Indian Maritime University

(A Central University, Govt. of India)

B.Sc. (Nautical Science)

END SEMESTER EXAMINATIONS- JUNE/JULY 2019

SEMESTER-III

NAUTICAL ELECTRONICS PAPER-I

UG21T2304

Date: 02.07.2019 Maximum marks: 70

Duration: 3 Hrs Pass Marks: 35

Attempt any **SEVEN** questions . All carry equal marks. (7x10=70)

1.(a) Sketch series RLC circuit connected to A.C source and derive equation for current and resonance frequency. (5)

(b) A circuit consists of a capacitor of 100 pF connected in series with coil of resistance of 5 Ω and inductor of 100 μH. Calculate resonance frequency and Q factor. (5)

2.(a) Define the terms active power, reactive power and power factor in a.c circuit. (5)

(b) A coil having L = 0.14 H and R = 9.43 Ω connected across 50 Hz 135 V supply. Determine X_L , Z and I. (5)

3.(a) What is need for modulation in communication system. (5)

(b) Compare amplitude modulation and frequency modulation. (5)

4.(a) Explain with the help of waveforms the process of amplitude modulation. (5)

(b) Define modulation index. Modulated carrier wave has maximum and minimum amplitude of 750 mV and 250 mV. Calculate the percentage of modulation. (5)

5.(a) Explain the process of demodulation using diode detector circuit for Amplitude Modulated signal. (5)

(b) The carrier frequency in a F.M modulator is 1000 KHz. If the modulation frequency is 15 KHz, what are the first three upper side band and lower side band frequencies. (5)

6.(a) Show the parallel RLC circuit connected to a.c source and its current waveforms. Also state the resonant frequency of the circuit. (5)

(b) Parallel RLC circuit consisting of 200 pF capacitor, inductor of 200 μH and resistance of 5 Ω is connected across 1.0 V, 800 KHz signal source. Determine resonant frequency and Q value. (5)

7.(a) A frequency modulated voltage wave is given by the equation e = 12 cos (6×10^8 t + 5 sin 1250 t), determine carrier frequency, signal frequency and modulation index. (5)

(b) Calculate the modulation index for Frequency modulated wave where the maximum frequency deviation is 50 KHz and the modulation frequency is 5 KHz. (5)

8. (a) Discuss the classification of amplifiers. (5)
(b) Describe the circuit of push-pull amplifier. (5)

9. (a) State the main characteristics of series RLC circuit. (5)
(b) Describe a transistor circuit of simple A.M modulator. (5)

*****