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PAST PAPERS

Faculty	Department / Section/Division
Not Applicable	Learning Resource Centre

Past Papers

Faculty of Maritime Science
Department of Marine Electrical

Electro Technical Rating (ETR)
2014-2022

Document Control & Approving Authority	Senior Director – Quality Management & Administration

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CINEC CAMPUS

Faculty of Marine Engineering
Department of Marine Electrical Engineering
PRE-SEA TRAINING COURSE FOR ELECTRO TECHNICAL RATING
COURSE CODE: EED -0465/ B013 & B014 / M1

EXAMINATION QUESTION PAPER
WORKSHOP THEORY

- *This question paper consists 06 questions.*
- *Answer any five (05) Questions.*

Date: 2022.10.23 *Pass marks 50%* *Time allocated: 03Hrs*

01. a. What is called "fitting"? (07 Marks).
b. How do you classify the fitting tools? (07 Marks).
c. List the safe working practice of fitting. (06 Marks).

02. a. What is a thread in engineering? (06 Marks).
b. Draw thread parameters on a diagram (elements of screw thread). (07 Marks).
c. State the types of threads (07 Marks).

03. a. List the operations available in lathe machine. (06 Marks).
b. Draw the neat diagram for turning operation (cylindrical job) of lathe. (09 Marks)
c. what are the steps for thread cutting on lathe? (05 Marks)

04. a. What is the meaning of fusion welding? (07 Marks).
b. List the principals of fusion welding? (03 Marks).
c. State types of fusion welding (04 Marks).
d. what are the advantages of fusion welding? (06 Marks)

05. a. What are the positions for BUTT and FILLET welding? (04 Marks).
b. State the types of welding current sources. (04 Marks).
c. How do you control welding current by welding transformer? (06 Marks).
d. What are the cooling systems for welding transformer? (06 Marks).

06. a. What are the most important factors include in a quality welding? (04 Marks)
b. List the main inspections after the welding job. (04 Marks)
c. Make the comparison for DC and AC welding machine. (12 Marks)

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COURSE CODE . EED -0465/ B013 & 14 /M1

EXAMINATION QUESTION PAPER
BASIC ELECTRICAL POWER & MACHINES

- *This question paper consist of 07 questions.* *Date : 2022.10.17*
- *Answer any 06 questions.* *Pass mark 50%* *Time allocated : 03Hrs*

01. a. Draw detailed diagram of D.C Series, shunt and Compound motors , name all components of each motor (07 Marks)

b. What are the applications of D.C series motors& D.C shunt motors? (05 Marks)

c How would you reverse the direction of rotation of dc shunt motor? (04 Marks)

02. a. Briefly Explain function of a Prime mover. (03 Marks)

b. Which DC motor Field coil has the same thickness winding as the Armature & terminals Explain why it has to be the same thickness (03 Marks)

c. Briefly Explain armature reaction of D.C. Motor. (04 Marks)

d. How can You minimize the effect of Armature reaction? (06 Marks)

03. a. What is the function of a Transformer (03 Marks)

b. What are the general uses and applications of transformer (03 Marks)

c. List losses in Transformers? (02 Marks)

d. Briefly Explain method of reducing of losses. (08 Marks)

04. a. What is a Dry type Transformer? (06 Marks)

b. 50 KVA 3300/330V Single phase Transformer.

i. Calculatel rated secondary current. (05 Marks)

ii. Turns ratio (05 Marks)

05. a. What are the types of 3 phase A.C. Motors? (03 Marks)

b. State 3 phase Induction Motor applications. (03 Marks)

c. Compare Squirrel cage rotor & slipring(wound) rotor. (10 Marks)

06. a. Explain in detail the Faraday's laws. (10 Marks)

b. A coil of 200 turns is linked by a magnetic flux of 10mWb. If this magnetic flux is reversed in a time of 1ms.Calculate the average e.m.f. induced in the coil. (06 Marks)

07. a. Compare single 3 phase Transformer & Transformer bank. (3single phase transformer)

(08 Marks)

b. Explain Star / Delta methods of connection , stating their phase and line voltage and phase and line currents. (08 Marks)

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EXAMINATION QUESTION PAPER
BASIC MATHEMATICS

- *This question paper consist 06 questions.*
- ***Answer any 05 questions.***

Date: 2022.10.21 *Pass Marks : 50%* *Time allocated: 03Hrs*

01. Integers and Simple Equations (4 * 5 = 20 Marks)

a. -12Y +23Y +16Y -9Y =

b. (-k) * (-m) * (n) =

c. {(-16) * (-4) * (-18)} / {(-8) * (-9)} =

d. ¼ . (X - 8) = 1/8 . (X – 32)

e. ¼ (Z + 9) = 1/6 (Z + 3)

02. Fractions and Removing Brackets in expression (4 * 5 = 20 Marks)

a. 8/6X + 7/3X + 3/4X =

b. 15Y/4 + 7Y/3 + 6Y/7 =

c. 6 (5M – 8N) =

d. (-11) (A - 3) -5 (K + 6) =

e. 8(S - 2) -10(T - 4) =

03. Simultaneous Equations and Indices (4 * 5 = 20 Marks)

a. 4X + 6Y = 28 , 6X – 4Y = 16

b. 15X + 12Y = 27, 9X – 18Y = -9

c. $X^{15} * X^{12}$ =

d. $A^{3/8} * A^{2/8}$ =

e. $120X^{-10} / 150X^{-6}$ =

04. Trigonometry (4 * 5 = 20 Marks)

θ	0°	30°	45°	60°	90°
$\sin\theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not defined
$\cot\theta$	Not defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not defined
$\operatorname{cosec}\theta$	Not defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

(Not defined also defined as ∞)

a. There is a right triangle called XYZ. XY = 12cm, XZ = 13cm and XYZ = 90^0. Find the length of YZ.

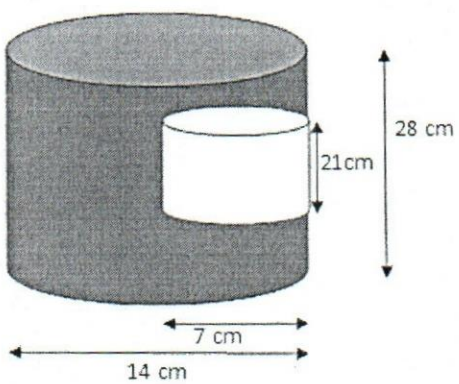
b. Prove that $(\sin^4\theta - \cos^4\theta + 1)\operatorname{cosec}^2\theta = 2$

c. Prove that $\text{Cos}30^0 . \text{Sin}\ 60^0 + \text{Cos}\ 60^0 . \text{Sin}30^0 = 1$

d. Find the value of $\text{Cos}150^0$

e. Find the value of $\text{Tan}\ 240^0$

05. a. Find the volume of dark portion of the cylindrical figure. (10 Marks)



b. Open tank is **14m** diameter and **15m** high. How many liters of paint will be required for the tank inside to paint. (2 square meter required 1 liter). (10 Marks)

06. Let $Z_1 = 3 + i2$, $Z_2 = -4 - i3$. Find

a. $Z_1 . Z_2$ (06 Marks)

b. $\frac{Z_1}{Z_2}$ (06 Marks)

c. $Express\ Z_2$ in polar coordinates and draw an argand diagram. (08 Marks)

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EXAMINATION QUESTION PAPER
Computer Knowledge

- *This question paper consists of 05 Questions*
- ***Answer Question No.01 and any other 03 questions.***

Date: 2022.10.20 *Pass Marks 50%* *Time allocated: 03 Hrs.*

01. Underline the most suitable answer. (4 x 10 = 40 Marks)

a. What is the meaning of ICT?
   i. Internet and Communication Technology
   ii. Information and Communication Technology
   iii. Information and Computing Technology
   iv. Internet and Computing Technology

b. Where we mostly use ICT?
   i. For health purpose
   ii. For corporate purpose
   iii. For banking purpose
   iv. For academic purpose

c. Identify the correct order according to the size (KB – KiloByte, GB – GigaByte,TB – TeraByte).
   i. MB < TB < GB
   ii. KB < MB < GB
   iii. TB < KB < MB
   iv. MB < GB < TB

d. What is the minimum storage device among given answers?
   i. Floppy Disk
   ii. Compact Disk (CD)
   iii. Digital Video Disc (DVD)
   iv. USB Pen Drive

e. Which port is the latest port we use for video transmissions?
   i. Digital port
   ii. USB port
   iii. VGA port
   iv. Serial port

f. Which port we use to connect 'old mouse and keyboards' to the computer?
   i. PS/2 port
   ii. HDMI port
   iii. USB type C port
   iv. Parallel port

g. Find the correct order of Hard Drives according to the speed.
   i. SATA HDD < NVMe < SSD
   ii. SSD < NVMe < SATA HDD
   iii. SATA HDD < SSD < NVMe
   iv. NVMe < SSD < SATA HDD

h. Work sheet of a MS Excel known as _____?
   i. Slide
   ii. Data sheet
   iii. Blank document
   iv. Spread sheet

i. This question is regarding to MS Excel. Choose the correct answer.

   A – Rows represent by Numbers

   B – Columns represent by English letters

   i. Only A is correct
   ii. Only B is correct
   iii. Both A & B are wrong
   iv. Both A & B are correct

j. Why do we mostly MS PowerPoint use for?
   i. To draft a letter
   ii. To make a presentation
   iii. To prepare a document
   iv. To calculations

02. Regarding fundamentals of ICT.

a. Provide 4 applications of ICT with an example for each. (08 Marks)
b. Briefly or using a diagram; explain main functionalities of a computer. (04 Marks)
c. Explain what is the CPU of computer? (04 Marks)
d. Identify the difference between RAM and ROM. (04 Marks)

03. Regarding Hardware of computer.

a. Is 'Computer Mouse' an input or output device? Explain. (04 Marks)
b. Identify 4 computer ports we currently use with examples where we use it. (08 Marks)
c. What is an input device? Provide examples. (04 Marks)
d. What is an output device? Provide examples. (04 Marks)

04. Regarding Software of computer.

a. What is an Operating System? (04 Marks)
b. Give 4 examples for operating systems. (2 for Desktop O/S and 2 for Mobile O/S) (04 Marks)
c. What are differences between System Softwares and Application Softwares? (04 Marks)
d. What is a computer virus? (04 Marks)
e. What are antivirus softwares we can purchase from the market? (04 marks)

05. Regarding Office package of computer.

a. How to save a MS Word document as a PDF file? (04 Marks)

b. How to put an animation to a MS PowerPoint presentation? (04 Marks)

c. Give 2 examples, why do we use MS Word for? (02 Marks)

d. Write down MS Excel formulas. (Use below data set to write answers for below questions.)

	A	B	C	D	E	F
1		Maths	Science	ICT	English	History
2	Amal	25	44	96	68	74
3	Kamal	85	79	50	60	80
4	Thusitha	64	33	87	61	41
5	Nimali	92	63	47	12	74
6	Chathura	63	47	85	41	26

e. Find the total marks for Thusitha. (02 Marks)

f. How many students are in this class? (02 Marks)

g. What is the minimum mark of the data set? (02 Marks)

h. What is the maximum mark for science? (02 Marks)

i. Find the average mark of Chathura. (02 Marks)

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REPEAT EXAMINATION QUESTION PAPER
ELECTRICAL THEORY

- *This question paper consists 06 questions.*
- *Answer any 05 questions only.*

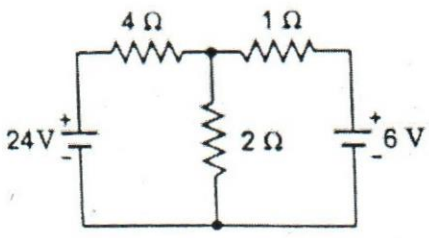
Date: 2022.10.19 *Pass mark 50%* *Time allocated: 03Hrs*

01. A Battery consists of 05 cells of 2V each, connected in series. If the internal resistance of each cell is 0.1 Ohm and the battery is connected to a load of 10 ohms, calculate
    a. Current supplied by the battery (05 Marks)
    b. Terminal voltage of the battery (05 Marks)
    c. Fall in terminal voltage and (05 Marks)
    d. Fall in voltage per cell (05 Marks)

02. The equation for a voltage is given by V = 622.5 sin 377t. Find
    a. Peak value (04 Marks)
    b. RMS value (04 Marks)
    c. Frequency (04 Marks)
    d. Time period (04 Marks)
    e. If this voltage is supplied across a resistor of 100 Ohms, power consumed by the resistor (04 Marks)

03. A balanced 3-phase Delta connected load is connected to a 400V,50Hz AC supply. The load per phase consists of a resistance (R) of 20 Ohm and an inductive reactance (X_L) of 10 Ohm. Find
    a. Impedance per phase (05 Marks)
    b. Phase current (05 marks)
    c. Line current (05 Marks)
    d. Total power consumed (05 Marks)

04.
    a. State Kirchhoff's Current Law and Voltage Law. (08 Marks)
    b. Find all branch currents in the circuit given below (12 Marks)



05. A pure inductor of 35 mH is connected in series with a pure resistance of 20 Ohm and supplied with a voltage of 200V, 50Hz supply. Find

a. Impedance of the circuit (05 Marks)
b. Current (05 Marks)
c. Voltage across resistor (05 Marks)
d. Voltage across inductor (05 Marks)

06.

a. Give 2 disadvantages of low power factor (02 Marks)
b. Give 2 methods to improve power factor (02 Marks)
c. Draw power triangle, name each leg of the triangle with units for a 3-phase system. Indicate phase angle and give one equation for power factor (08 Marks)
d. A 3-phase motor has a power factor of 0.8. If the supply voltage is 400V, 50Hz and the current is 10A find
   i. The Apparent power of the circuit and (04 Marks)
   ii. Active power drawn by the motor (04 Marks)

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EXAMINATION QUESTION PAPER
ELECTRONICS

- *This question paper consist of 05 Questions*
- *Answer all the questions.*

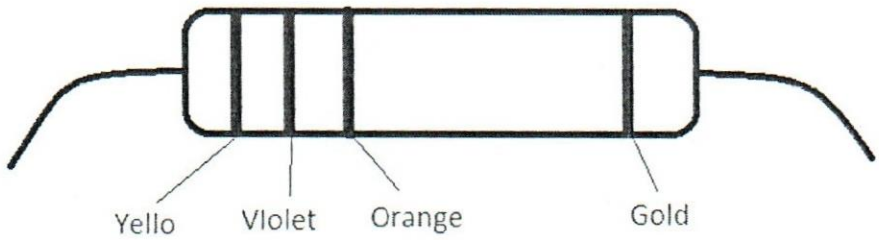
Date: 2022..10.18 *Pass Marks 50%* *Time allocated: 03 Hrs.*

01. With regards to Resistors

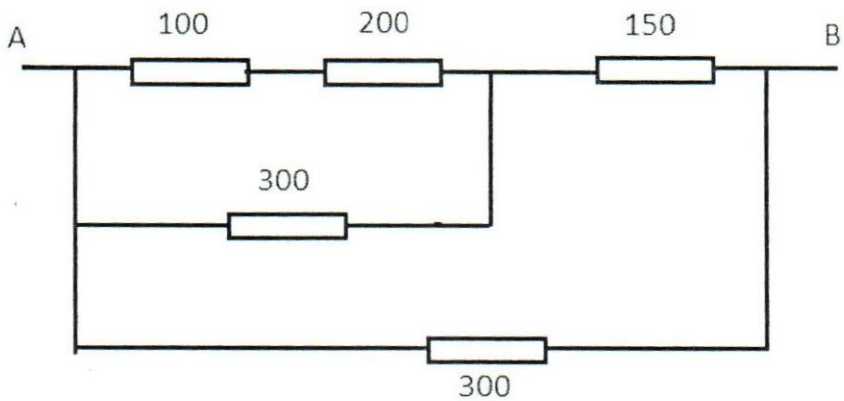
a. State 04 different types of Resistors used in electronic circuits (04 Marks)

b. Consider following resistor and find out,

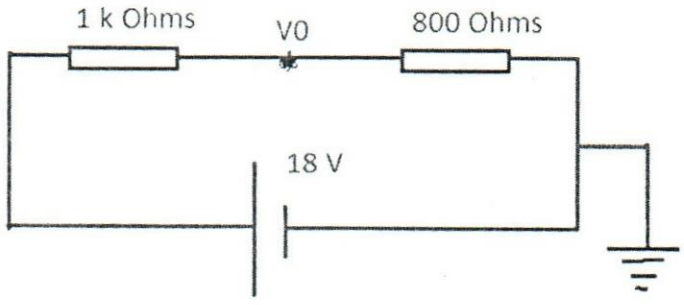
i. The value of the resistor (03 Marks)
ii. Tolerance (01 Mark)
iii. Range of value as per the given tolerance (02 Marks)



c. Find the equivalent resistance between points A and B in following resistor network (All the resistor values are given in Ohms). (05 Marks)



d. Using potential divider rule, find the voltage V0 in following resistor network. (05 Marks)



02. With regards to the Capacitors,

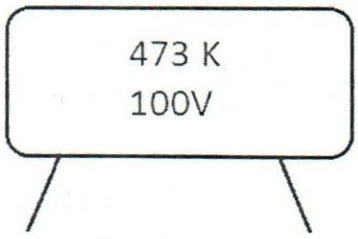
a. State 05 types of capacitors used in electronic circuits. (05 Marks)

b. Consider following Capacitor coding and find out,

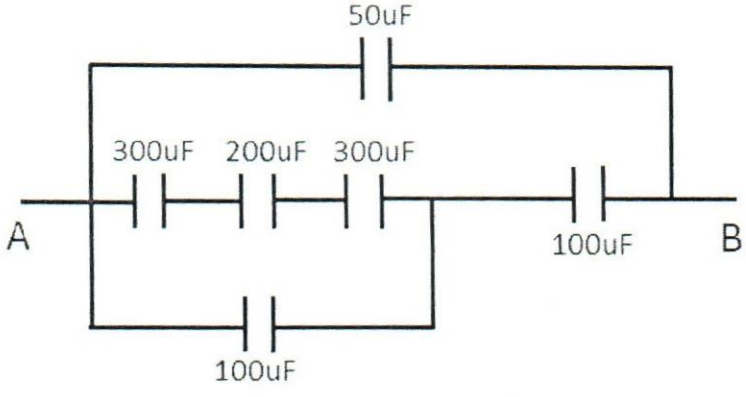
i. The value (03Marks)

ii. Tolerance (02 Mark)

iii. Voltage (02 Mark)



c. Consider following capacitor network and find the equivalent capacitance between points A and B. (08 Marks)



03. With regards to semiconductor diodes,

a. What do you mean by Intrinsic Semiconductors? and state 2 examples for them. (05 Marks)

b. Briefly describe the process of getting Extrinsic Semiconductors from Intrinsic Semiconductors. (05 Marks)

c. State 05 specifications of a power diode. (05 Marks)

d. Draw the characteristic curve of a Power Diode and mark the important points. (05 Marks)

04. With regards to Zener diodes,

a. What is the purpose of using Zener Diodes in electronic circuits? (02 Marks)

b. Consider following Zener circuit and find out,

i. Working condition of the Zener. (05 Marks)

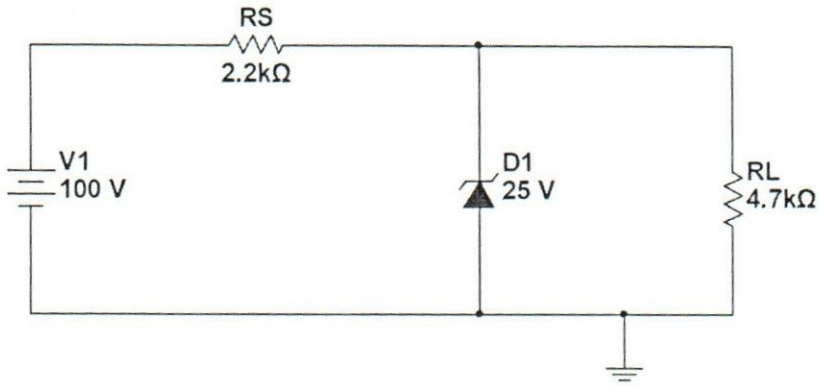
ii. Load voltage. (02 Marks)

iii. Load current. (02 Marks)

iv. Supply current (05 Marks)

v. Zener current (02 Marks)

vi. Power dissipation in Zener (02 Marks)



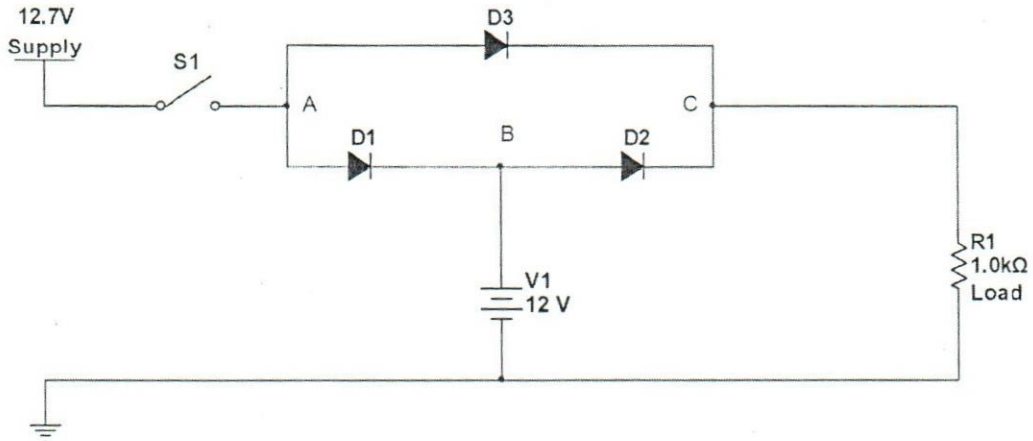
05. With regards to power supplies,

a. What are the main requirements that should have in a power supply? (02 Marks)

b. Draw the circuit diagram of a typical conventional power supply. (06 Marks)

c. Consider following simple UPS circuit diagram and fill the following table by finding the voltages of points A,B and C. Also state the working condition of diodes when power supply switch (S1) is ON and OFF (Consider all diodes are having barrier potential of 0.7V). (12 Marks)

Switch S1	VA	VB	VC	D1	D2	D3
ON						
OFF						



Resistor color code

Color	Digit	Multiplier	Tolerance (%)
Black	0	10^0 (1)	
Brown	1	10^1	1
Red	2	10^2	2
Orange	3	10^3	
Yellow	4	10^4	
Green	5	10^5	0.5
Blue	6	10^6	0.25
Violet	7	10^7	0.1
Grey	8	10^8	
White	9	10^9	
Gold		10^{-1}	5
Silver		10^{-2}	10
(none)			20

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COURSE CODE : EED -0465/ B12/ M2

EXAMINATION QUESTION PAPER
BASIC ELECTRICAL POWER & MACHINES

- *This question paper consist 06 questions.* *Date : 2022.09.06*
- *Answer any (05) Five questions.* *Pass mark 50%* *Time allocated : 03Hrs*

01. a. Draw diagrams & name each component of all Series, Shunt & Compound (DC) motors. (10 Marks)
(Make a clear drawing with thick and thin lines, names all the components for full marks)
b. List at-least one application of Three types of DC motors (06 Marks)
c. Explain briefly purpose of Interpoles in DC machines (04 Marks)

02. a. Draw various symbols used for power transformer and instrument transformer (05 Marks)
b. List of applications of Power transformer and Instrument transformer (04 Marks)
c. Sketch a construction drawing of power transformer and name each components clearly (05 Marks)
d. List four type of common connection used for Three phase transformers (06 Marks)

03. a. Draw a clear sketch of Brush less generator and name each section (10 Marks)
b. Draw a clear sketch of Static Excitation and Name each component (10 Marks)

04. a. Explain purpose indicated by First and second digit of INGRESS PROTECTION CODE (04 Marks)
b. What type of Electrical Enclosures required at Paint stores, Battery room & Bunker station (03 Marks)
c. Explain Where EXi is applicable and the reason for such devices (04 Marks)
d. List two Type of Routine maintenance carried out on board ships with advantages and disadvantages of both type of maintenance (09 Marks)

05. a. List three Reduced Voltage AC Motor starters (06 Marks)
b. Sketch and mark each component of Direct online starter Power circuit (07 Marks)
c. Sketch and mark each component of Direct online starter Control circuit (07 Marks)

06. a. Why shore power is required for the ships? (06 Marks)
b. Sketch shore power supply panel arrangement onboard. (06 Marks)
c. If shore supply may have a different frequency or voltage, what will happen to the rotating machineries on board? (08 Marks)

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COURSE CODE : EED -0465/B12/ M2

FINAL EXAMINATION QUESTION PAPER
AWARENESS TO QUALITY, ENVIRONMENT & SAFETY MANAGEMENT SYSTEM

- *This question paper consists of 05 questions.*
- *Answer No. 1 question and any other 3 questions. No. 1 question is compulsory.*

Date: 2022.09.04 *Pass mark 50%* *Time allocated: 03Hrs*

01. With regards to shipping industry briefly explain TEN of the following terms.
    a. IMO.
    b. DPA.
    c. STCW.
    d. MARPOL.
    e. MLC 2006.
    f. Classification Society.
    g. Flag State.
    h. Port State.
    i. Safety Management System.
    j. ISPS code.
    k. Fire fighting Appliances
    l. Life saving appliances.

(40 Marks, each part carry 4 marks)

02. State what are the FOUR pillars of Maritime law and explain all elements in detail.

(20 Marks)

03. State elements of 5S system. Explain 5S system in detail giving examples how it helps to improve ship's engine room operating conditions. (20 Marks)

04. State what is ISM code and briefly explain the objectives of the ISM code. (20 Marks)

05. a. State 4 certificates ship should have before sailing out to sea and explain them briefly.

(12 Marks)

b. Who is authorized to issue these certificates, How they are issued. (08 Marks)

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COURSE CODE : EED -0465/ B012/M2

FINAL EXAMINATION QUESTION PAPER
APPLIED ELECTRONICS

- *This question paper consist of 05 questions.* *Date: 2022.09.02*
- *Answer all five questions.* *Pass mark 50%* *Time allocated: 03Hrs*

01. Regarding semiconductor diodes.

a. What is the difference between intrinsic and extrinsic semiconductors and briefly describe the process of forming extrinsic semiconductors? (04 Marks)

b. Draw the circuit diagram of a forward biased diode and reverse biased diode. Show the polarity of the voltage source. (04 Marks)

c. Draw the VI characteristics of a Si diode in common coordinate system (Forward and reversed). Show the turn of knee voltage value. (04 Marks)

d. Draw the circuit diagram of a three-phase full wave rectifier. (04 Marks)

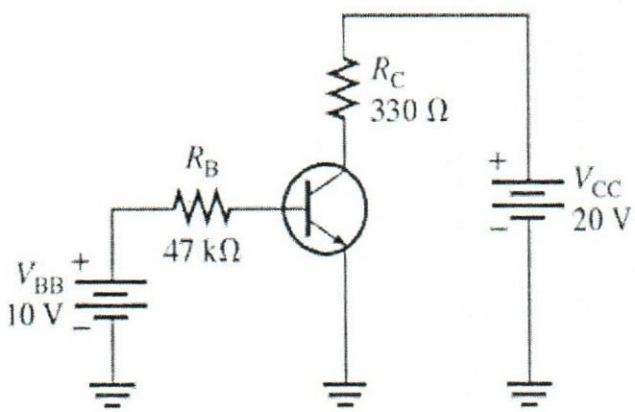
e. Describe the difference between Active and passive electronic components. (04 Marks)

02. Regards Bipolar Junction Transistors (BJT)

a. Draw the output characteristics curve of a npn transistor (04 Marks)

b. State three applications of bipolar junction transistors (04 Marks)

c. A transistor circuit is given below. Assume $\beta = 200$.



Find:

i. Base current (IB)
ii. Collector current (Ic)
iii. Emitter current (IE) (04 x 3 Marks)

03. Regarding thyristors

a. State different components in the thyristor family. Sketch the symbols and name the terminals of them. (04 Marks)

b. Draw the VI characteristic curve of a DIAC (04 Marks)

c. Expand the following abbreviations

i. SCR
ii. DIAC
iii. TRIAC
iv. SCS (04 Marks)

d. Describe one application of a SCR (04 Marks)

e. Briefly describe the operation of a SCS (04 Marks)

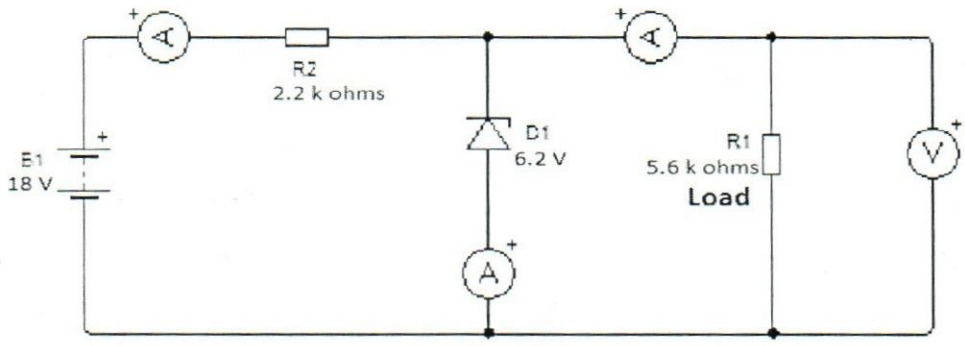
04. Regarding Zener diodes

a. Sketch the symbol of a zener diode and name terminals of it. (02 Marks)

b. Draw the VI characteristic curve of a zener diode (02 Marks)

c. Briefly describe the operation of a zener diode and state some applications of zener diodes. (04 Marks)

d. Find the values of the following.



i. Load voltage (VL)
ii. Load current (IL)
iii. Supply current (IS)
iv. Zener current (IZ) (3 x 4 Marks)

05. Regarding power supplies.

a. Draw the block diagram of an unregulated linear power supply. (04 Marks)

b. Draw the circuit diagram of an unregulated linear power supply with the relevant output voltage wave forms and briefly describe the functionalities of each part. (04 Marks)

c. Draw the circuit diagram of a regulated linear power supply with the relevant output voltage wave forms. (04 Marks)

d. What is the main difference between linear power supplies and Switch Mode Power Supplies? (SMPS) (04 Marks)

e. Draw the basic block diagram of an uninterruptible power supply (UPS) (04 Marks)

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FINAL EXAMINATION QUESTION PAPER
MARINE ENGINEERING KNOWLEDGE

- *This question paper consists 06 questions.*
- *Answer only 05 questions.*

Date: 2022.09.03 *Pass mark 50%* *Time allocated: 03Hrs*

01. a. State with reasons why steam need to be generated onboard ship (05 Marks)
    b. State FIVE boiler mountings and explain their functions? (10 Marks)
    c. Explain two types of Boilers used in shipboard practice and their differences? (05 Marks)

02. a. Explain what benefits ship owner get by installing a Fresh Water generator onboard a ship (02 Marks)
    b. With an aid of a diagram explain the function of a Evaporative type Fresh Water generator used onboard a ship. (12 Marks)
    c. State what type of filters used in a shipboard fresh water system (06 Marks)

03. a. With a diagram explain vapor compression cycle used in shipboard refrigeration systems (08 Marks)
    b. Write short notes on the following? (12 Marks)
    i. Filter Dryer ii. Condenser iii. Back Pressure Valve iv. Expansion Valve.

04. a. State the name and function of FOUR deck machineries fitted onboard a ship? (05 Marks)
    b. What are the type of hatch covers used onboard a ship. (06 Marks)
    c. Explain the main function of a Hatch Cover, how it is provided (09 Marks)

05. a. Explain the types and functions of the ships trade in the oceans globally. (10 Marks)
    b. Draw a cross section of a Container ship naming all the parts (10 Marks)

06. a . Explain why sewage Treatment plant is required in a ship (04 Marks)
    b. With a diagram explain the function of a sewage treatment plant (08 Marks)
    c. Explain what happens if Air Blower stops functioning (08 Marks)

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EXAMINATION QUESTION PAPER
Computer Knowledge, PC - Networking / Interfacing

- *This question paper consists of 02 parts and 06 questions.*
- *Part 01 - Answer all the Questions.*
- *Part 02 - Answer **Only 3** questions.*

Date: 2022.09.01 *Pass mark 50%* *Time allocated: 03Hrs*

Part 01

01. Write the correct answer number in the answer book (4 x 10 = 40 Marks)

a. What does a Network Protocol mean?
   i. Components of the Network.
   ii. An example for a topology.
   iii. Set of rules of a Computer Network.
   iv. Network addressing.

b. What is an example for a Global Identification of a network?
   i. MAC address
   ii. IP address
   iii. Postal address
   iv. Physical address

c. Which layer is not being an OSI layer?
   i. Network layer
   ii. Logical layer
   iii. Application layer
   iv. Session layer

d. Identify the correct order of the cables according to speed.
   i. Coaxial ‹ Fiber Optics ‹ Twisted Pair
   ii. Fiber Optics ‹ Coaxial ‹ Twisted Pair
   iii. Twisted Pair ‹ Fiber Optics ‹ Coaxial
   iv. Coaxial ‹ Twisted Pair ‹ Fiber Optics

e. How does Fiber Optic cables carry data?
   i. By light beams
   ii. As electricity
   iii. As magnetic field
   iv. By heat

f. What is the best example for a WAN?
   i. Intranet
   ii. Extranet
   iii. Internet
   iv. Corporate net

g. What does MAN stand for?
   i. Middle Area Network
   ii. Middle-East and Asia Network
   iii. Metropolitan Area Network
   iv. Multiple Area Network

h. Which network is being called for less than 1km^2 area?
   i. Corporate Area Network
   ii. Local Area Network
   iii. Metropolitan Area Network
   iv. Wide Area Network

i. Which device we can use as both input and output device?
   i. Touch screen display
   ii. Keyboard
   iii. LED Monitor
   iv. Speakers

j. Central Processing Unit (CPU) also known as the ____ of a computer.
   i. Heart
   ii. Kidney
   iii. Lungs
   iv. Brain

Part 02 (20 x 3 = 60 Marks)

01: Regarding Basics of Computers.

a. Write down four applications of ICT and provide an example for each. (08 Marks)
b. Explain Input and Output devices with examples? (04 Marks)
c. Explain, what is the CPU? (04 Marks)
d. What are basic functionalities of a computer. (04 Marks)

02:

a. Briefly explain where we use MS Word in real life. (04 Marks)
b. Write down how to add an animation to a MS PowerPoint Presentation. (04 Marks)
c. What are Spreadsheet and Excel formulas? (04 Marks)
d. Write down what is the formula for each function (08 Marks)
   i. Addition (Total)
   ii. Minimum Value
   iii. Maximum Value
   iv. Count of a range

03: Regarding Introduction to Computer Network.

a. What is a Computer Network? (02 Marks)

b. Write down 5 basic components of a computer network. (05 Marks)

c. Identify 3 types of Network devices. (03 Marks)

d. Write down the difference between Hub and Switch. (04 Marks)

e. Assume that you have 56 computers in your department to make a **Full Mesh** network. Calculate the required number of cables for your network. (06 Marks)

04:

a. What is a LAN, MAN and WAN in computer networks? Explain your answer with suitable examples. (09 Marks)

b. Draw diagrams for following Network topologies. (02 x 4 = 8 Marks)

i. Ring Topology

ii. Full Mesh Topology

iii. Bus Topology

iv. Star topology

c. What is the main difference between Topology and Network Architecture? (03 Marks)

05:

a. Briefly explain Peer-to-peer architecture and Client Server architecture. (06 Marks)

b. Explain following terms with examples. (06 Marks)

i. Internet

ii. Intranet

iii. Extranet

d. Write down 3 layers of OSI model. (04 Marks)

c. Identify 2 main differences between IP and MAC address. (04 Marks)

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FINAL EXAMINATION QUESTION PAPER
MARINE ELECTRICAL SYSTEM

- *This question paper consist of 06 questions.*
- ***Answer only 05 questions.***

Date: 2022.08.31 *Pass mark 50%* *Time allocated: 03Hrs*

01. With reference to electrical safety on board.
    a. i. State five rules of safety. (05 Marks)
    ii. What are the personal protective equipment(PPE) available onboard? (04 Marks)
    b. i. List the types of fire detectors used onboard. (05 Marks)
    ii. Write the locations for above detectors. (06 Marks)

02. With reference to shipboard electrical maintenance
    a. What are the four types of maintenance (04 Marks)
    b. How do you manage and plan the maintenance work? (07 Marks)
    c. How do you carry out the inspection of following?
    i. Motors (03 Marks)
    ii. Starter & motor control gear (03 Marks)
    iii. Contactors & relays. (03 Marks)

03. With reference to navigation lights and navigational aids onboard ship.
    a. i. What are the alarms fitted in navigational light panel? (04 Marks)
    ii. Make a table for locations and colour, angle of projection, range of visibility and rated power of navigation lights. (06 Marks)
    b. Briefly describe the followings.
    i. Auto pilot system (05 Marks)
    ii. AIS (05 Marks)

04. With reference to shipboard alternators and main switch board and
    a. What are the alternator protections? (08 Marks)
    b. Draw the basic block diagram of self excited brushless AC alternator and name the each component clearly. (12 Marks)

05. With reference to the Low Voltage alternators.
    a. State the condition for Synchronizing an alternator with live bus bar. (04 Marks)
    b. What are the Synchronizing method ? (06 Marks)
    c. Draw the any of two method (10 Marks)

06. With reference to electrical circuits in tankers
    a. Make the table for type of protection (Ex.) with their symbols. (10 Marks)
    b. Draw the intrinsically safe barrier circuit(Zener barrier) with main component. (10 Marks)

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FINAL EXAMINATION QUESTION PAPER
ELECTRICAL PRACTICE

- This question paper consists of 06 questions.
- **Answer No. 1 question and any other 4 questions. No. 1 question is compulsory.**

Date: 2022.08.30 *Pass mark 50%* *Time allocated: 03Hrs*

01. Draw POWER and CONTROL circuit for the forward-revers magnetic contactor starter circuit. (Name the all terminal number and equipment identification letters with numbers).

Specification : Electrical Supply : 3- 440V-60Hz (Insulated neutral system)
Induction motor : 3- 440V/7.5kW – 60Hz ,(3520r.p.m.)
Control voltage : 24V – 60Hz
Indicating lamp : " Green" for forward running
" Yellow" for reverse running
"Red" for motor over O/L

(20 Marks)

02 a. Briefly explain the following terms.

i.	Current	ii.	Resistance	iii.	Capacitance
iv.	Impedance	v.	Power factor	vi.	Resistivity

(12 Marks)

b. State the full name of the followings. (Electrically)

i.	M.C.B.	i.	O.C.R.	iii.	HRC
iv.	MCCB	v.	IP	vi.	TEFV
vii.	RCCB	viii.	XLPE		

(08 Marks)

03. a. Briefly explain the following terms?

i.	Fusing factor of the fuse	ii.	Eddy current of the transformer
iii	Stroboscopic effect of a florescent lamp.	iv.	Single phasing of a three phase motor.

(08 Marks)

b. Draw the wiring diagram of tendem (series) fluorescent lamp circuit .Name the accessories and their parameters. (12 Marks)

04. a. Three 40Ω heating resistors are connected to the 400V /50Hz three phase electric power supply by a star delta (Y/Δ) switch. Draw the wiring diagram and calculate the following for both star and delta connections.

i. The phase voltage (Vp) & Line voltage.(V_L) (03 Marks)

ii. The phase current (Ip) and line current (I_L) (03 Marks)

iii. What is the line current ratio of the star and delta connection (03 Marks)

iv. What is the power ratio of the star and delta connection. (03 Marks)

b. Draw the phase relationship graph in a three-phase voltage generating system. (08 Marks)

05. a. When an electrical cable is expressed as

Al/ XLPE /SWA/PVC – 25mm² – 19/1.35 mm – 450/750V. What does it signify?

(08 Marks)

b. Figure shows the name plate of an electric machine. Give the following data.

i. Diagram of winding connection.

ii. Full load line & phase currents.

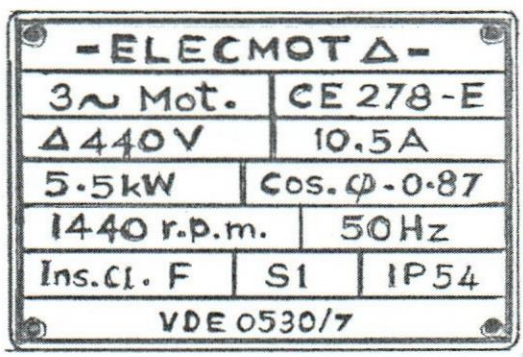
iii. Out put horse power.

iv. Synchronous speed.

v. Number of poles.

vi. Slip.

vii. Apparent power.



(12 Marks)

06. a. How do you preform the IR test of a three phase 6 terminal induction motor. (10 Marks)

b. A single phase transformer has voltage ratio of 440/110V (60Hz) and delivers power of 660VA.

i. What are the primary and secondary current at full load.

ii. If secondary winding consists of 550 turns, calculate the number of turns of the primary winding.

(10 Marks)

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FINAL EXAMINATION QUESTION PAPER
ELECTRICAL PRACTICE

- *This question paper consist 06 questions.*
- *Answer all six questions.*

Date: 2022.05.26 *Pass mark 50%* *Time allocated: 03Hrs*

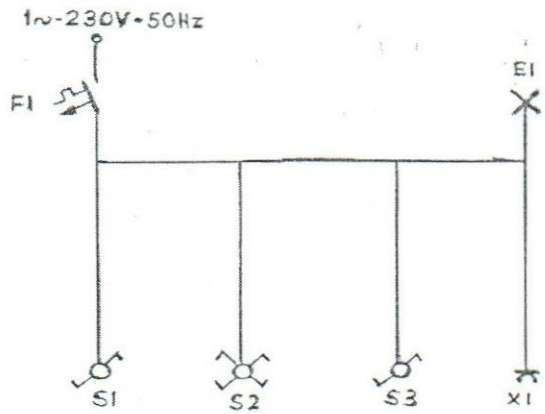
01. a. State the five safety rules for working with electrical maintenance. (05 Marks)

b. How will you remove a person who has received an electric shock from an electric appliance? (05 Marks)

c. How do you check the insulation resistance of a three phase 6 terminal induction motor. (10 Marks)

02. a. What are the various types of electric diagram? (08 Marks)

b. Draw the wiring diagram for the following single line diagram (12 Marks)



03. a. Three 44Ω heating resistors are connected to a 440V three phase electric power supply by a star delta (Y/Δ) switch. Calculate the following for both connections. (for Star & Delta arrangements)

i. The phase voltage & the phase to phase voltage. V (04 Marks)

ii. The phase current and phase to phase current (04 Marks)

iii. The phase power and the total power (03 Marks)

iv. What is the power ratio of the star and delta connection. (03 Marks)

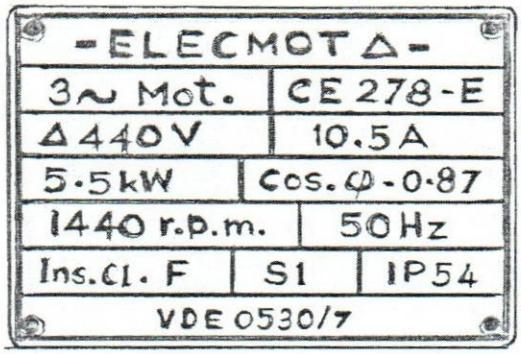
b. Draw the phase relationship graph in a three-phase voltage generating system. (06 Marks)

04. a. Draw a wiring diagram to show the essential parts cables of single fluorescent lamp.

(08 Marks)

b. Figure show a rating plate of an electric of an electric machine. Give the following value.

i. Type of machine ?
ii. Winding connection ?
iii. Full load phase current ?
iv. Hourse power (Output) ?
v. Power factor ?
vi. Synchronous speed ?
vii. Slip ?
viii. Apparent power ?



(12 Marks)

05. a. A single phase transformer has voltage as 440/230V at a power of 100VA.
i. What is the ratio ? (03 Marks)
ii. What are the primary and secondary current (05 Marks)

b. i. When an electrical cable is expressed as
Cu/ XLPE /PVC – 25mm^2 – 7/2.14 mm – 600/1000V. What does it mean? (08 Marks)

ii. What is the purpose of the insulation and sheath of a cable. (04 Marks)

06. Draw POWER and CONTROL circuit for the forward-revers magnetic contactor starter circuit. (Name the all terminal number and equipment identification letters with numbers).

Specification : Electrical Supply : 3- 440V-60Hz (Insulated neutral system)
Induction motor : 3- 440V/7.5kW – 60Hz ,(3520r.p.m.)
Control voltage : 24V – 60Hz
Indicating lamp : " Green" for forward running
" Yellow" for reverse running
"Red" for motor over O/L

(20 Marks)

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FINAL EXAMINATION QUESTION PAPER
MARINE ELECTRICAL SYSTEM

- *This question paper consist 06 questions.*
- *Answer all six questions.*

Date: 2022.05.27 *Pass mark 50%* *Time allocated: 03Hrs*

01. a. How does the charging capacity of a storage battery is measured? (05 Marks)
b. How does the concentrated sulphuric-acid is dialuted to make electrolyte? (07 Marks)
c. When you visit a battery shop to buy a battery without sample, what are the details you think are important in order to buy the correct battery. (08 Marks)

02. a. Define the term "Power Factor" (04 Marks)
b. What is used to adjust power factor? (03 Marks)
c. What is the maximum time a synchro scope should be online for? (03 Marks)
d. What happens when there is a loss of excitation in a parallel alternator system? Which alternator trip and why? (04 Marks)
e. Explain paralleling of alternators using a synchro scope. (06 Marks)

03. a. Briefly explain following terms. (01 x 06 Marks)
i. Port side
ii. Starboard side
iii. Ahead
iv. Stern
v. Overboard
vi. Wheel house or bridge.

b. What are the equipments and machineries on the wheelhouse? (Give 10 items) (10 Marks)
c. Name the Locations & types of fire detection sensors onboard. (04 Marks)

04. a What are the essential requirements to be satisfied for synchronizing of alternators? (06 Marks)
b Draw the sequence lamp circuit diagram for synchronizing . (09 Marks)
c What are the emergency loads onboard using with the emergency generator? (05 Marks)

05. a. Draw the earth fault lamp system and earth fault monitoring system. (10 Marks)
b. What are the disadvantages of earth fault lamp system? (04 Marks)
c. How do you locate and rectify an earth fault? (06 Marks)

06. With reference to fire alarm system on board.
a. What are the requirements for fire detection system? (05 Marks)
b. List the types of detectors onboard. (06 Marks)
c. Write the locations for above detectors (09 Marks)

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FINAL EXAMINATION QUESTION PAPER
ADVANCED ELECTRICAL POWER & MACHINES

- This question paper consist 06 questions.
- Answer all six questions.

Pass mark 50%

Date: 2022. 05. 27
Time allocated: 03Hrs

01. a. Draw and name each part of Brush less Alternator (07 Marks)
b. Explain how voltage and Frequency of a Single generator operation, controlled with rapid change of load (06 Marks)
c. Write down Electrical Protections required of All Auxiliary Alternators (06 Marks)
d. Draw block diagram of an Auto Voltage regulator (04 Marks)

02. a. What is the function of a Fuse ? (04 Marks)
b. What do the term "HRC "stands from an abbreviation of HRC Fuse? (03 Marks)
c. Describe the thermistor- based motor protection (03 Marks)
d. Describe the preferential – trip safety mechanism with a suitable diagram and Explain its purpose (06 Marks)

03. a. Sketch &Write four types of D.C. Motors (06 Marks)
b. Briefly explain one type of D.C. Motor with a suitable sketch (04 Marks)
c. Explain purpose of Inter-poles in a DC Motor with basic connection of it (04 Marks)

04. a. What is the difference between three phase induction motor and three phase synchronous motor? (04 Marks)
b. List the applications of three phase induction motors commonly used. (04 Marks)
c. What is the purpose of using wound rotor three phase motor, and explain how? (04 Marks)

05. a. Why shore power is required for the ships? (04 Marks)
b. Sketch shore power supply panel arrangement onboard. (04 Marks)
c. If shore supply may have a different frequency or voltage, what will happen to the rotating machineries on board? (08 Marks)

06. a. Describe the basic operating principle of a transformers (05 Marks)
b. Describe why transformer cores are laminated (04 Marks)
c. State what is meant by step down & step up action of transformers. (05 Marks)
d. Draw single phase transformer equivalent Circuit and name each section (05 Marks)

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FINAL EXAMINATION QUESTION PAPER
AWARENESS TO QUALITY, ENVIRONMENT & SAFETY MANAGEMENT SYSTEM

- *This question paper consists of 05 questions.*
- *Answer all the questions.*

Date: 2022.05.31 *Pass mark 50%* *Time allocated: 03Hrs*

01. Write short notes of the following.

i. IMO
ii. Convention
iii. Protocol
iv. EEBD
v. International Shore Connection

(04 x 5 Marks)

02. Explain all FIVE elements of "5S Concept" giving examples for each element. (20 Marks)

03. a. State 04 pillar conventions of the maritime law (04 Marks)

b. State any 04 committees of IMO (04 Marks)

c. State 04 emissions that are regulated by MARPOL annex VI (04 Marks)

d. State 03 requirements to release CO2 fixed fire extinguishing system (03 Marks)

e. Name 05 Life saving appliances (LSA) or Fire fighting appliances (FFA) that you find onboard (05 Marks)

04. With regard to MARPOL,

a. Write down the 6 Annexes (12 Marks)

b. State the regulations to discharge food waste outside and inside the special areas (08 Marks)

05. a. State 04 most commonly used portable fire extinguishers and their colour code (10 Marks)

b. State work/rest hours requirements according to MLC 2006 (10 Marks)

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EXAMINATION QUESTION PAPER
ELECTRICAL THEORY

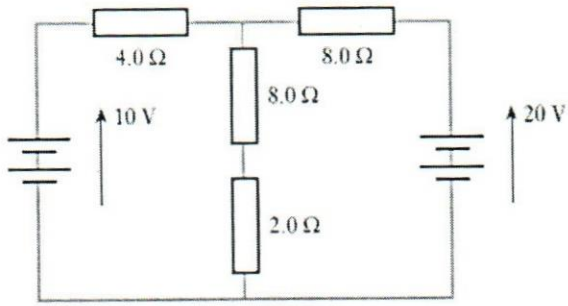
- *This question paper consist 06 questions.*
- *Answer all six questions.*

Date: 2022.03.12. *Pass mark 50%* *Time allocated: 03Hrs*

01.

a. State Kirchhoff's Current Law and Voltage Law. (06 Marks)

b. A resistor network connected to two batteries is given below.
Find the value of current through each battery and state whether the batteries are charging or discharging? (12 Marks)



02. A series AC circuit is comprised of one 10 mH inductor and one 4 Ohm resistor. The power supply is 100V,50Hz. Find

a. Circuit Impedance (03 Marks)
b. Input Current (03 Marks)
c. Voltage across Inductor (03 Marks)
d. Voltage across Resistor (03 Marks)
e. Power factor of the circuit (04 Marks)

03. A capacitance of 100 μ F is connected in series with a non-inductive resistance of 50 Ohm across 80V 50 Hz supply. Find

a. Total Impedance (03 Marks)
b. Current (03 Marks)
c. Phase angle (03 Marks)
d. Equation for the instantaneous value of current. (04 Marks)
e. Power factor of the circuit (03 Marks)

04.

a. Draw Impedance Triangle and name all components. (04 Marks)
b. Draw Power Triangle for a 3- phase system, and name all components, with units (06 Marks)
c. Give two methods that will improve power factor. (02 Marks)
d. Give 4 disadvantages of low power factor (04 Marks)

e. A generator load has 10kVAr reactive power. If this is reduced to 5kVAr using a capacitor what will happen to the circuit current, increase or decrease? What will happen to the active power? (02 Marks)

05. A balanced 3-phase Delta connected load is connected to a 400V,50Hz AC supply. Line current is 17.32A at Power Factor 0.8 lagging. Calculate
    a. Active power (04 Marks)
    b. Phase Current (04 Marks)
    c. Reactive Power (04 Marks)
    d. Impedance per phase (04 Marks)

06. The equation of an AC current is given as 28.28 sin (376.8 t -π/4) Amperes. Determine
    a. Maximum Value (03 Marks)
    b. RMS value (03 Marks)
    c. Frequency (03 Marks)
    d. Average value over one cycle (03 Marks)
    e. If this current is flowing through a resistor of 10 Ohms, power consumed by the resistor (04 Marks)