B.Tech. Degree IV Semester Examination in Marine Engineering May 2016

MRE 1404 MARINE ELECTRONICS

Time : 3 Hours   Maximum Marks : 100

$(5 \times 20 = 100)$

I.   (a)   Draw the circuit of a class B push-Pull amplifier and explain its operation.   (10)
     (b)   Prove that a class A power amplifier is cooler in the presence of signal than in the absence of signal.   (5)
     (c)   Define and explain harmonic distortion in power amplifier.   (5)
                                        OR
II. (a)   Draw the block schematic of an operational amplifier and explain each block.   (10)
     (b)   Explain the following terms: (10)
               (i) virtual ground (ii) CMRR (iii) slew rate (iv) offset voltage
               (v) offset current.

III. (a)   Prove that NAND and NOR are universal gates.   (10)
     (b)   Draw the truth table of full adder and write the Boolean expression for SUM and CARRY using min terms.   (5)
     (c)   Perform $(6AE)_{16} + (A8C)_{16}$ (5)
                                        OR
IV. (a)   Explain RAMP ADC. Compare its performance with dual slope and successive approximation ADCS.   (14)
     (b)   Determine the output of a 4 bit R-2 R Ladder DAC for the bit pattern 1101. Given $V_{REF} = 12V$.   (6)

V.   (a)   Draw and explain a basic TTL NAND gate.   (10)
     (b)   Why is negative supply preferred in ECL?   (2)
     (c)   Explain the following terms.   (8)
               (i) Noise margin (ii) Fan in (iii) Sinking current (iv) Totem-pole arrangement.
                                        OR
VI. (a)   Explain the two transistor analogy of an SCR. Explain its operation and VI characteristics.   (10)
     (b)   Define the following in reference to SCR   (6)
               (i) Latching current (ii) holding current (iii) firing angle
               (iv) conduction angle.
     (c)   What is a phototransistor? How is it different from optocoupler?   (4)

VII. (a)   Explain the working of a superheterodyne radio receiver, with the help of a block diagram.   (10)
     (b)   Explain different schemes of pulse communication.   (10)
                                        OR

VIII.   (a)   What are uplink and downlink frequencies? Why are they different?   (4)

      (b)   Explain one FM demodulator circuit. Why is 'de-emphasis' done in FM receiver?   (10)

      (c)   A sinusoidal carrier of 100 KHz is amplitude modulated with a modulating signal of 1 KHz having $V_{max} = 700\, mV$ and $V_{min} = 200\, mV$. Draw the modulated signal. Find the modulation index and bandwidth of modulated signal.   (6)

IX.   (a)   Draw and explain the functional block diagram of 8085 microprocessor.   (14)

      (b)   Explain the following.   (6)

          (i) ALU (ii) Flag Register (iii) Stock pointer.

OR

X.   (a)   Write a program to sort 10 numbers stored from memory location 2000_H and store the result from 3100_H (10)

      (b)   Explain the different interrupts used in 8085.   (10)

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