INDIAN MARITIME UNIVERSITY

(A Central University, Government of India)

END SEMESTER EXAMINATIONS-JUNE/JULY 2019

B.Sc (Nautical Science)

Semester-II

Nautical Electronics (UG21T4203)

Date: 29.06.2019 **Max.Marks : 70**

Time: 3 Hrs **Pass Marks : 35**

Part A: Compulsory

1. (a) Define P type and N type semi conductor. (2)
   (b) Explain working of transistor as a switch. (2)
   (c) State equation of α and β of a transistor. (2)
   (c) What is Barkhausen Criterion for oscillation? (2)
   (d) State De-Morgan's theorem (2)

Part B:
Attempt any 6 questions from 2 to 9

2. (a) Explain the action of zener voltage regulator with a neat diagram. (5)
   (b) An a.c supply of 230 V / 50 Hz is applied to a full wave bridge rectifier through a transformer of turn ratio 4:1 & connected load R_L is 200 Ω. Find (i) the output d.c. voltage and (ii) the peak inverse voltage. Assume ideal diodes used in the rectifier circuit. (5)

3. (a) What do you mean by transistor biasing. Explain voltage divider bias circuit. (5)

   (b) Explain class B push pull amplifier with neat circuit diagram. (5)

4. (a) Explain in detail with circuit diagram of BJT based Colpitt's oscillator and write the expression for its frequency & feedback fraction (5)
   (b) Find the β of a transistor if α is 0.98. For the same transistor if I_B = 240 μA & I_E = 12mA determine the value of IC using both α and β. (5)

5. (a) Which logic gates are known as universal logic gates & why? Design AND, OR and NOT gates using NAND and NOR gates (5)
   (b) What is demultiplexer & describe 1:4 demultiplexer circuit. (5)

6. (a) What is modulation & demodulation & why demodulation process is necessary in communication. (5)
   (b) An AM wave is represented by the expression:
   $v = 5\,(1 + 0.6 \cos 6280\,t) \sin 211 \times 10^4\,t$ volts
   (i) What are the minimum and maximum amplitudes of the AM wave?
   (ii) What frequency components are contained in the modulated

wave and what is the amplitude of each component? (5)

7. (a) Explain Radio Detection Finder (RDF) in detail (5)
   (b) Draw the detailed block diagram of super hetrodyne receiver and explain its working. (5)

8. (a) With the help of block diagram describe an elements of basic RADAR system. (5)
   (b) What are domestic satellite? List at least three Indian domestic satellites. (5)

9. Write a note on any TWO.
   a) LDR & LED (5)
   b) Timer IC 555 as monostable multivibrator. (5)
   c) Half adder logic circuit. (5)
   d) Clocked JK Flip Flop circuit with truth table and timing diagram (5)

-------End of question paper-----