

B.Tech Degree IV Semester Examination in Marine Engineering June 2011

MRE 404 MARINE ELECTRONICS

Time : 3 Hours

Maximum Marks : 100

- I. (a) Derive the efficiency of class A, B and C amplifiers. (12)
 (b) What do you mean by CMRR? Explain two methods to improve CMRR. (8)
- OR**
- II. (a) Explain the blocks of a typical OPAMP circuit. (12)
 (b) What is the need for heat sink? Determine the maximum dissipation allowed for an 80W silicon transistor (rated at 25°C); if derating above 25°C is by a factor of 0.5W/°C, at a case temperature of 125°C. (8)
- III. (a) Draw and explain a three bit up/down synchronous counter. (10)
 (b) Draw and explain a four bit R/2R ladder DAC. Also, explain the terms (i) Resolution (10)
 (ii) Accuracy (iii) settling time of the 4 bit DAC.
- OR**
- IV. (a) Using Karnaugh map method, implement a full adder circuit. (10)
 (b) With the help of timing sequence, explain a four bit Johnson counter. (10)
- V. (a) What is the basic difference between ROM and RAM. Which are the typical members of ROM and RAM family? Briefly explain about them. (10)
 (b) Draw and explain a single Dynamic RAM cell. How is data written into and read from a dynamic RAM cell? (10)
- OR**
- VI. (a) Draw the structure and two transistor analogy of SCR and explain its V-I characteristics. From characteristics, identify the regions of (i) forward blocking (ii) Forward conduction (iii) Reverse blocking. (15)
 (b) What is the importance of holding current? Explain. (5)
- VII. (a) Compare AM, FM and PM in terms of (10)
 (i) Waveform – draw the waveform
 (ii) Band width
 (iii) Modulation index
 (iv) Application.
 (b) Derive the basic RADAR range equation. (10)
- OR**
- VIII. (a) What do you mean by quantisation error? Calculate quantisation error of a quantiser using '8' – bits for a signal of $\pm 10V$. (10)
 (b) Explain how PPM can be generated and demodulated. (10)
- IX. Draw and explain the block diagram of Cathode Ray Oscilloscope. (20)
- OR**
- X. (a) Explain how the following are measured using CRO: (10)
 (i) Voltage
 (ii) Frequency
 (iii) Phase
 (b) Explain how 'ac' voltage is measured using a digital voltmeter. (10)