

## ***B.Tech Degree IV Semester Examination in Marine Engineering May 2012***

### **MRE 404 MARINE ELECTRONICS**

Time : 3 Hours

Maximum Marks : 100

- I. (a) Draw the circuit of a Class A amplifier and explain its working. Derive the expression for its output power and efficiency. (15)  
 (b) What is a push pull amplifier? Where is it used? Explain. (5)
- OR**
- II. (a) What is an operational amplifier? Explain. List its ideal properties. (10)  
 (b) Explain the circuit of an inverting amplifier using op amp, with the help of wave forms and frequency response plots. Derive its gain expression. (10)
- III. (a) State and prove De Morgan's Theorem. (6)  
 (b) Simplify and realize using gates: (6)  

$$Y = \overline{BC} + \overline{AD(AB + CD)}$$
  
 (c) Discuss the working of a 8:1 multiplexer with neat sketches. (8)
- OR**
- IV. (a) Draw a neat schematic of any one type of digital to analog converter. Explain the circuit. (10)  
 (b) With the help of a neat diagram explain the working of a Master slave JK flip flop. Why is the Master slave arrangement preferred? (10)
- V. (a) Write short note on one bit R/W memory cell. (10)  
 (b) Draw and explain the working of a CMOS inverter. (10)
- OR**
- VI. (a) Explain the construction of an SCR. Draw its V-I characteristics and explain its working based on two transistor analogy. (12)  
 (b) Briefly explain the principle of operation of a photodiode. (8)
- VII. (a) Explain the working RADAR. Derive the Range equation. What do you mean by maximum unambiguous range of a RADAR? (12)  
 (b) Differentiate between FM and PM. (8)
- OR**
- VIII. (a) What is modulation? What are the advantages of frequency modulation over amplitude modulation? What are the disadvantages of FM? (12)  
 (b) Explain the principle of a radio receiver with a neat schematic. (8)
- IX. With the help of a neat block diagram, explain the working of a CRO. (20)
- OR**
- X. Briefly explain any THREE from the following: (20)  
 (i) Frequency meter  
 (ii) Digital voltmeter  
 (iii) Signal generator  
 (iv) Q meter  
 (v) Multimeter.