



EXAMINATION QUESTION PAPER  
 HYDRAULIC SYSTEMS

- This question paper consists of *Six (06)* questions.
- Answer any *05* questions.

Date: 2023.03.30

Pass mark 50%

Time allocated: 03Hrs

- 01 a. Draw schematic diagram & explained the arrangements of three types of filters used in hydraulic circuits. (12 Marks)  
 b. Discuss the importance of maintaining the hydraulic oil in clean /dirt free condition. (08 Marks).
02. a. Explain briefly with sketches / symbols.  
 i. Directional control valve (04 Marks)  
 ii. Pressure compensated flow control valve (04 Marks)  
 iii. Pressure reducing valve (04 Marks)  
 b. Name the different methods of activating directional control valves. (08 Marks)
03. a. Draw a schematic hydraulic diagram of 100 % redundance steering gear system. (08 Marks)  
 b. What do you mean by single failure criteria? (06 Marks)  
 c. What are the checks to be carried out on steering gear system in daily routing? (06 Marks)
04. a. Write down four properties of a hydraulic oil (10 Marks)  
 b. Discuss the importance of maintaining the hydraulic system oil in clean /dirt free condition. (05 Marks)  
 c. What are the additional functions provided by hydraulic oil? (05 Marks)
05. a. What are the components associated to ships hydraulic mooring winch opening system? (08 Marks)  
 b. Discuss the basic principle of automatic tension control of mooring winches? (12 Marks)
06. With related to hydraulic circuits, explain.  
 a. open circuit system. (05 Marks)  
 b. closed circuit system (05 Marks)  
 c. Explain oil cooling arrangement in closed circuit (10 Marks)

Faculty of Marine Engineering  
 Department of Marine Electrical Engineering  
 ELECTRO TECHNICAL OFFICER CADET TRAINING COURSE.  
 COURSE CODE : EED -2475/ B009/P1/M3



EXAMINATION QUESTION PAPER  
 MARINE ENGINEERING KNOWLEDGE

- This question paper consists of **07 questions**
- Answer question **01** and any other **05 questions**.

Date: 2023.03.28

Pass mark 50%

Time allocated: 03Hrs

01. Write short notes of the followings.

- List
- Draft
- Gross Tonnage
- Keel
- FWG
- Turbo charger
- Filter Drier
- Free board
- Cam shaft
- Crank shaft

(2 x 10 Marks)

02. a. Usage of air compressor.

(06 Marks)

b. Write down 5 safety devices of air compressor.

(06 Marks)

c. Air bottle not coming up/toping up. What are the reasons.

(04 Marks)

03. a. Draw and explain suitable air conditioning system for marine ship.

(10 Marks)

b. Explain how the system works under,

i. Tropical

(04 Marks)

ii. Arctic

c. What is comfort zone.

(02 Marks)

04. a. Explain 4/2 stroke cycles with suitable diagram.

(10 Marks)

b. Named 3 differences between 2 stroke and 4 stroke.

(04 Marks)

c. Name most popular two kinds of modern engine brands.

(02 Marks)

05. a. What are the purpose of steam in a ship.

(04 Marks)

b. What is the meaning of a boiler mounting? Give examples

(06 Marks)

c. What are the boiler alarms.

(06 Marks)

06. a. Draw and named Marine Sewage plant. (10 Marks)
- b. What are the two bacteria in the sewage plant. (02 Marks)
- c. What are the test that carried out for sewage plant. (04 Marks)
07. a. Write indication of scavenge fire and actions to do of scavenge fire. (06 Marks)
- b. Briefly explain M/E starting air system with aid of a diagram. (10 Marks)

Department of Marine Electrical Engineering  
 ELECTRO TECHNICAL OFFICER CADET TRAINING COURSE  
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EXAMINATION QUESTION PAPER  
 MARINE LEGISLATION & SAFETY MANAGEMENT SYSTEMS

- This question paper consist of 05 questions..
- No.1 Question is mandatory. Answer No.1 question and any other 3 questions.

Date : 2023.03.28

Pass mark 50%

Time allocated: 03 Hrs

01. Write short notes of the followings.

- IMO
- Territorial Water
- SOLAS
- EEBD
- Maritime Convention
- MLC 2006
- Flag state
- ISM
- ISPS
- Exclusive Economic Zone

(40 Marks)

02. a. Name and explain briefly all six Annexes of MARPOL.

(12 Marks)

b. Explain the sewage discharge procedure.

(08 Marks)

03. a. Explain all FIVE element of "5S concept" giving examples for each element.

(14 Marks)

b. Briefly explain the type of maintenance system available in shipboard practice.

(06 Marks)

04. a. State 4 most commonly used portable fire extinguishers and their colour code.

(12 Marks)

b. State work/rest hours requirement according to MLC 2006.

(08 Marks)

05. a. State 6 types of surveys

(12 Marks)

b. Briefly explain following terms.

(08 Marks)

- Transmitter
- Receiver
- Noise
- Decode



EXAMINATION QUESTION PAPER  
ELECTRICAL DRAWING

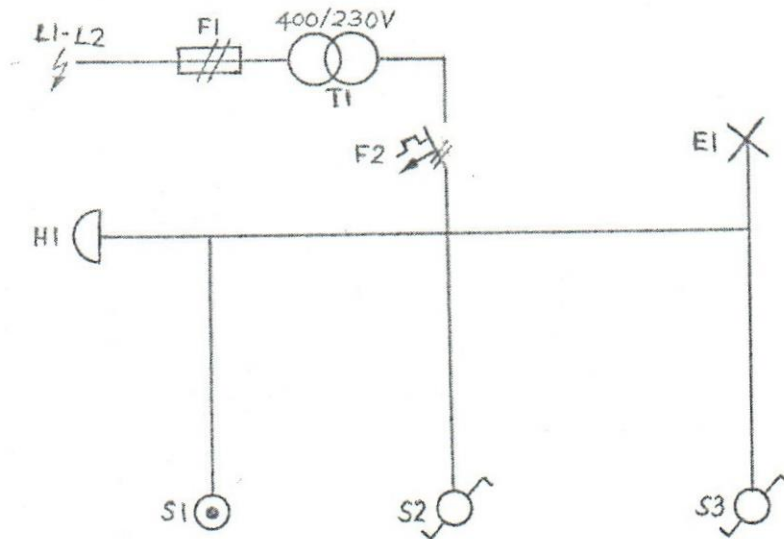
- This question paper consist 05 questions.
- Answer All the Questions.

Date: 2023.01.12

Pass mark 50%

Time allocated: 03Hrs

01. Draw the wiring diagram of the following single line diagram

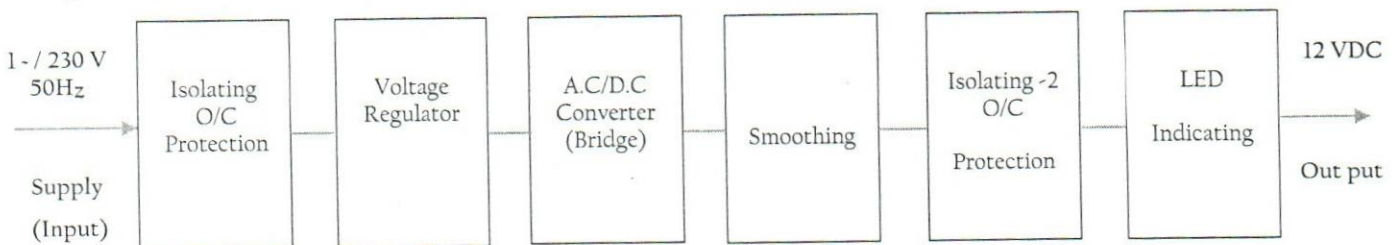


(20 Marks)

02. Draw circuit symbols for the following devices.

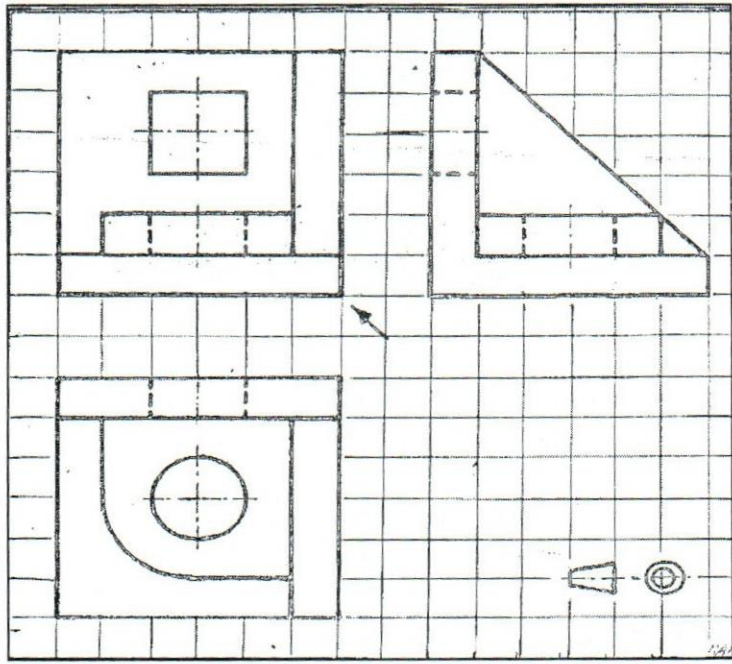
- |                            |                         |                            |
|----------------------------|-------------------------|----------------------------|
| a. Inductor with iron core | b. Buzzer               | c. Heater (General)        |
| d. Electrolytic Capacitor  | e. Inductor Lamp        | f. L.E.D                   |
| g. VDR                     | h. 3 ~ Auto transformer | i. Bridge Rectifier        |
| j. PNP Transistor          | k. Photodiode           | l. D.C. Series wound motor |
- (24 Marks)

03. Figure shows the block diagram of a single-phase AC to DC conversion system. Draw the circuit diagram by illustrating each block.



(20 Marks)

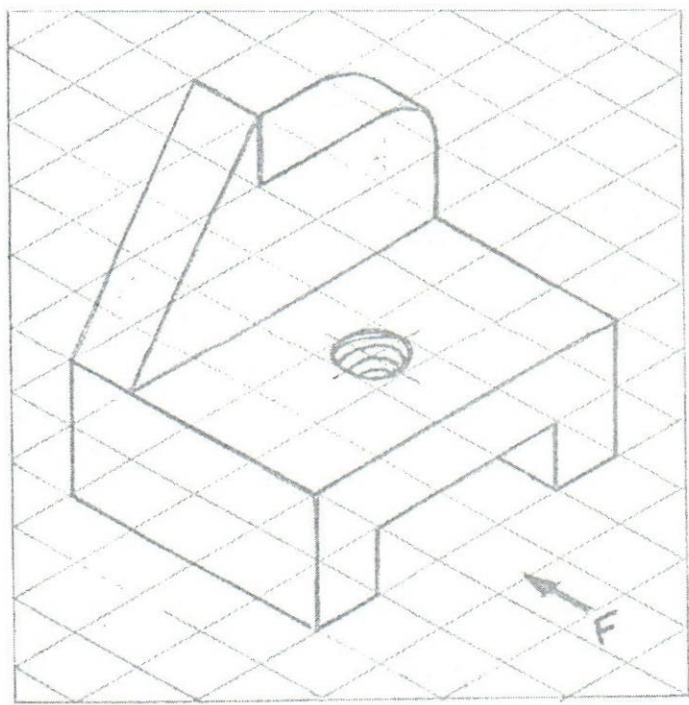
04. Draw the isometric view for the following orthographic views. (Size of each square is 12 x 12mm)



(18 Marks)

05. Figure below shows a isometric view of a bracket. Draw the orthographic projection (first angle) to a full scale using. (Size of each rhombus is 15mm x 15mm)

- a. Front elevation
- b. Left end elevation
- c. Plan elevation



(18 Marks)

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EXAMINATION QUESTION PAPER  
 MEASUREMENTS AND INSTRUMENTATION

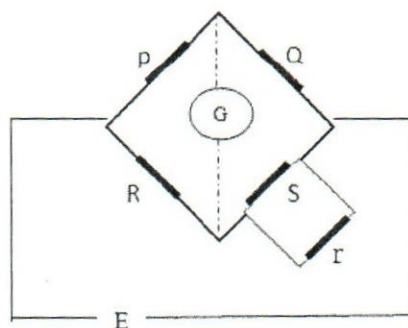
- This question paper consist of 06 questions.
- Answer any five (05) Questions.

Date: 2023.01.12

Pass mark 50%

Time allocated: 03Hr

01. a. A permanent magnet moving coil instrument gives full-scale deflection with 10mA and has a resistance of  $5\Omega$ . Calculate the resistance of the necessary components in order that the instrument may be used as
- a 5A ammeter (07 Marks)
  - a 50V voltmeter (07 Marks)
- b. List the advantages and disadvantages of moving coil instrument. (06 Marks)
02. a. A moving-iron instrument gives full scale deflection with 200V. it has a coil of 20000 turns and a resistance of  $2000\Omega$ . If the instrument is used as an ammeter to give full scale deflection at 10A, calculate the number of turns required. (06 Marks)
- b. What are the two types of instrument transformers? And draw their connections and label each parts. (14 Marks)
03. a. Explain the balanced condition of DC whetstone bridge circuit with suitable circuit diagram. (08 Marks)
- b. In Wheatstone bridge  $P = 8\Omega$ ,  $Q = 11\Omega$ ,  $R = 5\Omega$  and  $S = 7\Omega$ . How much resistance must be put in parallel to the resistance(r)S to balance the bridge. (12 Marks)



04. a. What are the advantages, disadvantages & applications of induction wattmeter (06 Marks)
- b. Draw the principles parts of a single phase induction wattmeter (08 Marks)
- c. List the errors of induction wattmeter. (06 Marks)

05. a. Draw the synchronous scope arrangement with windings diagram. (08 Marks)  
b. How do you decide the frequency of the incoming alternator is high or low? (08 Marks)  
c. What are the types of synchronous scope? (08 Marks)
06. a. Draw the neat diagram for vibrating reed frequency meter and name the each and every component. (09 Marks)  
b. Briefly explain the operation of above meter (06 Marks)  
c. List the features available in above meter. (05 Marks)



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EXAMINATION QUESTION PAPER  
**WORKSHOP THEORY**

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

Date: 2023.01.10

Pass marks 50%

Time allocated: 03Hrs

01. a. Define the following technical terms.
- i. Fitting (04 Marks).
  - ii. Assembling (04 Marks).
- b. How do you classify the fitting tools? (06 Marks).
- c. Write 06 safe working practices of fitting. (06 Marks).
02. a. What is a thread in engineering? (04 Marks).
- b. Draw thread parameters on a diagram (elements of screw thread). (05 Marks).
- c. Write 05 types of threads. (05 Marks).
- d. Briefly explain the followings
- i. Die threading (03 Marks).
  - ii. Tapping (03 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? (04 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? (03 Marks).
- e. Briefly explain the followings with suitable diagrams.
- i. Straight polarity (03 Marks).
  - ii. Reverse polarity (03 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. (06 Marks)  
d. List the types of Oxyacetylene flames with their applications. (06 Marks)

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EXAMINATION QUESTION PAPER  
 ELECTRONIC & POWER ELECTRONIC - I

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

Date: 2023.01.10

Pass mark 50%

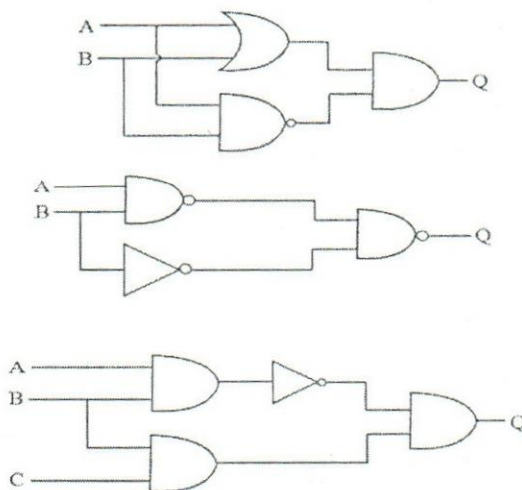
Time allocated: 03Hrs

## 01. Regarding semiconductor diodes.

- What is the difference between intrinsic and extrinsic semiconductors and briefly describe the process of forming extrinsic semiconductors. (04 Marks)
- Draw the circuit diagram of a forward biased diode and reverse biased diode. Show the polarity of the voltage source. (04 Marks)
- Draw the VI characteristics of a Si diode in common coordinate system (Forward and reversed). Show the turn of knee voltage value. (04 Marks)
- Draw the circuit diagram of a single-phase half-wave rectifier. (04 Marks)
- Describe the difference between Active and passive electronic components by giving examples (04 Marks)

## 02. Regards Bipolar Junction Transistors (BJT) and Logic gates

- Write Boolean expressions for the circuits given below and construct Truth Tables. (04 Marks)

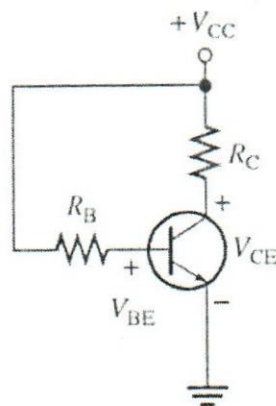


## b. Simplify

- $AB + B(B + \bar{C}) + \bar{B}C$
- $\bar{C}F + F(A + \bar{B}) + C$

(04 Marks)

- c. Determine the Q-point values of  $I_C$  and  $V_{CE}$  for the circuit below. Assume  $V_{CC} = 8\text{ V}$ ,  $V_{BE} = 0.7\text{ V}$ ,  $R_B = 360\text{ k}\Omega$  and  $R_C = 2\text{ k}\Omega$



- Base current ( $I_B$ )
- Collector current ( $I_C$ )
- Emitter current ( $I_E$ )
- Determine  $V_{CE}$

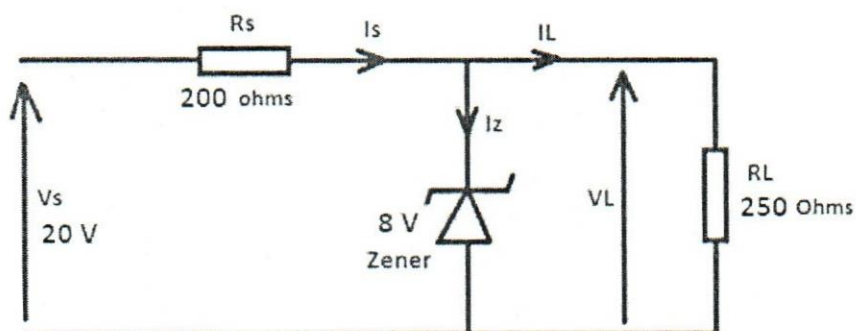
(03 x 4 = 12 Marks)

03. Regarding thyristors

- State different components in the thyristor family. Sketch the symbols and name the terminals of them. (04 Marks)
- Draw the VI characteristic curve of a DIAC (04 Marks)
- Describe three applications of a SCR (04 Marks)
- Briefly describe the operation of a TRIAC (04 Marks)
- Draw the circuit diagram of a three-phase full wave rectifier using thyristors. (04 Marks)

04. Regarding Zener diodes

- Sketch the symbol of a zener diode and name terminals of it. (02 Marks)
- Draw the VI characteristic curve of a zener diode (02 Marks)
- 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 ( $V_L$ )
- ii. Load current ( $I_L$ )
- iii. Supply current ( $I_S$ )
- iv. Zener current ( $I_Z$ )

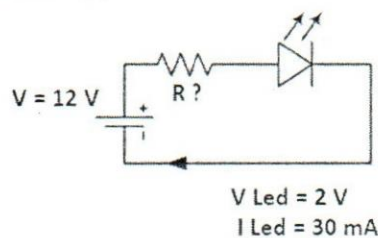
(03 x 4= Marks)

05. Regarding power supplies.

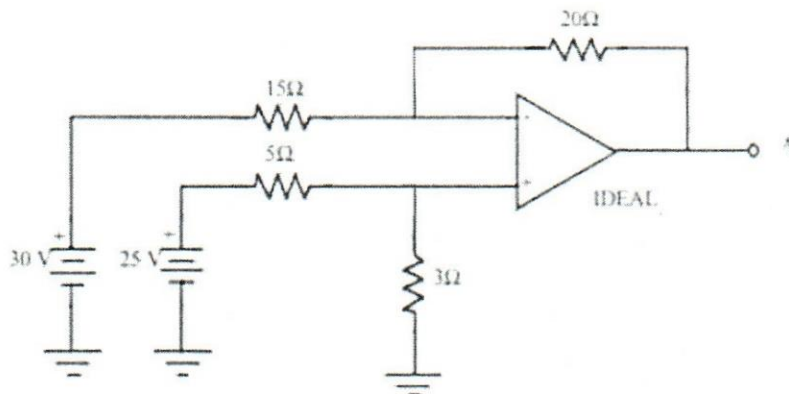
- a. Draw the block diagram of an unregulated linear power supply. (02 Marks)
- b. Draw the circuit diagram of an unregulated linear power supply with the relevant output voltage wave forms and briefly describe the functionalities of each part. (04 Marks)
- c. Draw the circuit diagram of a regulated linear power supply with the relevant output voltage wave forms. (04 Marks)
- d. What are the main two types of voltage regulators and describe one of them. (04 Marks)
- e. What is the main difference between linear power supplies and Switch Mode Power Supplies?(SMPS) (02 Marks)
- f. What is an uninterruptible power supply? (02 Marks)
- g. Draw a circuit diagram of an uninterruptible power supply (02 Marks)

06. Regarding operational amplifiers and LEDs

- a. What are the advantages and disadvantages of using LEDs? (02 Marks)
- b. How to find the polarity of a LED. (02 Marks)



- c. What should be the value of ballast resistor of the above circuit? (02 Marks)
- d. If the resistance is much lower than above value what can you observe? (02 Marks)
- e. Find VA of the given operational amplifier (12 Marks)





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EXAMINATION QUESTION PAPER  
 ELECTRO TECHNOLOGY

- This question paper consist of 06 questions.
- Answer any 05 Questions.

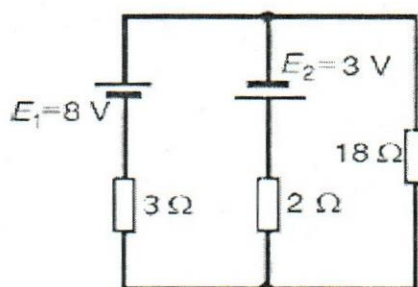
Date: 2023.01.08

Pass mark 50%

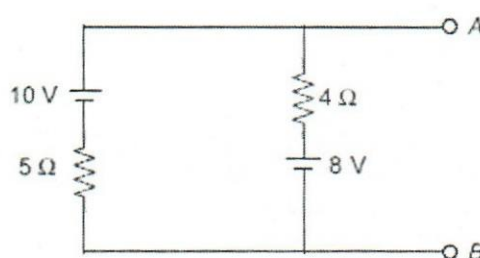
Time allocated: 03Hrs

01. An inductance 0.08H and a resistance 15 Ohm is connected in series to a 240V, 50Hz supply. Determine the
- |  |            |
|--|------------|
| a. Reactance and impedance                                     | (04 Marks) |
| b. Current in the circuit                                      | (03 Marks) |
| c. Circuit phase angle   | (03 Marks) |
| d. Voltage across the resistor and voltage across the inductor | (06 Marks) |
| e. Power consumed  | (04 Marks) |
02. An alternating current  $i$  is represented by  $i = 10 \sin 942t$  Amperes. Find
- |   |            |
|---|------------|
| a. The maximum value and peak to peak value | (02 Marks) |
| b. The RMS value                            | (02 Marks) |
| c. The frequency and                        | (02 Marks) |
| d. Time period                              | (02 Marks) |
- Three voltages are given by following equations. Find the equation of the resultant voltage when they are added together.
- |                                    |            |
|------------------------------------|------------|
| $V_1 = 50 \sin \omega t$           |            |
| $V_2 = 80 \sin (\omega t - \pi/6)$ |            |
| $V_3 = 60 \sin (\omega t + \pi/3)$ | (12 Marks) |
03. A balanced delta connected load has a combination of  $5 \Omega$  resistance and a 31.4mH inductance per phase. When connected to a balanced 440V, 60Hz power supply, determine
- |                                   |            |
|-----------------------------------|------------|
| a. Impedance per phase            | (04 Marks) |
| b. Line current and phase current | (08 Marks) |
| c. Power dissipated per phase and | (04 Marks) |
| d. Total power dissipated         | (04 Marks) |
04. a. State four disadvantages of poor power factor and give two methods to improve the same. (12 Marks)
- b. A single phase motor of capacity 3.36kw runs at a power factor of 0.7 lagging. To improve the overall power factor to 0.9 calculate the reactive power in kVAr required for a shunt connected capacitor. (08 Marks)

05. a. Calculate the currents in all branches of the following circuit using Kirchhoff's laws. (12 Marks)  
 b. What is the potential difference across 18 Ohm resistance? (04 Marks)  
 c. State charging/discharging condition of the batteries. (04 Marks)

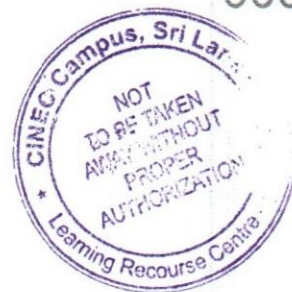


06. Referring to the circuit below,  
 a. Find the Thevinins voltage and Thevinins Resistance across terminals A and B. (08 Marks)  
 b. For the maximum power transfer what is the value of the resistance to be connected across A and B.? (04 Marks)  
 c. Find the maximum power transfer in such case. (04 Marks)  
 d. If a 20 Ohm resistor is connected between A and B, what is the current and power consumed by the same. (04 Marks)





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EXAMINATION QUESTION PAPER  
ELECTRICAL POWER AND MACHINES

- This question paper consist of 05 questions..
- Answer any 04 Questions.

Pass mark 50%

Date : 2023.01.07  
Time allocated : 03 Hrs

- Sketch single line diagram to Show Main Electrical Power system of ship (07 Marks)
  - Sketch and name each components of Brush type Generator (07 Marks)
  - Sketch and Name each component of Brush less Generator (07 Marks)
  - Briefly explain Which devices maintains Voltage and Frequency of the Alternator (04 Marks)
- List Five Electrical Protections required at any Marine Electrical switch board (07 Marks)
  - Which switch board supply essential loads. (04 Marks)
  - Explain Why ESB cannot supply Electrical power to MSB (07 Marks)
  - Explain purpose of Preferential tripping, Name of loads controlled by preferential trip (07 Marks)
- Explain working principle of the AC three phase Squirrel cage Induction motor (10 Marks)
  - Why squirrel cage Induction Rotor can't run at the synchronous speed (05 Marks)
  - List Five Parts of Squirrel cage induction motor to be checked on a routine basis (10 Marks)
- What is the difference between ideal transformer & practical(real) transformer? (04 Marks)
  - List and describe the type of losses in a transformer. (07 Marks)
  - Draw an equivalent circuit of a simple single-phase transformer. (07 Marks)
  - Explain Three minimum conditions to operate 3-phase transformers in parallel. (07 Marks)
- List 3 Reduced voltage starters required for large 3 phase squirrel cage Induction motor. (08 Marks)
  - What is the best way to protect Three phase motor against Single phasing (08 Marks)
  - Describe Protection required to protect AC three phase squirrel cage induction Motor. (09 Marks)





CINEC Campus (Pvt) Ltd  
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 COURSE CODE : EED -0475/B008/P1/M3



REPEAT EXAMINATION QUESTION PAPER  
 MARINE ELECTRICAL SYSTEM

- This question paper consist of 06 questions.
- Answer any 05 Questions.

Pass mark 50%

Date : 2022.12.18  
 Time allocated : 03 Hrs

01. With reference to Main switch board
- a. Write down Protections required for Electrical systems at the Main panel (05 Marks)
  - b. Sketch a DC Injection earth fault monitoring system used onboard 440 V Main bus . and list advantages and disadvantages of DC Injection earth fault monitoring system ? (05 Marks)
  - c. List criteria to be matched to synchronize an incoming generator to the live bus bar. (05 Marks)
  - d. Sketch explain requirement of instruments at shore power supply panel arrangement on board. (05 Marks)
02. With reference to Galley, Refrigeration room & Hospital
- a. Sketch and describe hot plate Element connection of Galley with three level heating. (05 Marks)
  - b. Where alarm buzzer is installed to warn if any one trapped in the Refrigeration room. (05 Marks)
  - c. Explain how temperature of multiple Ref rooms (Meat & Veg Rooms) are controlled/maintained (05 Marks)
  - d. Where emergency calling bell of hospital to be connected to warning Duty Officers (05 Marks)
03. With reference to deck cargo cranes,
- a. What are the safety devices incorporated in all Electric cargo cranes on Deck? (04 Marks)
  - b. Which component of the electric crane hoist motor holds the hoist cable drum and how it prevent lowering cargo load during power failure (04 Marks)
  - c. Write down of critical parts of deck cranes which requires continuous monitoring, Routine maintenance (04 Marks)
  - d. Write most important safeties, Limit switches, sensors, protections required for following sections of All Electric Cargo cranes (08 Marks)
    - i. Cargo cable and Cargo Hook
    - ii. Crane boom
    - iii. Slewing
    - iv. Main power system
04. Reference to electrical circuits in tankers & flammable Areas
- a. Tabulate name of six type of Ex protection with its abbreviation (05 Marks)
  - b. Sketch and explain an intrinsically safe circuit protected by Zener barrier. (05 Marks)
  - c. Explain two Zones Where Zener barriers are installed and the sensors are installed (05 Marks)
  - d. Write down names of locations requires of Explosion proof Enclosures installed (05 Marks)

05. With reference to Fire alarm and smoke detection system
- a. List Four Components /devices which might get deactivated by activation of CO<sub>2</sub> Alarm. (05 Marks)
  - b. Where the cargo hold smoke detection system is installed and how it senses any smoke in hold (05 Marks)
  - c. Write four different type of fire detectors installed and connected Ships fire alarms (05 Marks)
  - d. What is the purpose of end resistors installed at the beach fire detection zones? (05 Marks)
06. With reference to safety & Emergency Procedure
- a. List down most important Electrical Permits, Safety forms and other check lists required before carrying out Low Voltage Electrical Maintenance on board ships (05 Marks)
  - b. Write down safety procedures to do arc welding by welder fitter on a Electrical Enclosure (05 Marks)
  - c. Write down any assessment to be carried before applying for a permit to work on Electrical system (05 Marks)
  - d. Write down Tests/checks Which may be carried out by Surveyors on annual basis and related reports to be maintained by Electro Technical Officers. (05 Marks)