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***B.Tech. Degree IV Semester Supplementary Examination in
Marine Engineering June 2015***

MRE 404 MARINE ELECTRONICS

Time: 3 Hours

Maximum Marks: 100

(5 × 20 = 100)

- I. (a) What are the different types of power amplifiers? Differentiate between them. (10)
 (b) Explain the operation of a push-pull amplifier, with neat circuit diagram. Discuss its advantages and disadvantages. (10)
- OR**
- II. (a) Explain with respect to an op-amp: (8)
 (i) Input-offset voltage
 (ii) Input bias current
 (iii) Large-signal voltage-gain
 (iv) CMRR
 (b) Explain the inverting and non-inverting configurations of an op-amp with feedback. Derive their voltage-gain equations. (12)
- III. (a) State and prove De-Morgan's theorem. (5)
 (b) What are universal gates? Explain. (5)
 (c) With neat logic diagram, truth table and timing diagram, explain the working of a J-K master-slave flip-flop. (10)
- OR**
- IV. (a) Draw and explain the logic-circuit of a 3-bit up/down counter. (10)
 (b) What is DAC? Explain any one type of DAC. (10)
- V. (a) Differentiate between RAM, ROM and PROM. (10)
 (b) Explain how a NOR gate is implemented using TTL and CMOS technologies. (10)
- OR**
- VI. (a) What is an SCR? Explain its different modes of operation referring to the V-I characteristics. (10)
 (b) Draw the circuit diagram and waveforms of a single-phase fully controlled rectifier and explain its operation. (10)
- VII. (a) Explain the block diagram of a typical communication system. (8)
 (b) What is modulation and de-modulation? (6)
 (c) Differentiate between AM, FM and PM. (6)
- OR**
- VIII. (a) What is RADAR? Give its applications. Derive its range equation. (12)
 (b) Write a short note on pulse communication. (8)
- IX. (a) With neat diagrams, explain the working of a Cathode Ray Oscilloscope. (10)
 (b) Explain how a CRO is used for the measurement of: (10)
 (i) Voltage
 (ii) Frequency
 (iii) Phase difference
- OR**
- X. Write short notes on: (20)
 (i) Signal generator
 (ii) Q-meter
 (iii) Frequency meter