

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

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

**Nautical Electronics-I (UG21T2304)**

**Date : 08.07.2016/F.N**

**Maximum Marks: 70**

**Time: 3 Hrs**

**Pass Marks : 28**

NOTE: Attempt any SEVEN questions. All questions carry equal marks **7x10=70**  
Use of Non-programmable scientific calculator is permitted.

1. Derive an expression for the current flowing through A.C circuit containing R, L & C in series. Derive the formula for resonant frequency and impedance of the circuit
2. The impedance  $Z_1 = (5 + j94.24)$  ohms and  $Z_2 = (10 - j21.20)$  ohms are joined in parallel and connected across a 200 volts, 50 Hz supply. Determine the current in  $Z_1$  and  $Z_2$ .
3. Prove that in amplitude modulation (AM) total carrier power  $P_t = P_c (1 + m_a^2 / 2)$ . Where  $P_c$  is the carrier power and  $m_a$  is the modulation index.
4. Calculate the percentage of power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of (a) 100% and (b) 50%.
5. Derive the formula for the instantaneous value of an FM voltage and define the modulation index.
6. (a) What is SSB modulation? How do you develop SSB signals?  
(b) How do you demodulate the amplitude modulated signal?

7. Explain the operation of an FM Transmitter with necessary block diagram.
8. Explain push – pull circuit with neat sketch.
9. A power transistor working in class A operation has zero signal power dissipation of 10 watts. If the a.c. output power is 4 watts, find collector efficiency and power rating of transistor.