

Indian Maritime University

(A Central University, Govt of India)

May-June 2018 End Semester Examinations

B. Tech (Marine Engineering)

Semester-III

Electronics (UG11T2302 /T1302)

Date: 04.07.2018

Time: 3 Hrs

Max Marks:100 Marks

Pass Marks: 50 Marks

Part-A

(3 x10 = 30 Marks)

Answer all the Questions

1. a) List the types of biasing of transistor. Which type of biasing is used mostly?
- b) Simplify using Boolean algebra $(A+B)(A+C)$
- c) What is the effect of negative feedback on the performance of amplifier?
- d) What is Barkhausen criteria for sustained oscillation.
- e) Design AND gate using NOR gate only.
- f) State the need of regulator.
- g) What is CMRR (Common Mode Rejection Ratio) for an OPAMP.
- h) What is the function of ALU in 8085 microprocessors?
- I) Define modulation index of AM.
- J) What is bus? name different types bus in 8085 microprocessors?

Part -B (5x14 = 70 Marks)

Answer any five from the following

2. a) Design a one-bit full adder. (7)
- b) Explain 3-bits synchronous counter with truth table and timing diagram. (7)
3. a) Draw the diagram of class B push pull amplifier and explain its working. (7)
- b) For a transistor prove that collector current $I_c = \beta I_B + (\beta+1) I_{CBO}$
Where β is the CE current gain, I_B is the base current and I_{CBO} is the collector to base leakage current. (7)
4. a) Draw circuit of transistorized series voltage regulator and explain its working. (7)
- b) Describe working of RC phase shift oscillator with neat sketch. Write formula for frequency of oscillation. (7)
5. a) If $R_1 = 2K\Omega$, $R_F = 100K\Omega$, $V_{CC} = + 15V$ and rms input voltage, $V_i = 20$ mV. Calculate output voltage in inverting and non- inverting mode.

(7)

b) Draw the circuit of basic integrator and derive the output expression. (7)

6. a) Prove that in amplitude modulation (AM) total carrier power $P_t = P_c \left(1 + \frac{m_a^2}{2} \right)$. Where P_c is the carrier power and m_a is the modulation index. (7)

b) AM transmitter transmits signals at 50 kW with modulation depth as 85%. Calculate carrier power and total side band power in transmitted signal. (7)

7. a) Minimize the following Boolean expression using K-map, $Y = \sum m(1, 3, 5, 7, 8, 10, 14)$. Draw the logical circuit diagram of minimized expression using basic gates. (7)

b) Draw and Explain the circuit of weighted resistor digital to analog converter (DAC). (7)

8. a) How frequency can be measured using CRO (4)

c) With neat diagram explain the operation of *CMOS Inverter* (NOT gate). (4)

c) Draw and explain $V-I$ characteristic of SCR. (6)
