

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

June 2017 End Semester Examinations
B. SC (Nautical Science – Second Semester)

Nautical Electronics – UG21T 3203
(AY 2016 - 17 batch onwards)

Date: 07.06.2017
Time: 3 Hrs

Maximum Marks : 70
Pass Marks : 35

PART – A

Marks: $7 \times 10 = 70$

(Answer any seven of the following)

1. a) Explain the action of a zener voltage regulator with a neat diagram. (5 Marks)
b) A half-wave rectifier is used to supply 50V d.c. to a resistive load of $800\ \Omega$. The diode has a resistance of $25\ \Omega$. Calculate a.c. voltage required. (5 Marks)
2. a) Define β in transistor. Prove that $I_E = I_B (\beta + 1)$ (5 Marks)
b) A transistor uses potential divider method of biasing. $R_1 = 50\ k\Omega$, $R_2 = 10\ k\Omega$ and $R_E = 1\ k\Omega$. If $V_{CC} = 12\ V$, find :
i. the value of I_C ; given $V_{BE} = 0.1\ V$,
ii. the value of I_C ; given $V_{BE} = 0.3\ V$. Comment on the result. (5Marks)
3. a) Draw a circuit of practical CE amplifier. Explain the function of each component. (5 Marks)
b) Classify of the amplifiers according to the mode of operations. (5 Marks)
4. a) Discuss the circuit operation of tuned collector oscillator. (5 Marks)
b) Find the capacitance of the capacitor required to build an LC oscillator that uses an inductance of $L = 1\ mH$ to produce a sine wave of frequency $1\ GHz$. (5 Marks)
5. a) Draw the d.c. and a.c. equivalent circuit of a CE amplifier. (5 Marks)
b) What is called feedback? Differentiate positive and negative feedback. (5 Marks)
6. a) What are called universal gates? Draw the symbol of universal gates and explain the operation with truth table. (5 Marks)
b) Draw the logic circuit diagram of full – adder, with necessary equations and tables. (5 Marks)

7. a) What is the need of modulation? (5 Marks)
- 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 Marks)
8. a) Draw a block diagram of tuned RF receiver. Explain the function of each block. (5 Marks)
- b) Write a short note on super heterodyne receivers. (5 Marks)
9. a) What is RADAR? Explain the principle of RADAR. (5 Marks)
- b) Write short notes on TACAN. (5 Marks)
