INDIAN MARITIME UNIVERSITY
MUMBAI CAMPUS
MARINE ENGINEERING & RESEARCH INSTITUTE

HAY BUNDER ROAD, MUMBAI

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1ST YEAR B.Sc. (MARITIME SCIENCE)

ANNUAL EXAMINATION – **MAY, 2011**

SUB. : TERRESTRIAL AND COASTAL NAVIGATION - PAPER - I

NOTE

01) Question No. **01** is compulsory and carries **15** marks.

02) Attempt any **05** questions from **Q02** to **Q08**. Each carries **12** marks.

03) Use of Traverse Table is a must. **CALCULATOR** is **NOT** allowed.

04) Where ever explanation is to be given, Figure must be drawn .

05) Questions must be solved step by step and methodically otherwise no marks will be given.

Q.01.   Write short notes on following :
  i)   Various types of ropes.
  ii)   What is safe working load and what is breaking load of a rope?
  iii)   State the use of following types of knots : Reef knot, Sheep Shank, Bow Line, Single Sheet Bend, Monkey Feast.
  iv)   What is a SART and EPIRB ? List its uses.
  v)   What is the difference between a derrick and a crane ?
  vi)   What is a fire triangle ?
  vii)   Write in 100 words what have you learnt from the safety movies that you have seen.

Q.02.   Explain the following :
  i)   Mercator chart construction.
  ii)   Natural Scale.
  iii)   Latitude, Longitude, Departure.
  iv)   DMP n MP.

Q.03.   A vessel sailed on a course 144⁰ (TRUE) from Latitude 15⁰ 40' (N) and makes a d'long of 47⁰ 50'. Find the distance covered and the latitude reached ? (use Mercator Method).

Q.04.   A)   Explain the use of Traverse tables.
  B)   By using Traverse tables find the departure for a d.long of 05⁰ 25' in a mean lat; of 65⁰ (S) and explain as to how you found same.

Q.05. A) What is a Sextant and the use of same ?
       B) In Sextant how many types of errors are there ?
       C) Explain transporting Sextant from Shore to the ship.
       D) What is the error of collimation, index error, side error ? How will you remove the index error on the sextant ?
       E) What is index error "on the arc and off the arc" and how will you apply same to the sextant altitude ?

Q.06. A) Draw the diagram of the Moon in opposition in conjunction and Quadrature in relation to spring tide and Neap tide and explain same ? (All the drawings must be in pencil and name all figures correctly).
       B) Chart datum, range of tide, high water, low water.

Q.07. A) Given the compass error 5°(W). The variation is 15° (E), find the deviation.
       B) Explain by figure, drawing compass error, deviation, variation.
       C) What is Deviation table on board the vessel. Where will you find variation on Mercator chart?

Q08.   Explain in Brief
           a) Parallel sailing
           b) Plane Sailing
           c) Rhumbline Sailing

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1ST YEAR B.Sc. (MARITIME SCIENCE)
ANNUAL EXAMINATION – MAY, 2011
SUB. : <u>SHIP CONSTRUCTION, NAVAL ARCHITECTURE, SAFETY AND ENVIRONMENT PROTECTION PAPER</u>

2010 ENTRY, 8TH BATCH   MAX. MARKS : 75
DATE : **24.05.2011**   TIME : 2 HRS.

<u>NOTE</u>

1. Section **'A'** is Compulsory.
2. All questions carry equal marks in sections **'B', 'C', 'D' & 'E'**.
3. Answer at least one question each from section **'B', 'C', 'D' & 'E'** respectively.
4. Attempt any five questions from sections **'B', 'C', 'D' & 'E'**.

SECTION – A   [15 MARKS]

Q1. (a). Write short notes with sketch on stress occurring due to panting, where it occurs and the principle structural members resisting this stress

(b). Write short notes with sketch on stress occurring due to hogging and sagging and name principle structural members resisting these stresses.

(c). Show on a sketch Margin Line and state its main Function.

SECTION –B (SHIP CONSTRUCTION)

Q2). List important section of steels used in ship construction. Show with the help of a sketch where some of these sections may be used.

Q3). Draw a sectional view of a bulk carrier and name its principle parts.

SECTION –C (NAVAL ARCHITECTURE)

Q4) i). State Archimede's Principle and Pascal's Law.

ii). A rectangular Double bottom tank is 20m long, 12m wide and 1.5m deep and is full of sea water having a density of 1.025 tonne/cu.mtr.
Calculate the pressure in KN/sq.mtr and the load in MN on the top and bottom of the tank if the water is:
     a) At the top of the tank
     b) 10m up the sounding pipe above the tank top

Q5. Define tonnes per centimetre immersion. Derive a formula to calculate TPC with respect to water plane area. The water plane area of the ship is 1730 m². Calculate the TPC and the increase in draught if a mass of 270 tonnes is added to the ship.

SECTION –D (SAFETY)

Q6)   Write short notes on SOLAS and explain how and when it came into existence. How many chapters SOLAS presently has and describe in one line function of each chapter.

Q7)   Write short notes on MARPOL 73/78 explaining as to what was the precursor to MARPOL 73/78. How many Annexes MARPOL 73/78 has and describe is one line function of each Annex.

SECTION –E (ENVIRONMENTAL PROTECTION)

Q8)   What are the sources of oil pollution from an oil tanker and which annex of MARPOL deals with it.

Q9)   Write short notes on Oil Record Book. State what items are recorded. Which annex of MARPOL requires oil record book and it is part of which certificate.

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1ST YEAR B.Sc. (MARITIME SCIENCE)
ANNUAL EXAMINATION – **MAY, 2011**
SUB.: **MOTOR ENGINEERING KNOWLEDGE (PAPER 1)**

2010 ENTRY, 08TH BATCH

DATE : **28-05-2011**

MAX. MARKS : 100

TIME : 3 Hours.

NOTE

1. Question No.1 in Section A is compulsory and carries (15 x 2) 30 marks.
2. Answer any 5 questions from Section B, 14 marks each.

SECTION A

Q 1.

(i)	Advantages of Rotocap fitted on 4 stroke engine air inlet and exhaust valves.
(ii)	What is overlapping of valves and why is it important in engine operation?
(iii)	What is the purpose of chrome plating of piston ring grooves?
(iv)	What is the purpose of lubrication of engine components?
(v)	Why fresh water is preferred over lubricating oil for cooling IC Engine cylinders?
(vi)	Draw an 'out of phase' indicator diagram and explain its purpose.
(vii)	What is the purpose of a piston rod stuffing box?
(viii)	What is the purpose of cross head in a large two stroke diesel engine?
(ix)	What is the function of heat exchangers in cooling system of marine diesel engine?
(x)	What are the advantages of having a turbo-charger to an IC engine?
(xi)	What are the functions of piston rings in diesel engine?
(xii)	Describe splash lubrication adopted to lubricate 4 stroke engine liner.
(xiii)	List out the different types of scavenging methods in two stroke engine
(xiv)	What are the effects of a dirty air cooler on the performance of engine?
(xv)	Define thermal and mechanical efficiencies.
(xvi)	What is the purpose of bursting disc in a starting air system?

SECTION - B

Q2 (a) Explain various types of lubrication used for machineries on board and give example of each.

(b) Explain under what type of conditions, following bearings are lubricated:
   i. Cylinder liner,
   ii. Cross-head bearing,
   iii. Main bearing.

(c) What is the importance of correct lubrication of cylinders?

(d) What are the effects of over and under lubrication?

Q3.(a) What are the advantages of turbo-charging a two stroke diesel engine?
(b) Why are coolers necessary after a Turbo-charger? Sketch and describe such a cooler, what are the effects if under cooling takes place?

Q4. (a) With regard to a 4 stroke diesel engine explain why:
  i.   Air inlet and exhaust valves open inwards?
  ii. Some valves are cooled while others are not?
  iii. Tappet clearances are necessary in valve operating gear?
(b) What are the consequences of having clearance in (iii) greater or less than recommended value?

Q5 (a) Sketch and describe a fuel supply system for a diesel engine showing all heaters, fillers, pumps etc. Describe how oil temperature is controlled?
(b) Write brief notes on the adverse effect that a fuel containing high valves of the following may cause:
  iv. Viscosity,
  v. Sulphur,
  vi. Water.

Q6 (a) Describe with the aid of a line sketch, the lubricating oil system as applicable to a two stroke marine diesel engine used for main propulsion.
(b) Discuss the routine tests and operational procedures adopted to ensure that oil reached the engine in optimum condition.

Q7. Sketch and describe how a main engine piston is cooled, discuss the advantages and disadvantages of cooling medium you have chosen. What are the possible causes of high temperature piston cooling return?

Q8 (a) Describe the following with suitable sketches:
  i.   Otto cycle,
  ii. Diesel cycle,
  iii. Dual cycle.
(b)Why (i) is called a constant volume cycle, (ii) called a constant pressure cycle and explain where these principles are used in today's modern engine?

Q9   (a) Sketch a simple fuel pump of Bosch (Jerk) type.
     (b) How does helical plunger control the amount of fuel injected?
     (c) Why are the fuel pumps located near injector?

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1ST YEAR B.Sc. (MARITIME SCIENCE)
ANNUAL EXAMINATION – **MAY, 2011**
SUB. : <u>MATHEMATICS</u>

2010 ENTRY, 08TH BATCH   MAX. MARKS : 100
DATE : **30.05.2011**   TIME : 3 Hours.

<u>NOTE</u>

1. Question No. 1 is compulsory and carries 20 marks.
2. Attempt any five from the rest of the questions. Each carries 16 marks.

Q.1.   (a)   Test for convergence the series :   (05 marks)

$$\sum \left(1 + \frac{1}{\sqrt{n}} \right)^{-n^{3/2}}$$

    (b)   Find the value of $T\,(\frac{1}{2})$ (05 marks)

    (c)   Show that the transformation :   (05 marks)
        $y_1 = 2x_1 = 2x_3,\ y_2 = x_1 + x_2 + 2x_3$
        $y_3 = x_1 - 2x_3$ is regular. Write down the inverse
        transformation.

    (d)   (05 marks)
        Solve : $\dfrac{d^3 y}{dy^3} + y = 0$

Q.2.   (a)   Find the Fourier series for the function :   (08 marks)

$$f(t) = \begin{cases} -1 & for & -\pi < t < -\pi/2 \\ 0 & for & -\pi/2 < t < \pi/2 \\ 1 & for & \pi/2 < t < \pi \end{cases}$$

    (b)   Reduce the quadratic from $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$ to the canonical form. Also specify the matrix of transformation.   (08 marks)

Q.3.   (a)   Solve $(D-2)^2 y = 8(C^{2X} + \sin 2x + x^2)$ (08 marks)

    (b)   A has one share in a lottery in which there is 1 prize and 2 blanks, B has 3 shares in a lottery in which there are 3 prizes and 6 blanks; compare the probability of A's success to that of B's success.   (04 marks)

(c) Evaluate : $\lim\limits_{x \to 0} \dfrac{xe^{x} - \ln(1+x)}{x^2}$ (04 marks)

Q.4. (a) Prove that :   (08 marks)

$$\beta(m,n) = \dfrac{\Gamma(m)\,\Gamma(n)}{\Gamma(m+n)}$$

(b) In a spherical triangle LMN, L = $88^0 24.5'$, N = $100^0 09'$ and M = $97^0 46'$, calculate l, m and N   (08 marks)

Q.5. (a) Find the complex form of Fourier series of $f^{(x)} = e^{-x}$ in $-1 \le x \le 1$ (08 marks)

(b) Solve the equations :   (08 marks)
$x_1 + 3x_2 + 2x_3 = 0$
$2x_1 - x_2 + 3x_3 = 0$
$3x_1 - 5x_2 + 4x_3 = 0$
$x_1 - 17x_2 + 4x_3 = 0$

Q.6. (a) The equation of EMF in terms of current for an electrical circuit having resistance R and a condenser of capacity c, in series, is   (08 marks)

$$E = Ri + \int \dfrac{i\,dt}{c}$$

Find the current at any time t, when $E = E_0 \sin wt$.

(b) If $u = x^2 \tan^{-1}\dfrac{y}{x} - y^2 \tan^{-1}\dfrac{x}{y}$ (04 marks)

show that $\dfrac{\partial^2 u}{\partial x \partial y} = \dfrac{x^2 - y^2}{x^2 + y^2}$

and $\dfrac{\partial^2 u}{\partial x \partial y} = \dfrac{\partial^2 u}{\partial y \partial x}$

(c) In 256 sets of 12 tosses of a coin, in how many cases can one expect 8 heads and 4 tails.   (04 marks)

Q.7. (a) Change the order of integration in   (08 marks)

$$I = \int_0^1 \int_x^{\sqrt{2-x^2}} \dfrac{x}{\sqrt{x^2 + y^2}}\, dx\, dy$$

And hence evaluate it.

(b)   Express the following integral as a gamma function.   (04 marks)

$$\int_0^1 \frac{d x}{\sqrt{1 - x^4}}$$

(c)   A seconds pendulum which gains 10 seconds per day at   (04 marks)
one place loses 10 seconds per day at another. Compare
the acceleration due to gravity at the two places.

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ANNUAL EXAMINATION – MAY, 2011
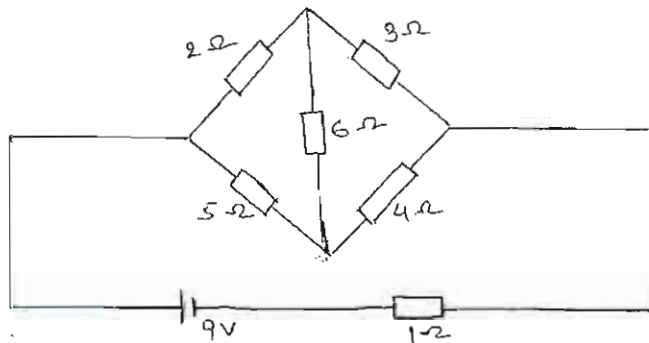### SUB. : **MARINE ELECTROTECHNOLOGY – PAPER I**

2010 ENTRY, 8TH BATCH
DATE : 13.05.2011

MAX. MARKS : 75
TIME : 3 HRS.

NOTE

1. Question **No.1** Compulsory (15 Marks).
2. Answer any **FOUR** questions from Section – A .
3. Answer any **ONE** question FROM Section– B .
4. ALL questions carry equal marks in Section– 'A' & 'B'

Q1.   Calculate the currents in the various branches of the network shown below:


SECTION – A

Q2.   A flux density of 1.2T is required in 3mm air gap of an electromagnet wound with 500 turns of wire and having an iron path of 125 cm. Calculate the current required, assuming a relative permeability of 1000 for the iron and neglecting the leakage and fringing.

Q3.   A series circuit consisting of a resistance of 10Ω and constant inductance of 2H is suddenly switched across a 50V d.c. supply. Determine (i) Final value of current. (ii) Equation of current (iii) Value of the current 1 S after the switch is closed   (v) Time constant of the circuit.

Q4.   A 75 µF capacitor in series with a 1500Ω resistor is suddenly connected ac ross a 200—V d.c. supply.
    Find : 1) Initial Constant.
           2) Time constant
           3) Initial rate of rise of P.d across capacitor.
           4) Value of current when the time is equal to the time constant.
           5) Charge on capacitor after 0.125 S.
           6) Voltage across resistor after 0.125 S.
           7) Charging current after 0.125 S.

Q5. The circuit shown in the figure below is connected to a 230 V, 50 Hz supply,
Calculate: 1) Total impedance.
2) The current and its phase relationship with the supply voltage.
3) The potential difference V1 and V2 with their phase angles on the same phasor diagram.
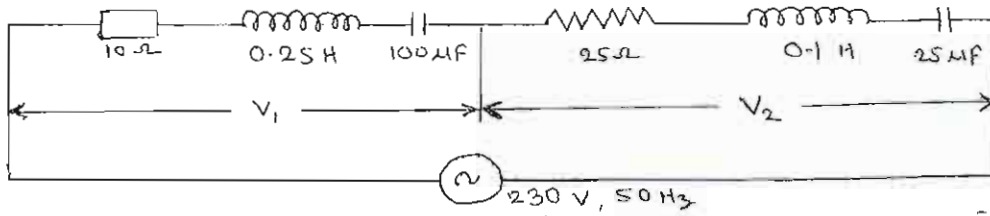
Q6. A circuit consists of three branches. Branch A has a resistance of 10Ω. Branch B has resistance of 6Ω in series with an inductive reactance of 8Ω and branch C has a resistance of 4Ω in series with a capacitive reactance of 9Ω. The whole circuit is connected across a 230V, 50 Hz supply.
Find : 1) The current in each branch..
2) Power factor of each branch.
3) Total current taken and power factor of the whole circuit.
4) Total power consumed by the circuit.
5) Equivalent impedance of the circuit.
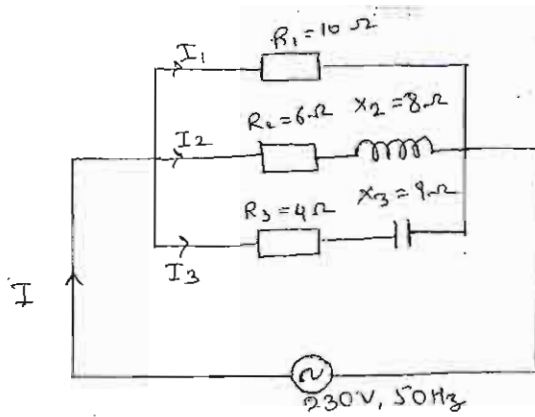
Q7. A series circuit, consisting of a resistance of 10Ω and a constant inductance of 2H, is carrying steady state current of 5A and is suddenly short circuited. Find (a) Equation of current as a function of time (b) Rate at which current beings to decrease (c) Current at instant corresponding to time constant of the circuit (4) Time taken for the current to fall to 1A. (Take time Constant = 0.2 S).

SECTION – B

Q8. Write short note on PN junction diode. Explain its use as a four diode full wave rectifier.

Q9. Draw a neat diagram of NPN transistor as an amplifier. Explain all components of the circuit. Draw diagrams of input and output wave forms.

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1ST YEAR B.Sc. (MARITIME SCIENCE)

ANNUAL EXAMINATION – **MAY, 2011**

SUB. : __MARINE AUXILIARIES – PAPER I__

2010 ENTRY, 8TH BATCH   MAX. MARKS : 75

DATE : 18-05-2011   TIME : 3 HRS.

NOTE

1. Question No.**1** Compulsory.
2. Answer any five from the remaining.

Q 1.
(i).	Sketch fresh water Hydrophor System.	[3 Marks]
(ii).	List safeties fitted on Main Air Compressor.	[3 Marks]
(iii).	Reasons for fitting inter cooler in air compressors.	[3 Marks]
(iv).	How do you align centrifugal pump with motor coupling.	[3 Marks]
(v).	State at least five colour codes on pipe lines.	[3 Marks]

Q2. (a) Sketch & Describe plate type of heat exchanger.   [8 Marks]

    (b) What maintenance is required?   [2 Marks]

    (c) How would you detect if one of the plates is leaking?   [2 Marks]

Q3. What is the effect of the following on main air compressor & remedies?

    (a) Suction valve leaking.   [4 Marks]

    (b) Piston rings broken on H.P. Piston   [4 Marks]

    (c) Bumping clearance increased.   [4 Marks]

Q4. (a) Sketch & Describe Screw displacement pump.   [9 Marks]

    (b) What defects are normally found?   [3 Marks]

Q5 (a) Sketch & Describe Sewage treatment plant.   [9 Marks]

    (b) What are the International Rules for disposal?   [3 Marks]

Q6. (a) Sketch and lable parts in a main Jacket cooling water system pipe line. Show   [9 Marks]
the location of Pumps, Valves, Heat Exchangers etc.

    (b) What are the differences between a gate valve and butterfly valve?   [3 Marks]
Logically explain as to where these valves are used.

Q7.   Write short notes on the following.

    (a) Colour Code of pipe lines.   [3 Marks]

    (b) List out different types of valves used on ship.   [3 Marks]

    (c) List out use of a windlass, mooring winch and, E.R. Overhead crane.   [3 Marks]

    (d) How Electric motor is protected from over loading?   [3 Marks]

Q8. (a) Sketch globe valve and show its parts.   [4 Marks]

    (b) Sketch two stage air compressor.   [6 Marks]

    (c) Why inter cooler is fitted in air compressor?   [2 Marks]

Q9. (a) What are tri metal bearings? Give composition of metals added   [4 Marks]

    (b) How bearing is aligned & bedded?   [4 Marks]

    (c) What defects can be found on ball bearing, metalled & roller bearings.
What is done to avoid damage?   [4 Marks]

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1ST YEAR B.Sc. (MARITIME SCIENCE)

ANNUAL EXAMINATION – **MAY, 2011**

SUB. : <u>HEAT & THERMODYNAMICS</u>

2010 ENTRY, 8TH BATCH   MAX. MARKS : 75

DATE : **19.05.2011**   TIME : 3 HRS.

<u>NOTE</u>

1. Question No.1 is compulsory.
2. Answer any **FIVE** from the remaining.

Q 1.   Answer any **TEN** from the remaining   [15 Marks]

1. State First Law of Thermodynamics & Define Enthalpy.
2. What is Combustion of fuel & efficiency of cycle?
3. Explain various modes of Heat Transfer.
4. State the Principle of Air Compressor.
5. Write combustion Equation for CO_2, SO_2, and H_2O.
6. Define Steam Turbine & Explain the Principle of Reaction Turbine.
7. State the Second Law of Thermodynamics according to Kelvin-Planck & Clausius.
8. What do you understand by coefficient of performance of Refrigerator & what is the unit of Refrigeration?
9. Prove that difference between two specific heats (C_p & C_v) is equal to characteristic gas constant(R).
10. State the Principle of Impulse Turbine.
11. State Zeroth Law of Thermodynamics & Prove general gas equation.
12. What do you understand by relative Humidity & Absolute Humidity?
13. Draw P-V & T-S diagram for Joule's Cycle.
14. Define Steam Nozzle & Explain its types.
15. Define Swept volume & mean effective pressure.

Q2. (a) Explain the various operations of Dual Combustion Cycle & derive its efficiency.   [7 Marks]

   (b) 0.1 m3 of air at pressure of 1.5 bar is expanded isothermally to 0.5 m3.   [5 Marks]
   Calculate final pressure of the gas & heat supplied during the process.

Q3. (a) Draw neat sketch of Throttling Calorimeter & explain how dryness fraction of steam is determined.   [7 Marks]

   (b) Describe the process of formation of steam with neat diagram.   [5 Marks]

Q4. (a) Describe the construction & working of Air Compressor. Draw P-V diagram for it & derive the expression for work done. [6 Marks]

(b) At very low temperature molar heat capacity of rock salt varies with temperature, according to Debye's relation $C = k \quad T$ with $k = 2000$ J/mol k

$\theta_0 = 300$ k [6 Marks]

Calculate : (i) How much heat is required to raise the temp. Of 2 mole of rock salt from 10k to 50k.
(ii) What is mean molar heat capacity in this range.
(iii) What is molar heat capacity at 50k.

Q5 (a) Derive an expression for velocity of steam exit from nozzle. [6 Marks]

(b) Dry saturated steam at pressure of 15 bar enters in nozzle & is discharged at pressure of 1.5 bar. [6 Marks]
Find the final velocity of steam, when initial velocity of steam is negligible.
If 10% of heat drop is lost in friction, find the percentage reduction in final velocity.
From steam table
$P = 15$ bar $\Rightarrow$ h $\Rightarrow$ 2789.9 kJ/Kg
$P = 1.5$ bar $\Rightarrow$ h $\Rightarrow$ 2693.4 kJ/kg

Q6 (a) Discuss the difference between Heat Engine, Refrigerator & Heat Pump [6 Marks]

(b) Five hundred Kg. of fruits are supplied to cold storage at 20^0C. The cold storage is [6 Marks] maintained at -5^0C & fruits get cooled to storage temp. in 10 hours. The latent heat of freezing is 105 kJ/Kg. & specific heat of fruit is 1.26. Find refrigeration capacity of the plant.

Q7. (a) Explain with the help of neat diagram a simple impulse turbine. Also explain the pressure & velocity variation. [7 Marks]

(b) Machine working on carnot cycle operates between 305 k & 260 k. [5 Marks]
Determine C.O.P. when it is operated as :
1. Refrigerating Machine.
2. Heat Pump.
3. Heat Engine.

Q8. (a) Explain the Otto cycle is detail & derive the necessary expression. [7 Marks]

(b) Explain the isothermal process & derive an expression for workdone. [5 Marks]

Q10. (a) Explain the various operation of Reheat Cycle with P-V & T-S diagram & Derive its efficiency.

(b) Diesel engine has diameter 150 mm & stroke 200 mm. The clearance volume is 10 percent of the swept volume (stoke volume). Determine the compression ratio & efficiency of engine if cut-off takes place at 6 percent of the stroke.

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1ST YEAR B.Sc. (MARITIME SCIENCE)

ANNUAL EXAMINATION – **MAY, 2011**

SUB.: <u>GENERAL ENGINEERING KNOWLEDGE (PAPER 1)</u>

<u>NOTE</u>

1. Section A is compulsory and carries (10 x 2) 20 marks.
2. Answer any five questions from Section B – 11 marks each.

SECTION-A

Q 1.

    (i)   What is interlocking safety guard?

    (ii)   What is that property of a material by virtue of which it can be rolled or hammered into thin sheets?

    (iii)   What is creep?

    (iv)   What are advantages of normalising?

    (v)   What are the uses of micrometer and vernier calliper? Define their least counts.

    (vi)   Name the parts of twist drill.

    (vii)   Give properties of polymers.

    (viii) Give the features of metallic bond?

    (ix)   What safety equipments are used by a welder?

    (x)   Name six different files. What is pinning?

    (xi)   What is the purpose of seasoning of wood?

SECTION - B

Q2.   Write short notes with the help of sketches:

    (i)   Claw Hammer

    (ii)   Mallet

    (iii)   Cross cut saw

    (iv)   External micrometer

    (v)   Screw pitch gauge

    (vi)   Hand Hack Saw

Q 3. (a) Discuss with the help of neat sketch, the principles of electric arc welding.

(b) What is straight polarity and reverse polarity? Describe the principles of each.

Q4.   Explain the difference between:
   (a) Normalising and Annealing,
   (b) Soldering and Brazing,
   (c) Work hardening and strain ageing.

Q5.   (a) What is an alloy? Give examples.
   (b) Explain the property of alloy from the example you have given.
   (c) What is fatigue strength? Give an example of fatigue failure.

Q6.   Describe briefly the following non-destructive tests:
   (i)   Ultrasonic test,
   (ii)   Liquid penetrant test,
   (iii)   Magnetic particle test,

Q7.   (a) What is hot working? What are its advantages and disadvantages?
   (b) What is cold working? Give examples of cold working process.

Q8.   Write short notes on the following:
   (i)   Plasma arc welding,
   (ii)   Flux cored arc welding,
   (iii)   Electro slag welding, and
   (iv)   Electro gas welding.

Q9.   What is an accident? Give in brief the causes which may lead to an accident in a workshop.

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INDIAN MARITIME UNIVERSITY

MUMBAI CAMPUS

MARINE ENGINEERING & RESEARCH INSTITUTE

HAY BUNDER ROAD, MUMBAI

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1ST YEAR B.Sc. (MARITIME SCIENCE)

ANNUAL EXAMINATION – **MAY, 2011**

SUB. : BRIDGE WATCH KEEPING & EMERGENCIES PAPER - I

2010 ENTRY, 08TH BATCH   MAX. MARKS : 75

DATE : **23.05.2011**   TIME : 3 Hours.

NOTE

1. Question No. **ONE** is Compulsory.
2. Answer any **FOUR** from Section "A"
3. Answer any **TWO** from Section "B"

Q.01. A) Define the terms :   (08)
   i) "Sailing Vessel"
   ii) "Vessel not under Command "
   iii) "Vessel constrained by her draught"

   B) You see the Red side light of a vessel four points on your (07)
   starboard side; state how would you ascertain risk of collision
   exists, state what would be your action to avoid collision.

SECTION "A"

Q.02   State the principle on which the Marine sextant works, give (10)
        geometrical proof there of.

Q.03. Compare the winding type of chronometer with a crystal quartz type (10)
        chronometer.

Q.04. State what precautions would you take when changing over ship's (10)
        steering from manual to autopilot mode.

Q.05. What is the function of an echo sounder on board. Sketch a simple (10)
        block diagram of an echo sounder and explain.

Q.06. Describe basic principle of the global positioning system. (10)

SECTION "B"

Q.07. Describe a ship's windlass and its operation. (10)

Q.08. State various types of speed logs used to record ship's speed; describe (10)
        any one of your choice.

Q.09. Describe ship's telegraph and its function on board ship. (10)
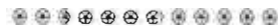
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1ST YEAR B.Sc. (MARITIME SCIENCE)

ANNUAL EXAMINATION – **MAY, 2011**

SUB. : BASIC ENGINEERING SCIENCE

2010 ENTRY, 8TH BATCH   MAX. MARKS : 75

DATE : **20.05.2011**   TIME : 3 HRS.

NOTE

- 01)   Question No. **01** is compulsory and carries **25** marks.
- 02)   Answer any **03** questions from **Section A**.
- 03)   Answer any **02** questions from **Section B**.
- 04)   All questions other than question 1 carry **10** marks each.

Q1.(a)   Find the resultant of the force system as shown in figure.
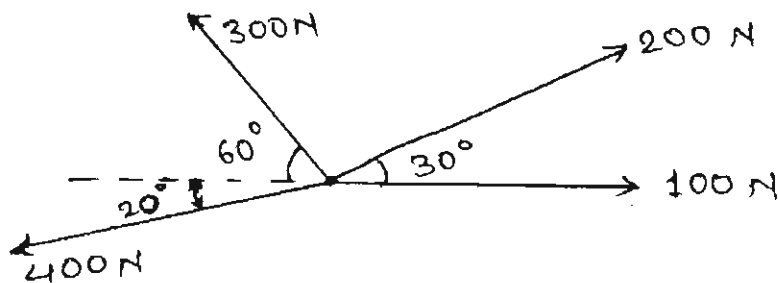
(b)   A solid shaft 100 mm in diameter is running at 150 rpm. If the angle of twist is 3° in a length of 3m. What power is being transmitted by the shaft and what is the maximum shear stress in the shaft.   Take G-100 G N/m².
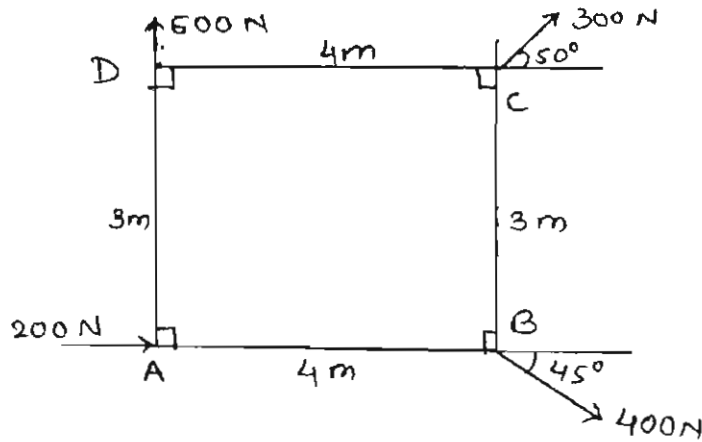
SECTION- A

Q2.   Find the resultant of the force system as shown in figure.
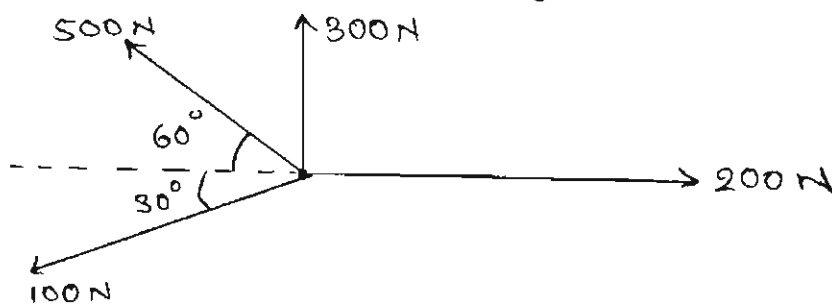
Q3. Find the resultant in magniture, direction and position with respect to point A.

Q4. In a simple screw jack, the pitch of the single start thread is 10mm. The length of the handle is 300 mm. Find the velocity ratio of the lifting machine. A load of 6000N is lifted by an effort of 75N. Find mechanical advantage, the efficiency of the machine and the load lost in friction, effort lost in friction.

Q5. A centrifugal clutch has four shoes each of mass 400 grams. The drum radius is 225 mm and the centre of gravity of shoe is 190 mm. Each shoe is attached to a spring. When the speed is 850 rpm the shoe just touches the drum. At 900 rpm the shoe gets fully engaged. If the coefficient of friction is 0.4, find the power transmitted by the clutch.

Q6. A belt drive, transmits 20KW at 500 rpm. The angle of lap is 201⁰. The coefficient of friction between the belt and the pulley material is 0.4. Find (a) tension in tight side and slack side. (b) The stress in the belt material if belt width is 50 mm and thickness 4mm.

SECTION - B

Q7. The cross section of a simply supported beam of span 5m is symmetrical T section having flange widgth of 125mm, over all depth of 220 mm and uniform thickness of 10mm. If the permissible bending stress is 125 MN/m², find the moment of resistance of beam. Also find the maximum value of u.d.l over the entire span.

Q8. A simple pendulum performing simple harmonic motion has a length of 0.8 m. Find (a) the period (b) for the amplitude of oscillation of 50mm find velocity, acceleration when bob is 20mm away from mean position. (c) The maximum acceleration and velocity of the bob.

Q9. Draw SFD & MBD for the simply supported beam shown.
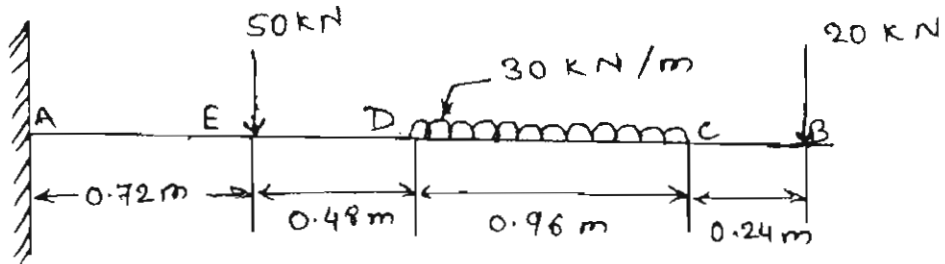
Q10. A solid aluminium shaft 1m long and 50mm diameter is replaced by a tubular steel shaft of the same length and outside diameter. What must be inner diameter of the tubular shaft for the same torque and same angle of twist.
For steel G = 85 GN/m², For aluminium G= 28 GN/m².

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