonic mechanism. And what is the
       major disaster it creates in ocean ?   (8)

Or

       c. Describe the weathering processes and its associated land
          forms.   (8)
       d. Explain the internal structure of the earth with diagram   (7)

2.   a. Briefly explain about the Ballast water management   (8)
       b. Explain about MOHOLE project and SOFAR   (7)

Or

       c. What are the major issues related to sea level rise ? What is
          the solution ?   (8)
       d. Compare the ocean bottom geomorphology to continent
          geomorphology with suitable examples ?   (7)

3.   a. Write abot drilling and pipe - laying method on the ocean
        bottom. Give any two real world examples.   (8)
     b. How hydrocarbons are naturally produced in the ocean?
                                                            (7)

                        Or

     c. How can we conserve the marine resources ? Give your
        own idea ?   (8)

     d. Write about the ideal energy production and important tidal
        stations in India ?   (7)

4.   a. Write about coriolis force and how it affects the normal wind
        system in the atmosphere ?   (8)
     b. Illustrate synoptic charts ?   (7)

                        Or

     c. Explain the Newton law of motion, absolute and relative
        motion ?   (8)
     d. Write about jet stream and its influence in the atmosphere
                                                            (7)

5.   a Explain the south - west monsoon and its mechanism ? (8)
     b. How do you estimate the True and Apparent wind ?   (7)

                        Or

     c. Write about Anabatic and Katabatic wind and its importance
        to mariners ?   (7)
     d. Briefly explain about the cyclone and its formation in Arabian
        Sea and Bay of Bengal ?   (8)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
MARITIME LAW - I
(UPTO 2007 BATCH)

Duration : 3 Hours   Maximum : 100 marks

Answer any **FIVE** Questions   (5 x 20 = 100)

All Questions carry Equal Marks

1.   a. What are the different types of jurisdictions ?

      b. Explain - Precedence, Codes, Directives, Clarifications, Circulars, Notifications

Or

      c. What is meant by Tort, Strict liability & Vicarious liability ?

      d. Explain - Action in rem, res & personam in admiralty jurisdiction

2.   a. What are the different legal remedies available for breach of contract ?

      b. Write a note on void & Voidable contracts, contingent contract

Or

c. Name any 12 important IMO instruments

d. "Qui Facit Per Litium Facit Per se" - discuss

3   a. Name the various types of flags & explain Closed registry

        b. What are the various types of marine insurance policies in use?

<div align="center">Or</div>

        c. What are the duties & authorities of a master of a merchant ship.

        d. What are the objectives of Registration & What are the uses of Certificate of Registry ?

4   a. Explain YORK - ANTWERP Rules

        b. When is an Agent personally liable for his acts during agency ?

<div align="center">Or</div>

        c. What is article of agreement ? What are its contents ?

        d. What is meant by "Res Nullius, Res Fillius" ?

5.   a. What is meant by "Innocent Passage" ?

        b. Write a note on Max hours of work & rest to which a seaman is entitled.

<div align="center">Or</div>

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c. Write a note on - Salient features of UNCLOS 1982

d. Write a note on - Insurable interest, Carving note.

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

MARITIME COMMERCE

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 100 Marks

Section - A   (5 × 20 = 100)

Answer any **Five** questions

All questions carry equal marks

1 a. Write an elaborate notes on Indian research vessels   (10)

   b. Describe the cost models for various types of ships.   (10)

(*Or*)

   c. Briefly explain about the Indian shipping economy.   (10)

   d. Write notes on classification and cost analysis of shipping.   (10)

2 a. Write shorts notes about the following :   (10)

     (i) Trade barriers

     (ii) Trading blocks

     (iii)   Trading agreements

b. Briefly explain the international economic organisation and forums.

(10)

(*Or*)

c. Give elaborate notes on foreign exchanges by shipping.   (10)

d. Explain the role of ADB, GATT on social infrastructure creation and development.   (10)

3 a. Write short notes on following :—   (10)

  (i)   Bill of lading

  (ii) Mates receipt

  (iii) Charter party

  (iv) Cargo plan

b. Write an essay on various Indian shipping company.   (10)

(*Or*)

c. Briefly explain the types of shipping services and its management.

(10)

d. Describe in detail about the cargo ship management.   (10)

4 a. Give an elaborate notes on Cargo handling method.   (10)

b. Briefly explain the various types of ship industry in India.   (10)

(*Or*)

c. Explain about Tamil Nadu shipping and port management.   (10)

d. Write notes on shipping and the national product.   (10)

5 a. Briefly explain about the Indian fleet and their evolution. (10)

b. Describe cargo handling ports organization in the world. (10)

(Or)

c. How to construct the jetties and port and their location, function, financial aspects ?

(10)

d. Distinguish between Liner Trade and Tramp Trade. (10)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
Nautical Science
NAVIGATION - III
(Upto-2007 Batch)

Duration : 3 Hours   Maximum :75 Marks

Extract of Nautical Almanac 1992 and Norie's Tables Permitted

Answer **All** questions

Part - A

1.(a) (i) Define twilight ? What are the conditions necessary for a body
         to be circumpolar ?   (5)

   (ii) Explain Maximum azimuth.   (5)

                              (*Or*)

   (b) On 16th June 1992, in DR Long 156deg. 0.8′ E in high north
        latitued, the sextant meridian altitude of the sun's LL below
        the pole was 10deg. 14.8′ . HE=11m, IE=1.6′ on the arc. Find
        the latitude.

2. (a) Write short notes on :

   (i) Notices to Mariners.

   (ii) List of lights and fog signals. (10)

   (*Or*)

   (b) (i) What are the main points discussed during a MASTER/
   PILOT information exchange ?

   (ii) Explain master's responsibilities in pilotage waters. (10)

3. (a) (i) At what time GMT on the morning rising tide at 1st Jan. 1987
   will the height of tide at Ullapool be 3.2m above chart datum.

   (ii) Explain tidal stream, Low water and height of tide. (10)

   (*Or*)

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

   (ii) At what time (GMT) will the height of tide be 2.2m at Ullapool
   on the evening falling tide of Sunday 11th January 1987. (10)

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4.(a) Find the G.C. distance, initial co. and final co. from A:24deg. 11'N 168deg. 24'W to B: 47 deg. 19'N and 157deg. 47'E .

(*Or*)

(b) Find the distance, initial co. and final co. along the composite G.C. track from A:40deg S 180deg. To B:56deg.S 64deg. 12'W , max. limiting lat: 56deg S.

5.(a) In 36deg. 48'S 110deg. 37'E , an Ex-meridian sight gave an obs. Lat. Of 37deg. 00'S and a PL of 100deg. –280deg. After steaming 000(T) for 87 miles and 270(T) for 101 miles an intercept of 7.2 miles away from AZ 086(T) was obtained. Working from the earlier Obs. Lat. Find the position of the ship at the 2nd observation.

(*Or*)

(b) In DR 68deg. 12.5'N 044deg. 18'W an astronomical observation gave an Obs. Long of 44deg. 10.6'W whilst bearing 281(T).After steaming for 112 miles on a course of 327(T), an observation of Polaris gave Obs. Lat. 69deg. 53.3 N bearing 358(T), using EP long worked from the earlier Obs. Long. Find the position of the ship at the second observation.

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

(*Or*)

(b)   On 31st Aug. 1992, AM at ship in DR 40deg. 30'N 064deg. 56'E , the sextant altitude of the star DIPHDA was 21deg. 23.4' when the chron. (error 01m 06s fast) showed 00h 21m 32s. If IE was 0.9' off the arc and HE was 9m, find the direction of the PL and a position through which it passes.

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CP-2949

B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

SHIP OPERATION TECHNOLOGY - III

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Section - A   (5 × 15 = 75)

Answer **All** questions.

1. a. (i) Explain the importance of IMO Grain code and describe the 'Document of Authorisation' as per IMO Grain Code. (10)

   (ii) What built in infrastructures are available in Indian Major Ports for cargo handling ? (5)

(Or)

   b. (i) A hold 14m x 10m x m is to be filled with jute and cotton bales. The jute bales measure 1m x 0.5m x 0.6m and weigh 180 Kg and the cotton bales measure 1m x 0.5m x 0.8m and weigh 250 Kg. How many bales of jute and cotton would you load if (10)

   (A) The Ship owner was paid by the tonne?

   (B) The load density of the deck was 1.86 t/m²?

   (C) The freight for jute was $5.50 per tonne and freight for cotton was $ 5.20 per tonne?

(ii) Write any five differences between crane and derricks.   (5)

2.   a. State and explain the basic cargo pipeline system of a tanker. (10)

(*Or*)

   b.   With the help of line diagram describe the hazards due to bulk
        cargoes.   (10)

3 a.   (i) Mention any five knots, bends or hitches and their uses.   (5)
       (ii) How will you take care of Natural fibre rope?   (5)

(*Or*)

   b)   Explain with a diagram the different turns executed to recover a
        man fallen over board.   (10)

4 a.   (i) Explain with the help of a diagram.   (5)

        (aa)Turning circle

        (ab)Stopping distance

       (ii) What special precautions will you take while keeping anchor
            watch at a tidal port ?   (5)

(*Or*)

   b   (i) What are the pyrotechnics carried in a lifeboat   (2)
        (ii) Explain the working principle of EPIRB.   (8)

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5 a. (i) List out various types of paints and the areas where they are used ? (5)

(ii) How steel surface is prepared in dry dock? (5)

(*Or*)

b. (i) What are the methods of testing hatch covers? Explain them. (5)

(ii) In sequence explain how will you lower a Gravity Davit launched lifeboat? (5)

6 a. Explain the general procedure for planning a dry docking (10)

(*Or*)

b. What measures will you adopt for maintaining crew accommodation, also mention the safe guards to be applied in various methods? (10)

7 a. (i) Mention any three gas detecting instruments and write short notes on each. (5)

(ii) What are the aims of Code of Safe working practice for Solid Bulk Cargoes. (5)

(*Or*)

CP-2950

b. Write short notes on : (10)
   (i)   Barometer
   (ii) Chronometer
   (iii) Azimuth mirror
   (iv) Sextant
   (v)   Handlead

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

MARINE MANAGEMENT

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

$(5 \times 15 = 75)$

Answer **All** questions.

All questions carry equal marks.

1 a.   What are the key elementes of OB ? Why is it important to study OB ?

(*Or*)

   b.   Explain the different types of Demand forecasting methods.

2 a.   Discuss in detail the different elements of Marketing Mix.

(*Or*)

   b.   Briefly explain the principles of effective executive communication.

3 a. What are the different functions of Personnel Management ? Explain.

(*Or*)

b. Differentiate Cost Accounting from Management Accounting.

4 a. Explain the significance of operations research in Marine Management.

(*Or*)

b. Discuss in detail the different elements of Management Information System.

5 a. Critically examine the reasons for current trend of Indian economy.

(*Or*)

b. How does a management policy designed ? Explain.

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B.SC. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

MARITIME LAW II

(UPTO 2007 BATCH)

Duration: 3 Hours   Maximum: 100 Marks

Answer ALL Questions

1. a. What are the characteristics of a voyage charter
      party?   (10)

                    (OR)

   b. What are the salient features of a Time charter?
                                                       (10)

2. a. What are the basic features of a B/L?   (10)

                    (OR)

   b. What are the duties, responsibilities and
      immunities of a carrier?   (10)

3. a. How are the B/L classified?   (10)

                    (OR)

   b. What are the characteristics of a MTD?   (10)

4. a. What is meant by "Res Nullius, Res Fillius"? (10)

(OR)

b. Explain:

EEZ, EFZ, Contiguous Zone, Archipelagic
Waters, Continental Shelf. (5 x 2)

5. a. What is "Hot pursuit"? (10)

(OR)

b. Enforcement jurisdiction of Coastal State.
Explain. (10)

6. a. Explain the terms:
Rights in Rem,
Res and
personam with respect to Maritime law. (10)

(OR)

b. Explain the terms "No cure No pay" and "Last
came first paid, First came last paid with
respect to salvage award". (10)

7. a. i. What is a crew agreement? (3)

ii. Explain Running Agreement. (7)

(OR)

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b. What are the powers, duties and responsibilities of a Receiver of Wreck? (10)

8. a. How can a ship owner limit his liabilities against maritime claims? (10)

(OR)

b. What is a Crew Agreement? What are its contents? (10)

9. a. What are the discharge procedures to be followed in respect of a seaman from ship? (10)

(OR)

b. Write a note on MS Notice No.1584 on Accident investigation. (10)

10. a. i. What are the laws relating to repatriation of a seaman? (5)

ii. Write a note on Hans of work and wages and manning convention No 109/1958 modified by 180 of 1994. (5)

(OR)

b. What is the master's Role in collecting evidence after a marine incident? (10)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAVIGATION - IV

(Upto 2007 Batch)

Duration : 3 Hours 　　　　　　　　　　　　　　Maximum : 75 Marks

Section - A 　　　　　　　$(5 \times 15 = 75)$

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

1. Describe the two properties of a free gyroscope and explain how it is made into a North seeking compass.

2. Describe the principle system of ECDIS and how it helps in berthing the V/L.

3. What is ARPA ? Explain the limitations of ARPA in detail.

4. Draw the block diagram of an echo sounder. Explain the principle and controls of the Echo Sunder.

5. a) Explain how Racon Helps in posein fixing.

   b) Write short notes on Remark.

6. a) Describe how a fix is obtained by GPS.

    b) Explain Pseudo Rangs and True ranges.

7. Explain the following:

    a) Errors of Navy Navigation Satellite System (NNSS)

    b) Errors of Decca Navigation System.

8. a) Explain with reference of LORAN :

        i) Coding Delay

        ii) Group Repetation Interval

    b) Explain how LORAN-C measures the time difference.

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

SHIP OPERATION TECHNOLOGY - IV

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Answer **All** questions.

1 a. i) Explain the term 'Alloy' Name some alloys used in the ship building Industry.   (5)

    ii) Why is steel preferred over cast iron in shipbuilding ?   (5)

(*Or*)

  b. Write brief notes on the different types of steel used in ship building.   (10)

2 a. Explain the working principle of a Cathodic Protection system (10)

(*Or*)

  b. What are the different sources of marine corrosion of metal surfaces ?   (10)

3 a. Explain the terms : $(2 \times 5 = 10)$

    i)   Gross Registered Tonnage (GRT)

    ii)   Fresh Water Allowance (FWA)

(*Or*)

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

    i)   Winter North Atlantic (WNA) Loadline.

    ii)   Plimsol Disc.

4 a. Explain the terms : $(2 \times 5 = 10)$

    i)   Crush Stop Distance

    ii)   Turning Circle

(*Or*)

  b. i)   Tactical Diameter $(2 \times 5 = 10)$

    ii)   Squat

5 a. In a shell expansion plan, demonstrate how strakes and individual plates in a strake are identified ? (10)

(*Or*)

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

    i)   Loadline Zones

    ii)   Summer Draft

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6 a. Explain how vessel interaction affects a vessel moored to a jetty when passed by another vessel at high speed in a narrow waterway. (10)

(*Or*)

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

i) MAYDAY

ii) SOS

7 a. i) What does ALRs stand for ? How many volumes are there ? What is the information available in ALRS Volume 6 ? (5)

ii) What is the GMDSS equipment to be carried by a vessel in Sea Area A3 ? (10)

(*Or*)

b. i) How many different types of EPIRB and are there ? (5)

ii) Why is the Inmarsat EPIRB not carried by vessels operating in latitudes 60° North or South ? (10)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

MARINE ENGINEERING AND CONTROL SYSTEMS - III

(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

$(5 \times 15 = 75)$

Answer **All** questions

All questions carry equal marks.

1 a. (i)   Draw and explain Fire Main system for fire fighting onboard ships.   (10)

    (ii)   How many fire pumps are to be provided on board ship as per safety requirement?   (2)

    (iii) Why a relief valve is fitted on the deck fire main line?   (3)

(*Or*)

  b. (i)   Draw and explain the working of a mooring winch fitted on board ship.   (12)

    (ii)   What are the differences between a crane and a derrick fitted on board for cargo operations ?   (3)

2 a. (i) What are the causes and remedies of scavenge fire in a large two stroke Marine diesel engine?   (10)

    (ii)   What are the indications to show that the scavenge fire has taken place?   (3)

    (iii) What is the fire fighting arrangement provided to fight scavenge fire?   (2)

(*Or*)

b. (i) Draw and explain the fresh water cooling arrangement for a two stroke Main engine on board ship. (9)

(ii) How warming up of the main engine is carried out while preparing the Ship for sailing? (3)

(iii) How fuel consumption for a main engine is calculated? (3)

3 a. Write short notes on:

(i) Impulse Turbine (4)

(ii) Pressure compounding (4)

(iii) Velocity compounding (4)

(iv) Pressure velocity compounding (3)

(*Or*)

b. (i) Draw and explain the operation of Oily Bilge Water separator. (12)

(ii) What are the regulations governing oily water discharge over board? (3)

4 a. Write short notes on:

(i) Open loop system (5)

(ii) Closed loop system (5)

(iii) Proportional action (5)

(*Or*)

b Draw and explain with line diagram Bridge Control of Main Engine. (15)

5 a. (i) Draw and explain a Ionisation type smoke detector for engine room of a merchant ship. (12)

(ii) Explain remote stopping of fuel oil system for engine room.
(3)

(*Or*)

b (i) Name two classification societies for on board survey. (2)

(ii) Draw and explain the CO_2 flooding system for cargo holds.
(10)

(iii) What are the precautions to be taken before releasing CO_2 in to the hold?
(3)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

Environmental Science - III

(UPTO 2007 BATCH)

Duration : 3 Hours　　　　　　　　　　Maximum : 75 marks

Answer **ALL** Questions　　　(5 x 15 = 75)

All Questions carry equal marks

1.　a. Explain the TRS and its origin, formation, structure with
　　　diagram　　　　　　　　　　　　　　　　　(15)

　　　　　　　　Or

　　b. Explain the extra tropical cyclone and its associated weather
　　　condition and movement　　　　　　　　　(15)

2.　a. Describe the weather analysis and forecasting with numerical
　　　method.　　　　　　　　　　　　　　　　(15)

　　　　　　　　Or

　　b. What are the important methods and procedures used by
　　　IMD for weather forecasting and analysis ?　　(15)

3.   a. What factors are to be taken into account to prepare a safe
          and economical passage ?   (15)

                              Or

       b. Describe air and water pollution and its impact on real world
          with current problems.   (15)

4.   a. Describe Triangulation survey method   (7)

       b. Write notes on position fixing, height datum, tide poles and
          gauges.   (8)
                              Or

       c. Mention any ten instruments normally used in hydro graphic
          survey with their use.   (15)

5.   a. Explain the preparation of navigation charts & its uses (15)

                              Or

       b. Write notes on construction and use of fixed angle plots(7)

       c. Describe off shore survey and sounding survey   (8)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
ENGLISH & COMMUNICATION SKILLS
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

1. This question paper contains 5 questions each of 15 marks.
2. Each question contains two subdivisions (a) and (b) respectively.
3. Candidates attempt any ONE of the subdivisions in each question.
4. Attempt ALL questions

1. a. Read the passage carefully and answer the questions given below:

The voice had to be listened to, not only on account of its form but for the matter it delivered. It gave a message to the country that it needed greatly. It brought to the common people a realisation of their duty to concern themselves with their affairs. The common people were made to take an interest in the manner in which they were governed, in the taxes they paid, in the return they got from those taxes. This interest in public affairs politics as you may call it - was to be the concern no longer of the highly educated few

but of the many-the poor, the propertyless, the working men in town and country. Politics was not to be the concern of a small aristocracy of intellect or property of the masses. And with the change in the subjects of politics that voice brought about also a change in the objects of politics. Till then, politics had busied itself mainly with the machinery of Government towards making its personnel more and more native, with proposals for a better distribution of political power, with protests against the sins of omission and of commission of the administration.

This voice switched politics on to concern for the needs of the common people. The improvement of the lot of the poor was to be the main concern of politics and the politician. The improvement, especially of the lives of the people of the neglected villages, was to be placed before Governments and political organisations as the goal of all political endeavour. The raising of the standard of living of the people of the villages, the finding of subsidiary occupations which would give the agricultural poor work for their enforced leisure during the off season and an additon to their exiguous income, the improvement of the housing of the poor, the sanitation of the villages - these were to be the objectives to be kept in view.

In the towns, the slums and cheries were to reveive special attention. There was especially a class of the poor for which that compassionate voice pleaded and protested. This was for the so-

called depressed class, the outcastes of Hindu society. The denial of elementary human rights to this class of people is considered the greatest blot on Hindu society and history. It raised itself in passionate protest against the age-old wrongs of this class and forced those that listened to it to endeavour to remove the most outrageous of them like untouchability. It caused a revolution in Hindu religious practice by having Hindu temples thrown open to these people. It made the care of them a religious duty of the Hindus by renaming them Harijans.

Questions:

i.   Why had people to listen to 'The Voice' of Gandhi ? (2)

ii. Why had people to take an interest in politics ? (3)

iii. What was the change brought about in the objects of politics ? (2)

iv. What improvements were made for the common man ? (3)

v.   Explain the meaning of the following words: (5)
     1. Aristocracy
     2. Busied
     3. protests
     4. subsidiary
     5. exiguous

OR

3

b. Read the following passage and answer the questions given below:

Do the birds know how to come back home after a long flight ?   Bird scientists, known as ornithologists, say that birds know exactly where they are and where their nests are. Even the young ones can fly hundred of nautical miles without losing their way. How do they do it ? God has given them a tremendous sense of direction; possibly they have a compass of sorts in their brain. Every year, we can see birds from North India fly to the south. In India, we have several bird sanctuaries where birds from both parts of the globe come, spend a few months and return when the climatic conditions in their homeland are more favourable. When it is winter in the northern hemisphere, it is summer in the southern hemisphere. The birds which cannot stand the cold climate fly to the warmer regions. They are called migratory birds. They can fly non-stop for twenty hours or so in one stretch and cover a few hundred miles in one stop. The migratory birds always fly in groups.

Questions:

i. Who is an ornithologist ?   (2)

ii. Why do we call some birds migratory birds? (3)

iii. Are the seasons the same in both
     hemispheres ?   (2)

iv. Do the migratory birds fly single or in groups and how long can they fly ? (3)

v. Explain the meaning of the following words: (5)
1. nautical
2. tremendous
3. sanctuaries
4. favourable
5. migratory

2. Essay writing: (15)

a. Write an essay on emancipation of women in modern age.

OR

b. Write an essay on global warming.

3. Letter writing: (15)

a. Write an application letter with your resume for the post of Marketing Manager, address it to the General Manager, Infosys, Bangalore.

OR

b. Write a letter of complaint to the Mayor of your corporation complaining about the very bad conditon of the roads in your locality.

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4. Report Writing: (15)

   a. You are the staff reporter of The Hindu. Cover the fashion show organised by the Institute of Fashion Technology.

                    OR

   b. You happen to witness a bank robbery in broad daylight. Write a detailed report to be sent to the Police Superintendent.

5. Communication: (15)

   a. Write a note on the role of media in mass communication.

                    OR

   b. What is the scope for mass communication in future ?

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAUTICAL MATHEMATICS - I
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 100 marks

Answer any **FIVE** Questions   (5 x 20 = 100)

All Questions carry equal Marks

1.a.   For any two vectors $\overline{a}$ and $\overline{b}$

$$\left|\overline{a}+\overline{b}\right| \le \left|\overline{a}\right|+\left|\overline{b}\right|$$

b.   If $\overline{a} = \overline{i} + 2\overline{j} + \overline{k}$, $\overline{b} = 3\overline{i} + 2\overline{j} - \overline{k}$. Find

$$\left(\overline{a} + 3\overline{b}\right) \bullet \left(2\overline{a} - \overline{b}\right)$$

c.   Given that $P(A) = 0.35$, $P(B) = 0.73$ and

$P(A \cap B) = 0.14$. Find (i) $P(A \cup B)$ (ii) $P(\overline{A \cup B})$

2.a.   Find the standard deviation of the following data :

Expenditure	No. of Students
Below Rs. 5	6
" Rs. 10	16
" Rs. 15	28
" Rs. 20	38
" Rs. 25	46

b.   From 10 observation on price (X) and supply (Y) of a commodity, the following figures were obtained

$\overline{\Sigma}X = 130, \overline{\Sigma}Y = 220, \overline{\Sigma}XY = 3467, \overline{\Sigma}X^2 = 2288,$

$\overline{\Sigma}Y^2 = 5506$. Compute the line of regression on X and Y

3.a.   Find the focus, Latus Rectum, Vertex, axis and the directrix of the parabola $y^2 - 8x + 6y + 9 = 0$.

b.   Find the equation of the directrixes. focus and Latus Rectum of the ellipse $25x^2 + 9y^2 = 225$

4.   Define the following:

   a.   (i)   Great circle
         (ii) Small circle
         (iii) Pole
         (iv) Spherical angle

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b. Define the properties of spherical triangles

c. State the solutions of spherical triangles by Havession formula and sine formula.

5.a. If $x^3 + y^3 = 3axy$ Find $\dfrac{dy}{dx}$

b. If $y = tan^{-1} x$. Prove that $\dfrac{dy}{dx} = \dfrac{1}{1+x^2}$

c. If $y = e^{tan^{-1} x}$. Prove that $\left(1+x^2\right) y_2 + \left(2x-1\right) y_1 = 0$

6.a. Evaluate $\displaystyle\int \dfrac{\cos 2x}{\sin^2 x \, \cos^2 x}$

b. Evaluate $\displaystyle\int_0^1 x^2 e^{-2x} \, dx$

7.a. Test the consistency of the following systems of equations and solve it.

$$2x - y + 3z = 8$$
$$x - 2y - z = -4$$
$$3x + y - 4z = 0$$

b.   Obtain the characteristic equation of the matrix

$$\begin{pmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 0 \end{pmatrix}$$

8.   Using Cayley Hamilton's theorem for the

a.   Matrix $A = \begin{pmatrix} 1 & 0 & -2 \\ 2 & 2 & 4 \\ 0 & 0 & 2 \end{pmatrix}$ Find A^{-1}

b.   Find the characteristic equation of the matrix

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

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAUTICAL PHYSICS AND ELECTRONICS - I
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer ALL Questions   (5 x 15 =75)

All questions carry equal marks

1. a. Define impulse of a force and impulsive force. Give examples for it.   (3)

    b. Explain oblique impact of two smooth spheres and obtain expressions for the final velocities(8)

    c. Obtain an expression for the range of a projectile   (4)

                    OR

    d. State and explain Kepler's laws of planetary motion.   (6)

    e. How will you prove parallelogram law, triangle law of force, Lami's theorem experimentally ?(9)

1

2. a. Define RMS value of AC voltage and obtain an expression for it. (6)

b. Describe the principle, theory and working of a transformer. (9)

OR

c. What is a toroid and solenoid ? (5)

d. Explain dip, declination and horizontal component of earth's magnetic field. What are its uses ? (10)

3. a. Explain streamline flow and turbulent flow. (4)

b. What is viscosity ? (3)

c. Describe the working of Bourdon pressure gauge with a neat diagram. (8)

OR

d. Explain Stoke's method to find the viscosity of a highly viscous liquid. (7)

e. Describe the working of Marine Hydrometer. (8)

4. a. Explain the construction and working of photovoltaic cell. (5)

   b. Describe the construction and working of periscope and optical pyrometer. (10)

OR

   c. State the laws of photoelectric effect. (5)

   d. Explain Einstein's photoelectric equation. (4)

   e. Explain the construction and working of Astronomical telescope. (6)

5. a. Explain the working of Zener Diode in detail. (7)

   b. Describe the working of full wave rectifier with a circuit diagram. (8)

OR

   c. Explain the Zener and avalanche breakdown. (7)

   d. Describe the input and output characterestics of PNP transistor in CE mode.

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAVIGATION - I
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Part - A   (2 x 15 = 30)

Answer any TWO Questions

1. Explain any FIVE of the following : (Draw sketches)
                                        (5 x 3 = 15)

   a. Great Circle
   b. Difference in Meridional parts
   c. Cardinal points
   d. Deviation
   e. Meridian
   f. Geographical mile

2. Explain any FIVE of the following: (5 x 3 = 15)

   a. Inferior planets
   b. Opposition
   c. Declination
   d. First point of Aries
   e. Rational Horizon
   f. Equinox

3. Find the course and dist. from 20^0 10' N 170^0 40' W to 13^0 40' N 178^0 10' E.

Part - B (3 x15 = 45)

Answer any THREE Questions

4. a. Define Compass error, Variation and Deviation. (7)

 b. Find the compass co. if the true co. is 045^0 (T) variation 10^0 w and Deviation 15^0 E. (5)

 c. Given compass error 6^0 w. Deviation 2^0 E. Find the variation. (3)

5. a. Explain Kepler's Laws of planetary motion with diagram. (10)

 b. List the superior and inferior planets. (5)

6. By Mercator's principle, find the position arrived:

 Starting posn: 18^0 58' N 072^0 52' E
 Course : 265^0 Dist: 7126 M

7. Two ships A and B doing equal speeds are both in Lat 30^0 S, B being to the East of A. The D' Long between the two ships is 2^0 30'. A steers 150^0 (T) while 'B' steers 210^0 (T). Find the latitude reached when they are 20 miles apart.

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B.Sc. DEGREE EXAMINATION, APRIL 2010
Nautical Science

SHIP OPERATION TECHNOLOGY-I

(2008 Onwards)

Duration : 3 Hours   Maximum : 75 Marks

Answer **All** questions.

1. (a) Write shorts on :

    i.   Gas carriers.

    ii.   Bulk carrier.   (5)

(*Or*)

  (b) Explain the following terms :

    i.   Pump Room

    ii.   DB tanks.

    iii.   Navigation lights.

    iv.   Draft.

    v.   Monkey Island   (5)

2. (a) Sketch neatly all the 32 points of a compass.   (10)

(*Or*)

  (b) Draw a ship which is made fast alongside a berth and show the mooring patter. Briefly explain the use of each mooring line.

(10)

3. (a) i. What is "Lookout" and explain its purpose ? (5)

   ii. Explain the following anchor terms :
       a. Letting go anchor.
       b. Surge cable.
       c. A'cockbill
       d. Short stay.
       e. Snub cable. (5)

(*Or*)

(b) i. Draw a stockless anchor and mark its parts.
    ii. List any 5 safety gears.

4. (a) i. List the pyrotechnics carried on board a L/Boat. (5)
   ii. Explain the launching procedures of a Life raft. (5)

(*Or*)

(b) i. List any 10 L/raft equipments. (5)
    ii. Draw a L/buoy and label its parts ? (5)

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5. (a) What are the duties of the following in L/boat station.

    i.   Bowman.

    ii. Stern sheet.

    iii. Lowerer.   (5)

   (b) Briefly explain heavy weather precautions ?   (5)

<div align="center">(<i>Or</i>)</div>

   (c)What is the difference between synthetic and natural fibre
      rope ?   (5)

   (d)Explain care and maintenance of steel wire rope.   (5)

6. (a) i. What are the types of painting brushes ? Explain the use
           any Two types of brushes ?   (5)

       ii. Describe the advantages of primer before applying the
           final finish coat ?   (5)

<div align="center">(<i>Or</i>)</div>

   (b) i. Name any five painting defects.   (5)

       ii. Explain any two painting defects.   (5)

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7. (a) Draw the diagram of a simple derrick and label its parts. (10)

(*Or*)

(b) Draw a muster list for 20 person on board with duties and positions. (10)

8. (a) i. What is the difference between a block and a tackle ? (5)

ii. Draw a block and label its parts. (5)

iii. Explain briefly any Two types of blocks ? (5)

(*Or*)

(b) Briefly explain the following terms : (5 × 2 = 10)

i. Elastic limit

ii. Yield point

iii. Chain stopper

iv. Velocity ratio

v. Turn buckle.

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
VOYAGE PLANNING, COLLISION PREVENTION AND MARINE COMMUNICATION - I
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 25 marks

(5 x 5 = 25)

1. a. Explain the following:

   i. Compass Rose   (1)

   ii. Relation between latitude scale and longitude scale on a Mercator chart.   (2)

   iii. What are Gnomonic Projection Charts ? For which areas are they normally used ?   (2)

OR

   b. Explain the following:

   i. The difference between Mercator charts and Gnomonic charts. Advantages and disadvantages of each.   (3)

   ii. What information is obtained from the 'Cumulative Notices to Mariners' ?   (2)

1

2. a. Explain the meaning of the following chart symbols. (5 marks)

i. P A

ii. | 6 |

iii.

iv.

v. P

OR
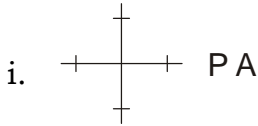
b. i. What are the different types of charts used in Passage Planning ? (3)

ii. Draw a representation of a Ship's Deviation Card. (2).

3. a. Given that vairation in a location was 2^0 E and the deviation for ships head was 3^0 W, if the bearing taken of an object was 310^0 (M), calculate the True bearing and compass bearing. (5)

OR

b. i. What is meant by Dead Reckoning (DR) position ? (2)

    ii. What is the difference between Drift and Leeway ? (1)

iii. What is meant by Chart Datum ? (2)

4. a. Define the following as per COLREGS:

    i. Vessel Underway (2)
    ii. Vessel constrained by her draft (2)
    iii. power-driven vessel (1)

OR

b. i. What are the actions to be performed by a vessel when approaching a bend in the river ? (2)

    ii. What is the obligation on an overtaking vessel with respect to the vessel being overtaken ? (2)

iii. Define a 'sailing vessel'. !1)

5. a. i. List some factors that restrict visibility (2.5)

    ii. Define a 'Trawling vessel' as per COLREGS (2.5)

OR

b. i. Identify the following day time symbols   (3)
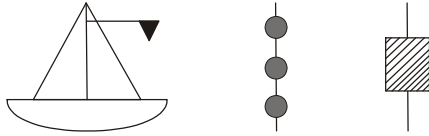
b. ii. Explain what is meant by 'close quarter
         situation' in your own words.   (2)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

Nautical Mathematics - II

(2008 ONWARDS)

Duration : 3 Hours   Maximum : 100 marks

Answer **All** Questions.   ($5 \times 20 = 100$)

1. a. Prove that

$$\frac{\sin 7\theta}{\sin \theta} = 7 - 56 \sin^2 \theta + 112 \sin^4 \theta - 64 \sin^6 \theta \qquad (10)$$

   b. If $\cos(x + iy) = \cos \theta + i \sin \theta$ show that

$$\cos 2x + \cos 2y = 2$$

(10)

(*Or*)

   c. Expand $\sin^3 \theta \cos^5 \theta$ in a series of sines of multiples of θ

(10)

   d. $1 - \dfrac{1}{2} \cos\theta + \dfrac{1.3}{2.4} \cos 2\theta - \dfrac{1.3.5}{2.4.6} \cos 3\theta + \ldots\ldots$ (10)

2. a. Evaluate

$$\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = (a - b)(b - c)(c - a)(ab + bc + ca)$$

(10)

b. Evaluate $\begin{vmatrix} x+\lambda & x & x \\ x & x+\lambda & x \\ x & x & x+\lambda \end{vmatrix}$ (10)

(*Or*)

c. Solve by Cramer's rule the equations. (10)

$3x + y + 2z = 3$

$2x - 3y + z = -3$

$x + 2y + z = 4$

d. Show that $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1+\dfrac{1}{a}+\dfrac{1}{b}+\dfrac{1}{c}\right)$ (10)

3. a. Diagonalise the matrix $A = \begin{bmatrix} 2 & 0 & 4 \\ 0 & 6 & 0 \\ 4 & 0 & 2 \end{bmatrix}$ by means of an orthogonal transformation. (12)

b. Verify that the matrix $A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ satifies its characteristic equation and hence find A^4. (8)

(*Or*)

2

c.   Test for the consistency of the following systems of equations and solve them, if consistent by matrix inversion.

$$x - y + z = -1$$
$$x - 3y + 4z = -6$$
$$4x + 3y - 2z = -3$$
$$7x - 4y + 7z = -16$$

(10)

d.   Investigate for what values of λ M the equations

$$x + y + z = 6$$
$$x + 2y + 3z = 10$$
$$x + 2y + \lambda z = \mu \quad \text{have}$$

(i)   no solution
(ii)   a unique solution
(iii) an infinite number of solution

(10)

4.a.   Define divergence and nul of a vector and write their physical meaning. Show that

$$\overline{F} = \left(y^2 - z^2 + 3yz - 2x \right) i + \left(3xz + 2xy \right) j + \left(3xy - 2xz + 2z \right) k$$

is solenoidal

(10)

b. Show that

$$\overline{F} = \left(y^2 + 2xz^2 \right) i + \left(2xy - z \right) j + \left(2x^2z - y + 2z \right) k \text{ is}$$

irrotational and hence find its scalar potential

(10)

(*Or*)

3

c. If $r = |\bar{r}|$ where r is the position vector of the point (x, y, z) prove that $\nabla^2(r^n) = n(n+1) r^{n-2}$ and hence duduce that $\dfrac{1}{r}$ satisfies laplace equation. (10)

d. Find the constants a and b so that the surfaces $5x^2 - 2yz - 9x = 0$ and $ax^2 y + bz^3 = 4$ may cut orthogonally at the point $(1, -1, 2)$. (10)

5. a. Evaluate $\iint_s \bar{A} \cdot d\bar{s}$ where $\bar{A} = 12x^2 y\bar{i} - 3yz\bar{j} + 2z\bar{k}$ and S is the portion of the plane $x + y + z = 1$ included in the first Octant. (20)

(*Or*)

b. Verify Green's theorem in a plane for $\int_C [3x^2 - 8y^2] dx + (4y - 6xy) dy$, where C is the boundary of the region defined by the lines $x = 0$, $y = 0$ and $x + y = 1$. (20)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAUTICAL PHYSICS & ELECTRONICS - II
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer any FIVE Questions   (5 x 15 = 75)

1. a. What are the safety precautions to be followed in handling nuclear wastes? Explain

    b. Explain the use of satellite for weather forecast.

    c. Give an account on oil splashing.

2. a. How is electrical resonance useful in radio communication ? Explain.

    b. What is skip distance ? Explain.

    c. Give an account on the effect of ionosphere on radio waves.

3. a. Explain decimal to binary conversion.

    b. Convert the binary number 110101 into a decimal number.

    c. Give the circuit of a NOR gate. Explain its working with its truth table.

4. a. Show that NAND and NOR gates are universal.

   b. Explain the working of a full adder.

5. a. Explain the working of a J-K flip flop.

   b. Describe an astable operation of a multivibrator and explain its working.

6. a. Define voltage gain and power gain of a transistor amplifier.

   b. Explain the action of a transistor as a switch.

7. a. Define frequency modulation.

   b. What is modulation index in FM.

   c. How is FM Modulation achieved ? Give its advantages.

8. a. State the merit and demerits of a super heterodyne receiver.

   b. Explain the use of superheterodyne receivers in naviagation.

   c. With the aid of block diagram, explain the working of a receiving antenna.

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAVIGATION - II
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Part - A   (2 x 15 = 30)

Answer any TWO Questions

1. Explain any FIVE of the following : (Draw sketches)
                               (5 x 3 = 15)

    a. Observer's Zenith
    b. Rational Horizon
    c. Declination
    d. Great circle
    e. Right Ascension
    f. International Date Line
    g. Index error

2. a. Describe the errors of a sextant.   (1 x 15 = 15)

OR

    b. i. Explain Nutation.

       ii. Why stars rise, culminate and set 4 min. earlier each day ?

3. a. On 1st May 1992 in DR 30^0 06' N 179^0 45' W, the setting sun base 285^0 (C). If variation was 2^0W, find the deviation of the compass. (15)

OR

b. Sextant altitude of Sun's LL was 119^0 11.6'. IE 2.8' on the arc, HE 12m, Date : 30th Nov 1992. Find the altitude. (15)

Part - B (3 x 15 = 45)

Answer any THREE Questions

All Questions carry equal marks

4. a. At 08 00 hrs, the DR posn of the ship was Lat 30^0 16.8' S. Long 057^0 49.3' E, a fix was obtained and found to be Lat 31^0 00.7' S Long: 058^0 20.8' E Find the Set and drift. (10)

b. Explain when the amplitude of the sun can be taken and the appropriate reasons (5)

5. a. Using plane sailing formula, find course and dist from 20^0 10' N 179^0 40' W to 13^0 40' N 178^0 10' E (7.5)

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b. Find by Mercator's principle, the position arrived:
   Starting posn Lat: 44^0 11' N Long: 140^0 20' W
   Course: 056^0 Dist: 2222 miles   (7.5)

6. In the evening of 22nd sept 1992, a ship in DR Long 160^0 12' W, found sextant altitude of POLARIS to be 36^0 18.6' at 05R 23 m 17s. Cheon time (error 02m 09s fast). If IE was 2.8' on the arc and HE was 10m, find the direction of the PL and the Latitude where it cuts the DR Longitude.   (15)

7. On 29th Nov 1992 in Dr 26^0 27' N 130^0 27' W, the sext. altitude of the sun's UL East of the Meridian was 28^0 11' when cheon (error 01m 31s fast) showed 05R 49m 20s. If HE was 10m and IE was 2.3' off the arc, calculate the direction of the PL and a positon through which it passes.   (15)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

SHIP OPERATION TECHNOLOGY - II

(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer ALL Questions

1. a. Define the following: (5 x 3 = 15)

   i.   Cargo density
   ii. Deadweight cargo
   iii. Fire triangle
   iv. Sweat
   v.   Broken stowage

OR

   b. i. Draw the loadlines of a ship and depict the Winter North Atlantic Loadline   (10)

      ii. Under what conditions, does a vessel get the WNA Loadline ?   (5)

2. a. Draw a typical cargo stowage plan of a general cargo ship with three holds and no tween decks. (10)

OR

b. What are the various methods of ventilation on a ship ? Briefly describe each of them. (5)

3. a. i. What are the SOLAS requirements for a life jacket ? (5)

ii. What are the markings on a lifeboat ? (5)

OR

b. i. What are the advantages of the lifeboat canopy ? (5)

ii. What are the pyrotechnics carried in a lifeboat ? (5)

4. a. What is the procedure for uprighting a liferaft lying upside down in the water ? (10)

OR

b. i. What are the tests to be carried out on a SCBA before useage? (7)

ii. Which fire extinguisher is most suitable for extinguishing a small electrical fire in an equipment ? Why ? (3)

5. a. Explain the following: (2.5 x 4 = 10)

    i. Spontaneous combustion
    ii. Flash point
    iii. Oxidation
    iv. Ignition point

OR

b. Explain the following methods of fire fighting :
(2.5 x 4 = 10)

    i. Cooling
    ii. Starving
    iii. Smothering
    iv. Boundary cooling

6. a. Explain:

    i. The need to prevent build-up of static electricity in tankers (5)

    ii. The need to stop radio and radar transmission during oil cargo operation (5)

OR

b. Explain:
The working principle of a SART (10)

7. a. i. Draw a diagram indicating HOG and explain how it affects cargo carrying capacity ? (5)

   ii. What are the duties of a 'stern sheet' during the launching of a life boat ? (5)

OR

   b. Write short notes on:
      i. TPA (5)
      ii. Immersion suit (5)

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B.SC. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

VOYAGE PLANNING, COLLISION PREVENTION & MARINE COMMUNICATION - II

(2008 ONWARDS)

Duration : 3 Hours   Maximum : 25 marks

Answer ALL Questions   (5 x 5 =25)

All Questions carry equal marks

1. a. Draw the following:
    i.   South cardinal mark
    ii. Safe water mark
    iii. Chart symbol for dangerous wreck
    iv. Chart symbol for pilot boarding area
    v.   Chart symbol for rock awash at chart datum

OR

    b. i. Which are the V/L's can enter a seperation zone or cross a seperation line ?

       ii. What is an inshore traffic zone ?

2. a. Draw and denote the arc of visibility of Mast head lights, side lights and stern light.

OR

b. Draw the day time symbols of

i. V/L constrained by her draft
ii. Pilot V/L
iii. V/L at anchor
iv. Power driven V/L
v. V/L RAM

3. Briefly write notes about the following:

a. Ocean passages of the world

b. Chart catalogue

OR

c. Sailing Directions

d. List the publications on board

4. a. Explain:

i. Meaning of the flag 'O'
ii. Meaning of the flag 'Y'
iii. Courtesy flag
iv. House flag

OR

b. What are the different types of safety messages ? Briefly explain each.

5. a. What are the factors to be considered for selecting a suitable anchorage ?

OR

b. Define the following:

    i. Chart Datum
    ii. High water
    iii. Height of tide
    iv. Mean high water Neap
    v. Range of tide

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B.SC. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

METEOROLOGY & OCEANOGRAPHY - I

(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer ALL Questions

1. a. Write about the
      i. Lithosphere
      ii. Asthenosphere   (5)

OR

   b. Write short notes on:
      i. Emission
      ii. Reflection   (5)

2. a. Explain about the
      i. Dew point temperature
      ii. Optimum temperature   (5)

OR

   b. Write a note on seasonal variation of water   (5)

3. a. Write in detail about the cyclone and their types? (10)

   b. Explain the following:
      i   Development and classification of clouds
      ii. Global warming (10)

4. a. Give a detailed account on temperature and pressure (10)

OR

   b. Explain the following:
      i. Salinity Vs density
      ii. Temperature Vs salinity (10)

5. a. Write a detailed account on thermal and physical properties of sea water. (10)

OR

   b. Explain in detail about the diurnal and seasonal variation of water vapour. (10)

6. a. Write a detailed account on ozone depletion. (10)

OR

   b. Write a detailed account on radiation laws (10)

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7. a. Explain the following:

    i. Variation of temperature
    ii. Evaporation   (10)

OR

  b. Give a detailed account on surface layers of ocean.   (10)

8. a. i. Briefly explain the composition and equation of state of dry air and moist air   (10)

    ii. Density variation   (5)

OR

  b. Write account on the principles construction and their various uses of meteorological instruments.   (15)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAVIGATION - III
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Extract of Nautical Almanac 1992 permitted

Part - A   (2 x 15 = 30)

Answer any TWO Questions
All questions carry equal marks

1. Find the initial course, final course and distance along the G.C. track:
   From Lat : 69^0 30' N 060^0 50.0' E
   To   Lat : 44^0 40.0' N 120^0 20.0' E   (15)

2. a. Explain the conditions necessary for a body to be circumpolar. (3)

   b. Why stars rise, culminate and set 4 min. earlier each day ? (6)

   c. Explain Nutation and the effects of nutation. (6)

3. a. On Sept 23rd 1992, the sun rose bearing 094⁰ (C) in DR 00⁰ 00'   120⁰ 27' W when chron showed 01 h 54m. If chron error was 03m 12s fast and variation was 27⁰ w , find the deviation of the ship's head. (15)

OR

   b. On 20th Jan 1992, in DR 57⁰ 31' N 164⁰ 20' w, the sextant meridian altitude of the star DIPHDA was 14⁰ 33.7'. If IE was 0,6' on the arc and HE was 14.5 m, find the latitude and the direction of the PL and state the GMT of meridian passage. (15)

Part - B   (3 x 15 = 45)

   Answer any THREE Questions
   All questions carry equal marks

4. a. Explain the principle of the Echo Sounder and explain how it works. (7.5)

   b. Explain the errors of the Echo Sounder. (7.5)

5. a. Explain civil, nautical and astronomical twilights ? (3)

   b. Explain all types of solar eclipses. (12)

6. a. In south latitude, the sextant meridian altitudes of a star were observed as follows:
   upper mer. alt = 79^0 27.5' bearing N
   lower mer. alt = 14^0 08.5' bearing S

   If HE was 11m and IE was 2.3' off the arc, find the declination and the Latitude. (15)

7. On 23rd Aug 1992 in DR 34^0 31' S 003^0 30' W, at about 1800 hours at ship, the sextant altitude of the star SPICA was 45^0 27.2' , when the chron (error 02m 19s slow) showed 06h 15m 00s. If HE was 11m and IE was 2.1' on the arc, calculate the direction of the PL and a position through which it passes. (15)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

NAUTICAL SCIENCE

SHIP OPERATION TECHNOLOGY - III

(2008 ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer any FIVE Questions

(5 x 15 = 75)

1. a. Define (with diagrams)

    i. Transfer
    ii. Turning circle

   b. Write short notes on:

    i. Line throwing apparatus (LTA)
    ii. Precautions to be observed when working aloft

2. a. i. What are the advantages of having studded links in the anchor cable.

    ii. Draw a Kenter Luglers shackle and label all the parts.

   b. i. What are the indications that a vessel is dragging anchor ?

ii. What are the duties of a watch-keeping officer in such a case ?

3. a. Describe the method of executing a "Standing Moor".

   b. Explain the terms:
      i. Foul Hawse
      ii. Dredging the anchor

4. a. Draw a diagram depicting a vessel portside alongside to a jetty with the following mooring configuration for 'd and aft   (3+3+2)

   b. Draw the positon of a vessel's masthead light, sidelights and stemlight and denote the respective arcs of visibility.

5. a. i. What are the attachments to a lifebuoy ?

      ii. What are the different shallow water effects ?

   b. i. What is the 'Critical Period' during dry-docking ? Why is it so called ?

      ii. What are the duties of a 'stern sheet' in a lifeboat crew ?

6. a. Draw a diagram to describe the following:
      i. Back spring mooring lines
      ii. stern line

   b. i. What are the advantages of a liferaft canopy ?

      ii. Box the compass from NNW to ENE.

7. a. i. What are the pyrotechnics in a ship as per SOLAS ?

ii. What are the precautions to be observed when a vessel is entering harbour ?

b. Explain the following terms:
i. Anchor aweigh
ii. Vessel interaction.

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

VOYAGE PLANNING, COLLISION PREVENTION AND MARINE COMMUNICATIONS - III

(2008 - Onwards)

Duration : 3 Hours   Maximum : 25 Marks

Answer **All** questions

All questions carry equal marks

1. A   Define the following terms as per ROR.

   a)   Vessel

   b)   Vessel restricted in her ability to manoeuvre.

   c)   Sailing Vessel.

   d)   Vessel not under command.

   e)   WIG craft.

                                    (*Or*)

   B   a)   Power Driven Vessel.

        b)   Restricted Visibility.

        c)   Vessel constrained by draught.

        d)   Vessel engaged in Fishing.

        e)   Underway

2. A   What are the different type of marks used in the maritime system of buoyage ? Draw a preferred channel to port buoy and write down the characteristics with respect to colour, shape, topmark and light fitted on it.   (5)

(*Or*)

B   List down the ALRS volumes you would find on ships and what information can you obtain from each of them ?   (5)

3. A   Give a brief description of the GMDSS system. What are the three main types of messages in the system ? Give a brief description of the GMDSS sea areas.

(*Or*)

B (a)   On what channels should a vessel with respect to her sea areas keep watch on (As per GMDSS) ?

(b)   What do you mean by MMSI Number with respect to a ship station ?

4. A   How many areas does a WORLDWIDE NAVIGATIONAL WARNING SERVICE (WWNWS) cover ? Under what area is India included ? Write down atleast 10 types of messages transmitted as warnings by this system.

(*Or*)

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B (a) List down atleast 5 reporting vessel reporting systems.

(b) Give a brief description about AMVER ? What are the various reports which have to be sent under AMVER ?

5. A (a) What are the lights exhibited by a power driven vessel constrained by their Draught ?

(b) Write down the definitions of the following :

(i) Mast head lights.

(ii) Side lights.

(*Or*)

B What is a stand -on vessel ? What are the duties of a stand-on vessel.

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B.Sc. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
NAVAL ARCHITECTURE - I
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 100 marks

Answer ALL Questions

1. a. Draw and explain the profile and cross sectional diagram of a container vessel.   (15)

OR

   b. Define the following with diagram   (15)

     i. LOA
     ii. DWT present
     iii. Camber
     iv. Moulded draft
     v. Freeboard

2. a. Draw and label all the parts of a bulk carrier having hooper tank arrangement.   (10)

OR

   b. Briefly explain the developments of ocean going Merchant vessels till today's modern vessels.(10)

3. a. Explain the following with a diagram   (10)
     i.   Peak tanks
     ii. Fore castle deck
     iii. Cargo Hold

                    OR

   b. Draw the super structure of a ship and mark the
      following: (10)

   Wheel House, Main deck, dining hall, funel deck,
   captain's cabin, Jr. officer's cabin, stores, life boat,
   gallery, Sr. officer's cabin.

4. a. Explain the testing of ship building materials as
      recommended by classification society.   (15)

                    OR

   b. Explain various welding defects with their cause
      of happening and the remedial measures to avoid
      the same.   (15)

5. a. Write short notes on:

      i.   Grades of steel used in ship building.
      ii. Advantages of steel castings.
      iii. Edge preparation.   (10)

                    OR

   b. Draw and explain the uses of various steel
      sections used in ship builiding.   (10)

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6. a. Give the meaning of the following: (15)

    i. Midship area co-efficient.
    ii. Prismatic co-efficient.
    iii. Dockwater allowance
    iv. Present displacement.
    v. DWT available.

OR

b. i. Define TPC

    ii. The waterplane areas of a ship at 1.25m intervals of draft commencing at the 7.5m waterline are 1845, 1690, 1535, 1355 and 1120 m². Draw the curve of tonne per cm immersion and determine the mass which must be added to increase the mean draft from 6.10 m to 6.30 m. (15)

7. a. Define the following (10)

    i. Centre of buoyancy.
    ii. Righting lever
    iii. Unstable equilibrium
    iv. List

OR

b. A homogeneous log of wood 3 x 0.75 x 0.75m floats in SW with one face horizontal. If the RD of the log is 0.8m, calculate the vertical distance between its COG and COB. (10)

8. a. i. Differentiate stiff and tender ship (5)

   ii. A ship 180m long has 1/2 widths of water plane of 1, 7.5, 12, 13.5, 14, 14, 14, 13.5, 12, 7 and 0 m respectively. Calculate
   i. Water plane area
   ii. TPC
   iii. Water plane area co-efficient (10)

OR

b. A vessel has two deep tank, port and starboard each 12m long, 5m wide and 8m deep. The port side is full of SW while the starboard side is empty.

Displacement : 9840 t, KM = 8.5 m, KG = 8 m.

Calculate the GM fluid if SW is transferred fromPort and Stbd. Until each tank has equal quantity of ballast. (15)

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B.Sc. DEGREE EXAMINATION, APRIL 2010

NAUTICAL   SCIENCE

MARINE   ENGINEERING & CONTROL SYSTEM - I

(2008 -ONWARDS)

Duration : 3 Hours   Maximum : 75 marks

Answer **ALL** Questions   (5 x 15 = 75)

All questions carry equal marks

1. a. Draw the SF and BM diagrams for a length of 4M long beam which is simply supported at each end and carrying concentrated loads of 20KN at 1.5M from the left end and 40KN at 1.25M from the right end. (7)

   b. Define the following terms:

      i. Modulus of Elasticity

      ii. Strain

      iii. Tensile Stress

      iv. Compressive stress (8)

OR

c. A block of wood is pulled along a horizontal table by a force of 25N inclined at 20^0 above the horizontal. Find the vertical and horizontal component of the force. (4)

d. State Newton's I, II, and III Laws of Motion.(9)

e. Define Force (2)

2. a. Define the following terms:
   i. Viscosity
   ii. Specific gravity
   iii. Density
   iv. Discharge (8)

b. The horizontal plates are placed 1.25cm apart, the space between them filled with oil of viscosity 14 poises. Calculate the shear stress in oil if upper plate is moved with a velocity of 2.5m/sec. (7)

OR

c. Derive and state the Bernoulli's Equation. State the assumptions made in the Bernoulli's equations. (8)

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d. Calculate the specific weight, density and specific gravity of one litre of liquid which weighs 7N. (7)

3. a. Explain the following laws:
    i. Zeroth Law
    ii. First Law of Thermodynamics
    iii. Second Law of Thermodynamics (6)

    b. Define the following terms:
    i. Boyle's Law
    ii. Charles Law
    iii. Dryness Fraction
    iv. Wet steam (9)

OR

    c. A gas occupies a volume of $0.1m^3$ at a temperature of 20^0 C and a pressure of 1.5 bar. Find the final temperature of the gas, if it is compressed to a pressure of 7.5 bar and occupies a volume of $0.04m^3$. (5)

d. Assuming compression according to law
   pv = constant.
   i. Calculate the final volume when $1m^3$ of gas at $120KN/m^2$ is compressed to a volume of $960KN/m^2$.
   ii. Calculate the initial volume of gas at a pressure of 1.05 bar which will occupy a volume of $5.6m^3$ when it is compressed to a pressure of 42 bar. (10)

4. a. Define Coulomb's Law of electrostatics. (5)

   b. Write down Kirchoff's Voltage and Current Laws. (4)

   c. Four arms of Wheatstone Bridge have the following resistances:
   AB = 100 Ω
   BC = 10 Ω
   CD = 4 Ω
   DA = 50 Ω

A galvanometer of 20Ω resistance is connected across BD. Calculate current through the galvano-meter when a potential difference of 10 volts is maintained across AC. (6)

OR

4

d.
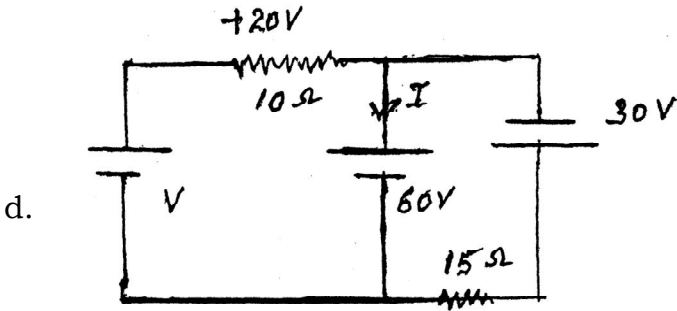
Using KVL and KCL, find values of V and I
(all resistances are in ohms).   (5)

e. Define magnetic field strength   (5)

f. Define the following:

   i. Frequency
   ii. Cycle
   iii. Time Period
   iv. Amplitude
   v. RMS value   (5)

5. a. Classify ships as per their propulsion plant. Also
       mention their various drive   (3)

b. For main engine to run, which machineries are required to be run essentially ? (5)

c. Why do we need an incinerator on board ? Give a brief description of the system you have studied. (7)

OR

d. Briefly explain the various systems required to run a generator engine and explain the various auxiliary systems. (10)

e. State the uses of the following machineries:

   i. Aux boiler
   ii. Purifier
   iii. Eductor
   iv. Emergency Air Compressor
   v. Oily water seperator. (5)

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B.SC. DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
ENVIRONMENTAL STUDIES
(2008 ONWARDS)

Duration : 3 Hours   Maximum : 100 marks

Answer ALL Questions   (5 x 20 = 100)

All questions carry equal marks

1. a. Briefly explain about the renewable and non-renewable energy sources.

   b. Write about the world food problem with example and give your solution to overcome this problem.

                    OR

   c. Write about deforestation and its causative factors.

   d. Explain about the over utilisation of ground and surface water and future problems.

2. a. Explain ecosystem.

   b. Describe the forest, grassland and desert eco system with flow chart.

<div align="center">OR</div>

   c. What is ecological succession ?

   d. Differentiate food chain and food web, and explain about ecological pyramids.

3. a. Write short notes about the following:

      i.   Bio-diversity
      ii. Poaching of wildlife
      iii. Man - wildlife conflicts
      iv. Biosphere reserves in India
      v.   Global biodiversity

<div align="center">OR</div>

   b. Write short notes on the following:

      i.   In-situ and Ex-situ conservation of biodiversity
      ii. Threats faced by Indian biodiversity
      iii. Social, ethical and aesthetic value of biodiversity.

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4. a. Write about Bhopal gas tragedy and Chernobyl incident.

   b. Write about the control measures of urban and industrial wastes.

OR

   c. Write short notes about the following:

      i.   Cyclone and earthquake
      ii. Marine and water pollution
      iii. Solid waste management

5. a. Write about ozone layer depletion and its effects on human environment.

   b. Briefly explain about HIV / AIDS.

OR

   c. Write about women and child welfare in India.

   d. What is the need of Environmental studies in all stages of curriculum ?

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B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAVIGATION - IV

(2008 - Onwards)

Duration : 3 Hours 　　　　　　　　　　　　　　Maximum : 75 Marks

EXTRACT OF NAUTICAL ALMANAC 1992 AND NORIE'S TABLES PERMITTED

Section - A 　　　　　　$(2 \times 15 = 30)$

Answer any **Two** questions from this section
All questions carry equal marks

1. On **31st of Aug. 1992**, in DR 00deg.**01' N 17deg.56'W**, the moon rose bearing **102deg(C)**. If Variation was **1.7deg. E,** find the deviation.

2. On **29th NOV 1992,** in **DR 36deg 08'S 096deg. 40'E,** the sextant altitude of the Moon's UL near the meridian was **68deg. 53.7'** at **09h18m 24s** chron time **(error 05m 01s slow)**. If **IE was 0.2' off** the arc and **HE=14m,** find the direction of PL and a position through which it passes.

3. On **22 Sept. 1992, PM** at ship in DR **60deg. 10'N 092deg. 27'E**, the sextant altitude of star **ARCTURUS** was **25deg.0.1** when chron **(error 05m 01s slow)** showed **00h 46m 31s**. If **IE** was **0.2' on** the arc and HE was **17m.** Find the direction of the PL and the longitude where it crosses the DR lat.

<div align="center">

Section - B $(3 \times 15 = 45)$

Answer any **Three** questions
</div>

4. In DR **60deg. 41'N 052deg. 27'E,** an intercept of **2.1' Away** from **AZ 225deg** was obtained. At the same time, and **ex-meridian** gave an obs. Lat of **60deg. 36.2'N** and **AZ of 357deg(T).** Find the position of the ship.

5. (a) Explain the errors and properties of Gyro compass.

   (b) Explain the principle and operation of any ONE type of LOG..

6. (a) On **23rd Aug 1992,** PM in DR **34deg. 31's 003deg. 30'W** comput the sextant altitude of **SPICA** when the chron **(error 02m 19s Slow)** showed **06h 15m 00s. hE=11m, IE=2.1' on** the arc.

(b) On **25th FEB 1992,** in **DR 10deg.13'N 103deg. 16'E,** compute the sextant meridian altitude of the Moon's UL if **IE** was **1.6'** on the arc and **HE=12m.**

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

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B.Sc DEGREE EXAMINATION, APRIL 2010
NAUTICAL SCIENCE
SHIP OPERATION TECHNOLOGY - IV
(2008 ONWARDS)

Duration: 3 Hours　　　　　　　Maximum: 75 Marks

Answer ALL Questions

1. a. Which ships carry an Oil Record Book (ORB) and what entries are made in this book? (10)

(OR)

   b. List the advantages and disadvantages of Crude Oil Washing. (10)

2. a. List the precautions to be observed prior to making tank entry. (10)

(OR)

   b. State the purpose of the following operations on the tanker vessel

   i. purging (4)

   ii. intering (4)

   iii. gas freeing (2)

3. a. Define the following terms: (5)

   i. T. E. U.

   ii. F. E. U.

   b. Describe the hazards involved in loading, carriage and discharging of containers. (10)

   (OR)

   c. Sketch and label FOUR types of containers. (10)

   d. Define Bay-Row-Tier. (5)

4. a. With respect to the carriage of bulk or packaged dangerous Goods state the meaning of EACH of the following abbreviations:

   i. EmS No.: (2)

   ii. MFAG Table No.: (2)

   iii. UN No.: (1)

   b. List the main heading found under an EmS entry. (5)

   (OR)

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

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5. a. State the publications which should be consulted when loading, carrying or discharging bulk chemicals.   (10)

(OR)

b. Define the term hygroscopic cargo.   (5)

c. List FIVE such cargoes.   (5)

6. a. A bulk carrier collided with a barge. List the actions you would take.   (10)

(OR)

b. Explain with a diagram of Standing moor.   (10)

7. a. With reference to Q. no. 6 a., list the types of distress signals you will use or exhibit.   (10)

(OR)

b. Write short notes on the following: (10)

    i. Antifouling paints

    ii. Prevention of corrosion

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B.Sc. DEGREE EXAMINATION, APRIL 2010
Nautical Science

VOYAGE PLANNING, COLLISION PREVENTION AND MARINE COMMUNICATIONS-IV

(2008 Onwards)

Duration : 3 Hours   Maximum : 25 Marks

Answer **All** questions.

All question carry equal marks

1. (a) i. The height of tide is 6.7m. The charted depth is 15m. What is the underkeel clearance required for a v/l drawing 18m draft ?

    ii. Explain Chart Datum, High water and Bore.

(*Or*)

   (b) i. At what time GMT on the morning rising tide at 1st Jan.1987 will the height of tide at Ullapool be 3.2m above chart datum.

    ii. Explain tidal stream, Low water and height of tide.

2. (a) Your next voyage is from Saldhana Bay (South Africa) to CHIBA (Japan). Your Master is informing you to prepare the Voyage planning. How do you go about it ?   (5)

(*Or*)

(a) i. How do you approach and pass through a TSS ?

   ii Write short notes on shore based weather routing.

3. (i) a. Your V/l is 154m is length at Anchor ? Which are the day and night signals your v/l will be showing ? (1)

   b You are 3rd officer of the slip. How do you take over and keep a sea watch at night ? (4)

   (*Or*)

(ii) a. Under what circumstances you will call the Master ? (1)

   b. How do you take over night watch in Port ? (2)

   c. Duty seaman is keeping gangway. What checks he will carry out during his duty ? (2)

4. (a) i. You are in a v/l in narrow channel. You intend to over take another v/l. What will you do ? (2)

   ii. While steering a course of 076deg. (T) at 13kts, a light house bore 046deg.(T) 4.5 miles off at 0800. At 0809, it bore 029deg.(T) 2.5miles off. (3)

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Find i) Range, Bearing and time at CPA.

ii) Range, Bearing and time when abeam.

iii) Set and drift of current.

(*Or*)

(b) i. How do a v/l conduct when it is nearing a bend or an area where other v/l's may be obscured ? (2)

ii. At 0200, a light v/l bore 225deg(T) 3.0 miles off. At 0230. it bore 140deg.(T) 2.0 M off. If the own ship's course and were 282deg. (T) and 6kts, find : (3)

i. CPA range, bearing and time.

ii. Beam range, bearing and time.

iii. Set and drift of current.

5. (a) What is an urgency message and explain how do you send a distress message ?

(*Or*)

(b) Explain the following :

i. Acknowledging a distress message.

ii. Relaying a distress message.

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CP-2977

B.Sc DEGREE EXAMINATION, APRIL 2010

MARINE ENGINEERING AND

CONTROL SYSTEMS II

Duration: 3 Hours   Maximum: 75 Marks

Answer ALL Questions   (5 x 15 = 75)

1. a. Describe the manufacture of wrought IRON. (7)

    b. Name the common engineering materials used in ship construction. Give one example for each material used on board.   (8)

(OR)

    c. Describe the "Bessemer" process for making Steel.   (8)

    d. What amount of Carbon is usual in Steel for following tools?
        Chisels, punches, knives, drills, files and scrapers.   (7)

2. a. Explain what is water hammer? How can it be prevented? (7)

   b. Describe a boiler feed water system. (8)

(OR)

   c. Sketch and explain the process of Fresh water generation. (10)

   d. What are the uses of compressed air on board and what is the use of interstage cooler in a multistage air compressor? (5)

3. a. Draw a neat diagram of a 2 RAM steering gear and explain the functions of the various components. (8)

   b. Draw a line diagram of a centralized air condition plant showing various components and their functions. (7)

(OR)

   c. Explain how the telemotor transmitter movement is communicated to the telemotor receiver and then to the rudder stock. (7)

   d. What are the safety and protection devices provided in a refrigerant plant? (5)

   e. What do you understand by a hydrosphore system? What is the use of it on board? (3)

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4. a. What do you understand by cylinder head mountings? (5)

   b. Write down the importance of each mountings. (10)

   (OR)

   c. Explain how the reciprocating motion of the piston in an internal combustion engine is converted into rotary motion for the propeller in a ship. (8)

   d. What do you understand by scavenging? (2)

   e. Write down the types of scavenging with line diagrams. (5)

5. a. Sketch and describe a transformer. Mention the various types in brief. (7)

   b. Write down condition for paralleling of generator engines with diagram. Explain about synchronizing methods. (8)

   (OR)

   c. What is overspeed trip, overload trip, under voltage trip and reverse power relay? (8)

   d. What is the function of a Wheatstone bridge? Explain with a line diagram the function of the same. (7)

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CP-2978

B.Sc. DEGREE EXAMINATION, APRIL 2010

Nautical Science

NAVAL ARCHITECTURE - II

2008 ONWARDS

Duration: 3 Hours   Maximum: 100 Marks

Answer ALL Questions.

1. a. Draw and explain the watertight plain bulkhead having twin deck arrangement along with stiffening arrangements. (10)

(*Or*)

   b. Draw and explain the following: (2 x 5 = 10)

      i. Peak tanks

      ii. Sounding pipe

2. a. Draw and label the midship cross sectional diagram of VLCC. (10)

(*Or*)

   b. Draw and explain cargo pumping and piping arrangement of a General purpose Tanker. (10)

3. a. Draw and explain spade type Rudder used onboard a ship. (10)

(*Or*)

   b. Draw and explain the shipyard layout based on process and shop floor arrangements. (10)

4. a. Draw and explain oil cooled stern tube used onboard a ship. (10)

(*Or*)

   b. Write short notes on the following: (10)

      i. Panting stress

      ii. Stern frame

   iii. Difference between hogging and sagging.

5. a. i. What is free surface? State its effect on the stability of a ship. (3)

      ii. A vessel has two deep tanks port and stbd. each 12m long 5m wide and 8m deep. The port side is full of SW while the starboard side is empty. Displacement 9840t.KM=8.5m KG = 8m. Calculate the GM fluid if SW is transferred from port to starboard until each tank has equal quantity of ballast. (12)

(OR)

b. i. State various information that may be obtained from a curve of statical stability. (3)

ii. Construct the curve of statical stability of M.V.VICTORY when displacement is 70,000t KG solid is 9.41m, FSM=6300 tm. From the curve, find the maximum GZ and the angle of heel at which it occurs. Also find the range of stability and initial GM in that condition. (12)

[Note: Use cross curves of stability - M.V.VICTORY]
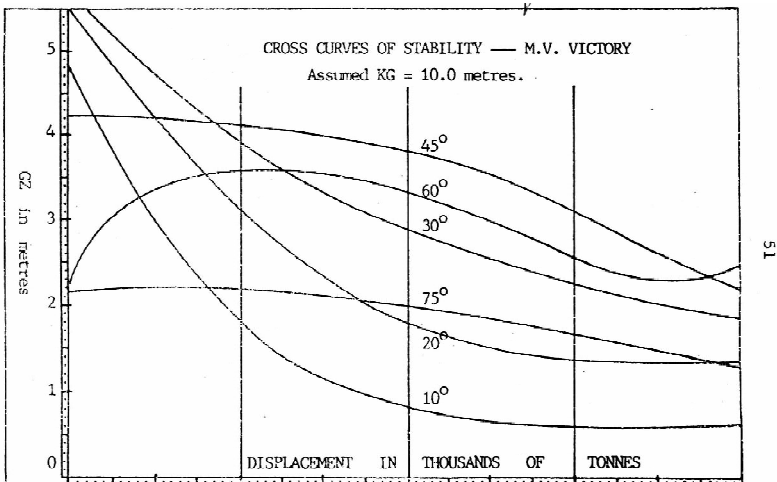
6. a. A ship 150m long arrives at the mouth of a river with drafts 5.5m Frd and 6.3m aft MCTC 200tm. TPC 15t, COF is 1.5m aft of amidships. The ship has then to proceed up the river where the maximum draft permissible is 6.2m. It is decided that SW ballast will be run into the

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forepeak tank to reduce the draft aft to 6.2m. If the COG of the forepeak tank is 60m frd of COF, find the minimum amount of water which must be run in and also find the final drafts.

(15)

(*Or*)

b. i. State the various intact stability requirements by M.S. Load Line Regulations 1998. (5)

ii. Explain the various influences on stability of a ship carrying deck cargo as timber in a voyage. (10)

7. a. i. State various effects of having greater beam on GZ of a ship. (3)

ii. A box shaped vessel 45m x 10m x 6m is floating in salt water at a draft of 4m frd and aft. GM=0.6m. Calculate the Dynamical Stability to 20 degree heel. (12)

(*Or*)

b. i. State the meaning of the terms "Grain" and "in Bulk". Also state two hazards by Carrying Grain in bulk. (5)

ii. Derive the formula for Angle of Loll using wall sided formula of GZ. (10)

8. a. i. What do you mean by "bilged ship"? State the effect of bilging on a floating vessel. (3)

   ii. A box shaped vessel 100m x 20m x 12m deep is floating in salt water on an even keel at 6m draft. A forward compartment is 10m long 12m wide and extends from the outer bottom to a watertight flat 4m above the keel. The compartment contain cargo of permeability 25%. Find the new drafts if this compartment is bilged. (12)

(Or)

   b. i. Define MCT 1cm. State the formula for finding the MCTC. (3)

   ii. A ship of 6000 tonnes displacement enters a drydock trimmed 0.3m by the stern. KM=7.5m KG=6m, MCTC=90tm. The centre of floatation is 45m from aft. Find the effective metacentric height at the critical instant before the ship takes the blocks overall. (12)

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B.Sc. DEGREE EXAMINATION, APRIL 2010
Nautical Science
ENGLISH AND COMMUNICATION SKILL
(Upto 2007 Batch)

Duration : 3 Hours   Maximum : 75 Marks

Instruction :-

1. This question paper contains 5 questions each of 15 marks.

2. Each question contains two sub-divisions (a) and (b) respectively.

3. Candidates attempt any One of the sub-divisions.

4. Attempt All questions.

1. a. Read the passage carefully and answer the questions given below :

The next ingredient is a very remarkable one : Good temper: "Love is not easily provoked". Nothing could be more striking then to find this here. We are inclined to cook upon bad temper as a very harmless weakness. We speak of it as a mere infirmity of nature, a family failing, a matter of temperament, not a thing to take into very serious count in estimating a man's character. And yet, hire, right in the heart of this analysis of love, it finds a place; and the Bible again and again returns to condemn it as one of the

most destructive elements in human nature. The peculiarity of ill temper is that it is the vice of the virtuous. It is often the one blot on an otherwise noble character. You know men also but perfect, and women who would be entirely perfect, but for an easily ruffled quick-tempered or "touchy" disposition. This compatibility of ill temper with high moral character is one of the strongest and saddest problems of ethics. The truth is there are two great classes of sins-sins of the body, and sins of disposition. The prodigal son may be taken as a type of the first, the Elder Brother of the second. Now society has no brand whatever as to which of these is the worse. Its brand falls, without a challenge, upon the prodigal. But are we right ? We have no balance to weigh one another's sins, and coarser and finer are but human words; but faults in the higher nature may be less venial than those in the lower, and to the eye of Him. Who is Love, a sin against Love may seen a hundred time more base. No form of vice, not. Worldliness, not greed of gold, not drunkenness itself does more to un-christianise society than evil temper. For embittering life, for breaking up communities, for destroying the most sacred relationships, for devastating homes, for withering up men and women, for taking the bloom off childhood; in short for sheer gratutious misery-producing power,

this influence stands alone. Jealousy, anger, pride, uncharity, cruelty, self-righteousness, touchiness, doggedness, sullenness-in varying proportions these are the ingredients of all ill temper. Judge if such sins of the disposition are not worse to live in, and for others to live with than sins of the body. There is really no place in Heaven for a disposition like this. A man with such a mood could only make Heaven miserable for all the people in it.

Questions:

    (i) What is the popular motion about "bed temper" ?   (5)

    (ii) How is bad temper "the vice of the virtuous" ?   (3)

    (iii) Mention some evils of bad temper.   (3)

    (iv) Why, according to the another, will there be no place in Heaven for bad-tempered folk ?   (3)

    (v) Explain the following words :   (4)

    (1) breaking up

    (2) scandalising

    (3) souring

    (4) quickly offended

<p align="center">(Or)</p>

(b) Read the following passage and answer the questions given below :

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The existence of mammals on the earth can be traced back to at least the Triassic time. The rate of development was retarded fill evolutional change suddenly accelerated in the oldest puleocens. This resulted in an increase in average size, larger mental capacity, and special adaptations for different modes of life, during the Eocene time. Further improvement was seen during the Oligocene Epoch, win the appearance of some new lines and extinction of others. The Miocene and Phiocene times are especially significant as they mark the culmination of various groups and a continued approach towards modern characters. It is in the Miocene time that the mammals reached their peak with reference to variety and size.

The ability of the mammals to adapt to various modes of life finds a parallel in the reptiles of the mesozoic time, and apart from their greater intelligence, the mammals apparently have not done much better than the corresponding reptilian forms. Undoubtedly the bat is a better flying animal than the pterosaur, but at the same time the dolphin and whale are hardly more fish like than the ichthyosaur. Quite a few of the swift-running mammals inhabiting the plains, like the horse and the antelope, must excel any of the dinosaurs. Although the fyrannosaur was a more weighty and robust

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carnivore than perhaps any carnivorous mammal, the lion and the tiger, by virtue of their superior brain are far more efficient and dangerous beasts of prey. It is significant to note that various species

of mammals gradually adapted themselves to various kinds of life styles, some took to grazing on the plains and were able to run swiftly-horse, deer, bison; others started living in rivers and swamps-hippo, bearer; inhabiting trees-sloth, monkey; burrowing underground-rodent, mole; feeding on flesh-tiger, wolf; swimming in the water-dolphin, whale, seal; and flying in the air-bat. Human beings on account of their superior brain have been able to harness mechanical methods to conquer the physical world and adapt to any set of conditions.

Such adaptation to different conditions leads to a gradual change in form and structure. This is a biological characteristic of the youthful, plastic stage of a group. It is seen that early in its evolutional cycle animals possess the capacity for change, but as the animal progresses in its cycle becoming old and fixed, this capacity for change disappears. The generalized types of organisms retain longest the ability to make adjustments when required, and it is from them that new, fecund stocks take origin.Certainly not from any specialized end products. with reference to mammals, we see their birth, plastic spread in many

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directions, increased specialization, and in some cases, extinction; this is a characteristic of the evolution of life, which can be seen in the geologic record of life.

Questions:

(i) Name the epoch in chronological order that are mentioned in this passage. (3)

(ii) What is the significance of Miocene and Phiocene times ? (2)

(iii) Why was tyrannosaur more dangerous ? (2)

(iv) How did the various species of mammals adapted themselves ? (2)

(v) Why does the change disappear in animals ? (2)

(vi) Explain the following words : (4)

    (1)   evolution

    (2)   extinction

    (3)   fecund

    (4)   robust

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2.   Essay Writing :

   (a) Some wonders of modern science

                    (*Or*)

   (b) E-learning.

3.   Letter Writing :

   (a) Imagine that the manager of the National Dairy Project near
   your town has invited your class to visit the milk chilling and
   bottling plant. Write a letter as written by your class secretary
   thanking him for the invitation, giving him the date and time of the
   visit, the number of student in the group and telling him what you
   would particularly like to seen.

                    (*Or*)

   (b) Write a letter to your friend, describing a book, you have just
        read and strongly recommending it to him.

4.   Report Writing :

   (a) Write a report on 'the Environmental Day', organized by the
        Biology department of your college.

                    (*Or*)

   (b) Write a report for the local newspaper of the recent 'box-
        office hit film'.

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5.   Communication :

   (a) What is the role played by media in mass communication.

                      (Or)

   (b) Trace the impacts of mass media in our life.

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