

PAST PAPERS

Faculty	Department / Section/Division
Not Applicable	Learning Resource Centre

Past Papers

Faculty of Maritime Science
Department of Marine Electrical

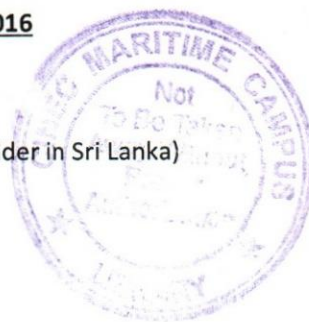
**Marine Electro Technical Officer
(Orals)
2016-2022**

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A-A-1-2

ELECTRO TECHNICAL OFFICER ORAL EXAMINATION – ON 20.10.2016



Name - Handukandelage Irosh Prasanjaya Wickramapala (As 1st COC Holder in Sri Lanka)

Attempt - 1st

Examiners - Mr.Bandula Kariyawasam
 Mr.P.V.T.V.Chandana
 Mr.Chathura (Electrical/Electronic, (BSc) From port authority)
 Mr.Kushan Weerasinghe (Competent CH. Eng)
 Mr.M.M.Kostha (Chartered Eng)

Time Duration - 2 hrs and 15 minutes.

Results - Pass

Dress code - Long sleeve shirt, Tie and overcoat

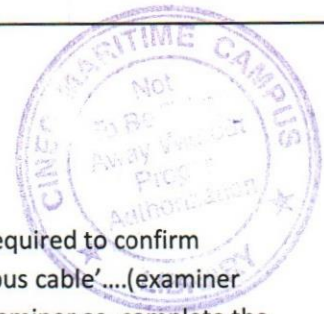
1. What types of ships you have been sailed?, In which company? ,which fleet?
 - ❖ All are container ships, except my last ship... It is a general cargo ship, actually a 'Gantry Crane ship', (Saga Pioneer)Anglo Eastern ,Saga Fleet
2. Year of built? , crane maker?
 - ❖ Saga Pioneer- 2008 ,T Suji
3. Explain Gantry crane ship?
 - ❖ All cargo loading and discharging are done by itself without any help of the shore based cranes, in efficient way, normally the paper pulp
4. What are the main movements of the crane?
 - ❖ Hook operation, travelling operation, traversing, FWD, REV, clockwise and anti-clockwise operations for the head block
5. Are you remember power of the main motors?
 - ❖ Yes, Travelling-150kw, Traversin-250kw, hook-kw
6. What type of motors, and what type of drivers?
 - ❖ Induction motors, VFDs (Inverter drives)
7. What kind of supply voltages and controllers are used?
 - ❖ 440Vac, 110Vac, 24Vdc-PLC drive
8. How the alarm condition shows?
 - ❖ on the human interface unit-Display unit
9. Are you involved with any PLC programming?
 - ❖ Yes, little bit
10. Where?
 - ❖ during my in-plant training-Author C .Clark Center
11. Is there any Dc motors?
 - ❖ No



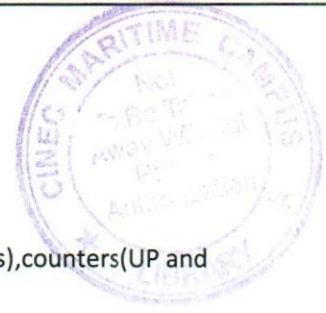
12. Why the DC motors have been replaced most of times?
 - ❖ Plenty of maintenance with C-brushes and its contaminants , all components of the motor need to be cleaned in regular intervals, company has to pay more for spare parts
13. What is 2 strokes and 4-Stroke engines?
 - ❖ In 2 stroke engine- 2 stroke takes place in 2 consecutive strokes of the piston, or one revolution of the crankshaft
 - ❖ In 4 stroke engine-All 4 consecutive strokes of the piston takes place during the 2 revolution of the crankshaft
14. Why the LNG ships(Liquefied Natural Gas carrier) normally having big capacity of Air -con?
 - ❖ Normally the HV systems involve, to cool the cargo gasses
15. What kind of safeties on generators
 - ❖ Mechanical over speed ,Lob oil low pressure, jacket cool water high temperature
16. Is high jacket temperature alarm is a shutdown alarm?
 - ❖ Yes
17. What types of calibrators can found onboard?
 - ❖ Temperature and pressure calibrators
18. Have you used them?
 - ❖ Yes, to check PT100, R-T(Resistor-temp) graph
19. What is the most available brand?
 - ❖ SIKA
20. How checked the PPM alarm?
 - ❖ With the oil contaminated water or using obstruction stick.....Examiner was not happy...
 - ❖ Then explain to me...2 methods-using the "MILK" or special kind of liquid, which is supplied by the same maker,....if use stick or other types of unusual method can destroy the sensor.
21. Where the Data stored and how can re-call under inspection, like PSC?
 - ❖ In the chip, from the display on the unit, with the date and time, local or GMT
22. Is there any other method to read data?
 - ❖ Yes ,by using onboard computer.....answer was wrong, Examiner was not happy a little...
Then explain to me...only the maker can check the chip separately and it is sealed already by them
23. IOPP comes under what?
 - ❖ MARPOL
24. What is your last contract emergency gene capacity?
 - ❖ Around 190 Kw
25. How you re-connect the MSB supply after blackout or re-store power?
 - ❖ Start the Gene and use the bus-tie braker (ACB) to re-connect
26. What are the input to the VDR?
 - ❖ GPS,DGPS, Dopler speed log, GYRO, Auto pilot, radars, Anemometer, Bridge Engine order with date and time

27. What is capsule?
- ❖ Similar to 'black box', situated on the monkey bridge, VDR data's receive to the capsule, ship position as longitudes and Latitudes, date and time, ship speed and its heading, VHF communication, main alarm on the bridge, rudder order, M/E orders and its response, under keel clearance, wind speed and directions, in addition to that, if any radar images
 - ❖ Examiner says capsule has 48hrs of recording time
28. If the capsule has 48hrs data recording time, where the previous data stored?
- ❖ Human interface unit in the bridge (HIU)
29. Then how the previous data can be obtained?
- ❖ from the floppy disk, or the data's which were transferred before to the computer (Examiner added some words- history data save to the HDD, and it is your responsibility also)
30. Assume, that your ship has hit with jetty and the investigation parties came,...what are they looking for.....How it was happened?
- ❖I'm totally stucked.....then.....examiner said...by checking VDR history saved data
31. What is GMDSS?
- ❖ I misunderstood the question.... start with ship distress situation....(This was not expected answer)
32. What kind of supply to GMDSS?
- ❖ I said that I'm not got the question...
33. Then what kind of supply come to the GMDSS console
- ❖ emergency power and battery power-24Vdc
34. What kind of security provided on the GMDSS?
- ❖ signals sending ... if any dangerous situations, pirate's attacks...distress
35. Have you done SSO course?
- ❖ Yes
36. What is your duty as SSO?
- ❖ Take action to establish ship's security (ISPS codes), Examiner added some words about SSAS (then I started as.. SSAS stands for... Ship Security alert System) and instructed me to test the SSAS, time by time, after confirming E-mails with the company
37. What are the ship internal communication systems?
- ❖ sound powered telephones, general line telephone, which is connected with telephone exchanger, walkie-talkie, public addressor
38. What are the types of steering gear you have come across?
- ❖ 4 or 2 ramp system, rotary vane
39. What type of alarms on steering gear system?...like what alarm in PSC inspection?
- ❖ phase failure, over load(thermal), Hyd oil tank low level, short cct protection
40. Why thermal over load alarm become only an indication?
- ❖ for the safety of system ,redundancy of the system
41. What kind of redundancy on it?
- ❖ emergency power, thermal overload is only an indication

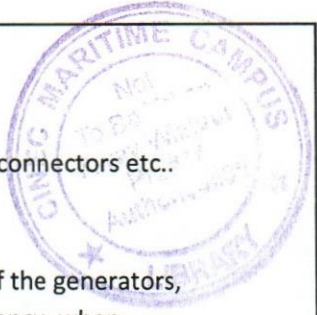
42. What are the types of motor starting methods?
- ❖ DOL, star-Delta, auto transformer, soft starters
43. ...There is one method to start the motor before come to soft starters and this method has been used for many years previously, what is that?
- ❖ ...I stuck...then auto transformer starting method...
44. What are the inputs to AVR? , what kind of functions?
- ❖ Generator average output voltage (normally average voltage on 2 phases),engine speed
 - ❖ Functions -the AVR senses the gene. output voltage and boosts the excitation current to the rotor to increase the flux in case of output voltage drop and vice-versa, AVR responds to Kvar load (reactive power) sharing in parallel operation to keep the system voltage constant (...just mentioned trimmer setting on the AVR, voltage and droop),Excitation for sustained short circuit, rotating diode condition monitoring ,over/under excitation protection
45. How call the battery continuous charge?
- ❖ Float charge...(Examiner was very happy)
46. What is marine high voltage?
- ❖ Any potential difference between 2 conductor is 1000Vac or 1500Vdc (Vm of 1000Vac can reach up to 1500Vdc)ripple free, (or additionally can mention, any voltage between live wire and earth higher than 600Vac or 900Vdc(Vm of 600Vac can reach up to 900Vdc) ripple free voltages)
47. Why so many times talk about HV safety?
- ❖ Arc flashes, Arc flash burns, Arc blast impact due to vaporized materials (normally the Cu conductors) ,shrapnel ,huge temperature (20000 Degree centigrade) on the arc terminals, in such condition can destroy every thing, what about a man???
48. You have transformer one side is 6.6KVac and other side is 440Vac,what is the procedure to do maintenance on that transformer?
- ❖ Scope of works(Categorized the work)
 - ❖ Prepare RA
 - ❖ Check the PPE, tool list ,manufacture guidance, manuals LSDs and additional drawings
 - ❖ Fill the HV permit (EPTW)
 - ❖ Inform to duty engineer
 - ❖ Donning required PPE
 - ❖ cordon the required supply panel for the HV transformer
 - ❖ Put the required Gene's mode switch to manual mode
 - ❖ Load reduce and switch off the VCB, off the gene
 - ❖ call to the authorized person
 - ❖ take out Gene excitation key (cut the Dc excitation to the Gene Via the Ry)
 - ❖ Rack out the VCB (Disconnected position on the VCB indicator)
 - ❖ use the keys to connect the earth switch(or main circuit earth-CME)
 - ❖ sign the section C of the HV permit by authorized person and section D , by competent person
 - ❖ ...now the power is completely dead to the transformer ,then can work on it.
 - ❖ Additionally sanction to test also should be filled, if do PI test etc...



- ❖ Examiner added some words...additional earth cables are required to confirm 'earthing' on the transformer side...I added also.. like 'octopus cable'....(examiner was very happy),and additional words are mentioned by examiner as- complete the procedure given by the 'EPTW' and 'sanction to test', then tick one by one, and 'authorized person as company superintendent'
49. VCB ' disconnected ' position indicator is a mechanical thing, it can be failed, how you come to know the VCB is actually in dead condition?
- ❖ By using HV test probe, additionally alarm on the FPD
50. How you know HV test probe in operational condition?
- ❖ HV test probe should be tested before and after use with the known supply or with the supply designed for the purpose(some testers come with TEST button, or test and work positions selector switch)
51. How call the HV insulation test?
- ❖ PI test,(for LV-insulation test)
52. How you measure it?
- ❖ Actually the polarization index is a ratio value, Test does for 1minutes and reading taken, then reading taken for 10minutes,then PI test value comes from 10minutes reading divided by 1minutes reading (Examiner said 4 is a good value)
53. What is the LV and HV insulation test voltage?
- ❖ 500Vdc and 5000Vdc
54. What is harmonics?
- ❖ It distorts original wave form of the system, normally the 'sin wave' as example ,the effect of harmonics at receptacle load centers can cause circuit breakers to trip prematurely, Erratic tripping due to non-linear currents having a peak value greater than rated r.m.s value of the circuit breaker may cause to trip.(Examiner was very happy)
55. How filter it?
- ❖ Pulse transformers or LRC filtering configurations
56. Have you heard about pod propulsion?
- ❖ Yes
57. What is construction of main HV propulsion?
- ❖ Different types of constructions ,It consists of processor controller, synchrodrive converter, propulsion motor, interconnected with PMS(power management system).....I thought answer given by me not enough.. as well expected
58. How the electric propulsions are connected?
- ❖ HV Gene-HV switch boards-HV propulsions and low power consumers.
59. What is the hotel system?
- ❖ air conditioner for accommodation
60. Have you filled refrigerant to air con?
- ❖ Yes,(Procedure not asked)
61. Can you understand 'Ladder Diagram'?
- ❖ Yes



62. Just explain what are the inside the Ladder ?
- ❖ N/O,N/C contacts, timers (TONR,TOF, WDT-watch dog timers),counters(UP and Down),outputs
(Examiner says that ladder program is a logical thing and cannot see as physical)
63. How check the required functions?
- ❖ check the required inputs are in order, then check for relevant output signals, mostly on the LED indicators
64. What kind of deck machinery have you met?
- ❖ cargo crane, mooring winches, windless..etc..
65. What kind of winches?
- ❖ fully hydraulic, Electro- hydraulic and fully electric, PLC driven, kinds
66. Have you experienced in any problem?
- ❖ Yes, anchor could not be able to heaving-up, stuck somewhere sea bed, may be with mud, the system was fully electric drive one,...after discussion with master and CH.Eng. I bypassed the load sensor for the anchor, then heaved-up,...after removed the bypass and restored the system back to normal.
67. Briefly explain structure of VSD?
- ❖ VSD or VFD stands for variable speed drivers or variable frequency drivers.. variable frequency with corresponding voltage change, It consists of electronic control unit, bridge rectifier, PWM controlled inverter to set the motor frequency
68. You has maintenance on the sea water pump, how you attain to that job?
- ❖ Inform duty Eng. ,tag in tag-out methods... first take all necessary steps related to the safety (examiner seems unhappy)....then said need to fill EPTW and follow the procedure on it(As expected answer)small discussion among the examiners about the radars, magnetron, ETO change magnetron etc...then,
69. What kind of safeties must be taken, working on the radar mast?
- ❖ Inform duty officer, switch off power, HV capacitor discharge etc. .but it not seems to be expected answer...Examiner said need to fill 'Working Aloft'
70. What means integrated bridge system?
- ❖ computer applications are increasing day by day as well as in fast way, As examples, ECDIS, radar, compass and other navigational equipments are inter conned with software applications and hardware applications via various types of sensors, transducers, D/A and A/D converters and so on...they are connected with LAN cables...
71. What are the types of connection for data communications?
- ❖ Twisted pair cables can connect as straight through ,cross over and roll over
72. Why different types of connections?
- ❖ otherwise the connected equipment cannot recognize each other through the communications
73. How check the cable connection?
- ❖ by using the tester, I forgot the name...one side is transmission side(Tx), other side is receiving end(Rx),LEDs on the tester shows connectivity of the cable
74. If you receive a ups, what 'specs' to be checked?

- 
- ❖ VA ratings , frequency, input and output voltages, types of output connectors etc..
75. What is PMS, how it works, main features of it?
- ❖ Power management system, it controls the starting and stopping of the generators, its connection ,load sharing, stabilize the system voltage and frequency, when increasing load demand, it operates non-essential consumer's preference overload trip within the intervals (air con and ventilation, then refrigerated cargo plant, then deck machineries in 10seconds intervals) and auto start the St-By generator and keeps the power distribution for the essential consumers, such as communications and navigation equipments
76. How works the stand-by pumps?
- ❖ main and St-By starters are interconnected and interlocked, incase of , abnormal signals (power failure) occurs on the main selected starter, the St-By starter detects that failure signal and start the ST-BY pump
77. If you encountered some problems at the same time...as example, reefer problem and same time engine room machinery problem...then how you decide, which job should be done in first?
- ❖ I said, ask from Ch. Eng....it is not correct answer, then examiner explained that "do the job in 1st ,which is more involved with the safety of the ship"
78. What type of boilers you have sailed?
- ❖ most of time.. In fire tube boilers
79. Tell me the boiler starting sequence up to ignition?
- ❖ safety interlocks-fuel valve off-post purge-main reset-start(auto or manual)-pre purge-pilot burner on(with ignition)
80. What are the types of burners?
- ❖ rotating cup burner, steam jet blast burners
81. What is BNWAS? how it works?
- ❖ Bridge navigation officers watch alarm systems, it gives 'alert signal' for the officer in charge, who is doing the navigation bridge watch, if not attained to the signal, then the signal rings in the master cabin, if not attained to the signal, then it goes up to the general alarm...examiner added some words.. for the E/R same as 'dead man alarm system'
82. What are the connected consumers to emergency switch board?
- ❖ navigation equipments, Do pump (if any), emergency air compressor (as expected answer),Co2 system, smoke detect ion system, St -gear etc...
83. How generator insulation done?
- ❖ SCR rotating rectifiers to be shorted to ground with the conductive layers, in addition to that related electronic components to be isolated, like AVR (if necessary)
84. What do you know about electronic engines?
- ❖ it is without camshaft, electronic transducers are used for in various mechanical operations and so on...
85. Assume some problem occurred in engine control electronic card, how you replace it?
- ❖ follow the SLDs, check. .if I switch it off power completely ...then what kind of "output signals" can be affected or what kind of engine performance may affect...(Examiner was very happy, because he had also faced to same problem)

86. What are the things to be checked before PSC inspection?

- ❖ Previous records.. if there any detained items ,if it can happen, critical equipment check list...specially is there any threat for the safety of the ship...

87. What kind of procedures have to follow as a new electro-tech officer?

- ❖ I excite...no answer to give....I heard some helpful words from examiner side,....any convention regarding this procedure...
- ❖ Yes ,STCW.

88. Ok, then under what section comes?

- ❖ section A-iii/6

89. Yes ,what comes under competence?

- ❖ functions,
 - electrical, electronic and control engineering at the operational level
 - maintenance and repair at the operational level
 - controlling the operation of the ship and care for persons no board at the operational level

90. How many columns on STCW table?

- ❖ 4 columns

91. What are they?

- ❖ col 1_competence
- ❖ col 2_knowledge understanding and proficiency
- ❖ col 3_method for demonstrating competence
- ❖ col 4_criteria for evaluating competence

Additional notes—Oral test completed.. ETO must be able to demonstrate his competence at any time or under any inspections..