D. MARINE
Study Material

MEO CLASS 2 WRITTEN: MET

(MARINE ELECTRO TECNOLOGY)

FOR INDIAN COMPETENCY EXAM

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JANUARY – 2026
SECTION-I

Q1. (a) List the various losses which occur in a squirrel cage induction motor on load.
(b) State which of these losses is:
(i) Independent of load current and speed;
(ii) Dependent on load current.
(iii) Dependent on speed.
2026/JAN/Q1
Click Here to See the Answer

Q2. In the event of a failure, of the main electrical power supply on a ship, an emergency source of power must be available, state the circuits which must be fed from such a source and discuss the reasons governing the selection of such circuits.
2023/SEP/Q2 **2026/JAN/Q2**
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Q3. (a) Draw a circuit diagram illustrating how a single thyristor (Silicon controlled rectifier) may be used to provide a variable voltage D.C. output from a single phase A.C. supply.
(b) Explain how the firing angle of the thyristor is varied.
(c) Sketch waveforms for the output voltage when the firing angle is:
(i) 60°
(ii) 120°. (16)
2026/JAN/Q3
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Q4. With reference to a 3 speed A.C. cage motor driven cargo winch:
A. Sketch a circuit diagram for a pole change motor. (8)
B. Describe how speed changes and braking are achieved. (8)

2022/OCT/Q4 **2024/JUL/Q5** **2024/AUL/Q4** **2025/JAN/04** **2025/OCT/Q4**

Q5. With reference to the condition monitoring of electrical machinery:
A. State TWO important parameters that may be recorded. (8)
B. Explain how the parameters are measured and what defects may be revealed. (8)
2022/OCT/Q5 **2023/SEP/05** **2025/OCT/Q5**
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SECTION-II

Q6. (a) Explain the significance of the root mean square value of an alternating current or voltage waveform. Define the form factor of such a wave form. (6)
(b) A total load of 8000 kW at 0.8 power factor is supplied by two alternators in parallel. One alternator supplies 6000 kW at 0.9 power factor. Find the kVA rating of the other alternator and the power factor,
2023/JUNE/Q6 **2024/UL/Q6** **2024/NOV/Q5** **2025/APR/Q4** **2025/OCT/Q6**
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Q7. A. By means of a schematic circuit diagram illustrate the peak rectifier. If the supply voltage is v(t) = VSinωt, what is the voltage across the load resistor? (6)
B. A series circuit comprising a 500 resistor, a coil having resistance and inductance and a capacitor is connected across a 50 V variable frequency supply. When the frequency is 400 Hz the current reaches its maximum value of 0.6 A and the voltage across the capacitor is 200 V. Calculate EACH of the following:
(a) The value of the capacitance.
(b) The resistance and inductance of the coil.
(c) The power taken from the supply.
(d) The circuit power factor. (10)
2026/JAN/Q7
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Q8. A. Why is it important to maintain high efficiency of operation and low values of voltage regulation for power transformers? (6)
B. A 100 KVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistances are 0.3 1 and 0.01 respectively and the corresponding leakage reactance's are 1.1 2 and 0.035 2 respectively. The supply voltage is 2200 V. Calculate:
(i) The equivalent impedance referred to the primary circuit.
(ii) The voltage regulation and secondary terminal voltage for full load having a power factor of (a) 0.8 lagging and (b) 0.8 leading. (10)
2024/JUN/Q7 **2024/AUG/Q7** **2024/NOV/Q8**
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Q9. A. List the factors that determine the starting torque of the three-phase induction motor. How does this torque generally compare with the value of the rated torque? (6)
B. A 3 ph 440 V, 60 Hz, 8 pole induction motor runs at a power factor of 0.85 lag and drives a load of 8 kW at a speed of 14.4 rev/s. The stator loss is 1 kW and the rotation losses (windage and friction) amount to 0.8 kW. Calculate EACH of the following:
(a) The synchronous speed.
(b) The rotor Copper loss
(C) The input power to the motor
(d) The motor current.
2026/JAN/Q9
Click Here to See the Answer

Q10. A. With the aid of delta and star connection diagrams, state the basic equation from which the delta-star and star delta conversion equation can be derived. (6)
B. Three batteries A, B and C have their negative terminals connected together, between the positive terminals of A and B there is a resistor of 0.5 ohm and between B and C there is a resistor of 0.3 ohm. Specifications of the three batteries are given below:
Battery A 105 V, Internal resistance 0.25 ohm

Battery B 100 V, Internal resistance 0.2 ohm
Battery C 95 V, Internal resistance 0.25 ohm
Determine the current values in the two resistors and the power dissipated by them. (10)

2024/NOV/Q10 **2025/OCT/Q10** **2023/JUN/Q10** **2024/JUN/Q9** **2024/AUG/Q9** **2024/NOV/Q.10** **2025/OCT/Q10**

Click Here to See the Answer