

Shree
27/12/16
Library copy

6

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

December 2016 End Semester Examinations
B.Sc. (Nautical Science)- First Semester (2013 – 15 batches)

Nautical Physics – II (UG21T2106)

Date : 27.12.2016

Time: 3 Hrs

Maximum Marks: 70

Pass Marks : 35

Note: Answer any seven from the following:

(7 × 10 = 70 Marks)

1. a) Define alternating signals. Draw three alternating signals. (2 + 3)
b) What is called impedance? How to find the magnitude and phase angle of impedance?
What is relationship between phase angle and power factor? (2 + 1 + 2)
2. a) What is meant by static electricity? Explain the various causes of static electricity. (7)
b) What is the importance of grounding the containers in ship? (3)
3. a) Explain Faraday's law and Lenz law. (6)
b) What is called electromagnet? How electromagnets are made? (4)
4. a) A capacitor is composed of two plates separated by a sheet of insulating material 3 mm thick and of relative permittivity 4. The distance between the plates is increased to allow the insertion of a second sheet 5 mm thickness of relative permittivity ϵ_r . If the capacitance of the capacitor so formed is 1/3 of the original capacitance, find ϵ_r . (5)
b) Find equivalent resistance if three resistance are connected in parallel. (5)
5. a) Estimate the number of ampere turns necessary to produce a flux of 0.5 milli – weber wound on an iron ring of 5 cm² cross – section and 30 cm mean diameter, having an air – gap of 1 mm wide across it. Assume the relative permeability of iron as 1000. Neglect the leakage flux outside the air – gap. (5)
b) Two coupled coils have a coefficient of coupling 0.85, $N_1 = 100$ and $N_2 = 800$ with coil 1 open and a current of 5 A in coil 2, the flux in the coil 2 is 0.35 milli – weber. Find self inductance of coil 1 & 2 and mutual inductance between the coils. (5)
6. Explain in detail construction and working principle of DC generator. (10)

- 7. a) Describe the principle operation of single – phase transformer with neat sketch. (5)
- b) A 3 – phase, 16 pole alternator has a star connected winding with 144 solts and 10 conductor per slot. The flux per pole is 30 milli – weber sinusoidally distributed and the speed is 375 rpm. Find the frequency, the phase and line emf. (5)

- 8. a) Calculate the total field of the earth at a place where the value of angle of dip is 30° and $H=0.48$ Gauss: (5)
- b) Explain why Earth is considered as a magnet. (5)

- 9. a) Differentiate soft and hard magnetic material. (3)
- b) What is called magnetic compass? What is the purpose of magnetic compass onboard a ship? Draw a simple sketch of wet card compass. (2 + 1 + 4)
