

INDIAN MARITIME UNIVERSITY
(A Central University, Government of India)

June 2016 End Semester Examinations
B.Sc. (Nautical Science) - 2013 batch onwards
Semester I

Nautical Physics-II (UG21T2106)

Date : 21.06.2016/A.N

Time: 3 Hrs

Maximum Marks: 70

Pass Marks : 35

NOTE: Attempt any SEVEN questions. All questions carry equal marks **7x10=70**

Use of Non-programmable scientific calculator is allowed.

1. a) The resistance of two wire is 25 ohms when connected in series and 6 ohms when joined in parallel. Calculate the resistance of each wire. (5)
b) Explain Static Electricity. Is static electricity hazardous? (5)
2. a) When do I need to bond and ground the container? (5)
b) What are the conditions under which generation and accumulating of an electrostatic charge exists will be a source of ignition? (5)
3. A $9\ \mu\text{F}$ capacitor is connected in series with a parallel combination of two capacitors of values $4\ \mu\text{F}$ and $2\ \mu\text{F}$ respectively.
 - i. Determine the capacitance of the combination.
 - ii. If a potential difference of 20 V is maintained across the circuit, determine the charge on $9\ \mu\text{F}$ capacitor. (10)
4. a) State the Faraday's Laws of Electromagnetic Induction. Derive an expression for the value of induced emf. (5)
b) The field of a 6 – pole d.c. generator each having 500 turns, are connected in series. When the field is excited, there is a magnetic flux of 0.02 weber/pole. If the field circuit is opened in 0.02 seconds and the residual magnetism is 0.002 weber/pole, calculate the average voltage which is indicated across the field terminals. (5)
5. a) Derive the emf equation of an ideal single – phase transformer. (10)

6. A 200 kVA, 3300/240 volt, 50 Hz, single – phase transformer has 80 turns on the secondary winding. Assuming an ideal transformer, calculate
- i. Primary and secondary currents on full – load
 - ii. The maximum value of flux. (10)
 - iii. The number of primary turns.
7. Sketch an elementary AC generator and explain how it produces an AC voltage. What is an essential difference an elementary AC generator and DC generator? (10)
8. a) Find the rms value of an ac signal given by $v = V_m \sin \omega t$. (5)
- b) Write a short note on thermoelectric effect and applications.(5)
9. a) Discuss earth as magnet. (5)
- b) What is magnetic compass? Explain dry compass and wet card compass. (5)