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

## MRE 1404 MARINE ELECTRONICS

Time : 3 Hours                                                      Maximum Marks : 100

I.  (a)  What are power amplifiers? How are they classified? Compare their collector      (10)
         efficiencies.
    (b)  Explain the circuit and operation of a push-pull amplifier, with neat diagrams. What is      (10)
         the use of phase-inverter circuit in it?

**OR**

II.  (a)  Define with respect to an op-amp: (i) input offset voltage (ii) input bias current      (10)
          (iii) CMRR (iv) output voltage swing (v) slew rate. Give typical values of each for
          op-amp IC 741.
     (b)  Draw and explain the circuits of inverting and non-inverting amplifiers using op-amp      (10)
          with feedback and derive the gain equations.

III.  (a)  What are universal gates? Explain. Implement AND, OR, NOT and XOR gates using      (10)
           universal gates.
      (b)  State and prove De-Morgan's theorems.                                           (5)
      (c)  Explain J-K flip flops and how it can be converted to T-flip flops.             (5)

**OR**

IV.  (a)  Draw the circuit diagram of a 3-bit up/down counter and explain it.              (10)
     (b)  Explain any one type of ADC with neat diagrams.                                  (10)

V.  (a)  Draw and explain TTL and CMOS inverter circuits.                                  (10)
    (b)  Write notes on semiconductor memories.                                           (10)

**OR**

VI.  (a)  Draw the circuit diagram and wave-forms of a phase-controlled full-wave rectifier.      (10)
          Explain its working.
     (b)  Write notes on photo electric devices.                                          (10)

VII.  (a)  What is modulation and demodulation? What is the need for modulation in      (10)
           communication systems?
      (b)  Differentiate between AM, FM and PM.                                           (10)

**OR**

VIII.  (a)  Draw and explain the working of a RADAR, with the help of a neat diagram.      (10)
       (b)  Write short notes on PWM, PPM and PCM.                                        (10)

IX.  (a)  With neat diagrams, explain the architecture of 8085 microprocessor.            (12)
     (b)  What are the different register pairs in 8085 microprocessor? Explain.          (8)

**OR**

X.  (a)  Write a program to add two hexadecimal numbers and to display the answer in an      (10)
         output port.
    (b)  Briefly explain the different categories of instructions in 8085 microprocessor with      (10)
         examples.

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