BT MRE-IV(S)-06-22-0771 Reg. No. | | | | | | | | |

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B.Tech. Degree IV Semester Supplementary Examination in Marine Engineering June 2022

MRE 1404 MARINE ELECTRONICS

(*2013 Scheme*)

Time: 3 Hours Maximum Marks: 100

(5 × 20 = 100)

I. (a) Draw neat diagram and explain the working of complementary symmetry class B push pull Amplifer? What is crossover distortion and how can it be eliminated? (10)

(b) Draw the circuit of Class A power amplifier and derive the expression for its power and overall efficiency. (10)

OR

II. (a) List any four characteristics of an ideal OPAMP. Explain the concept of OPAMP differential ampliifer along with circuit diagram and write the expression for differential voltage gain. (10)

(b) Explain opamp as noninverting amplifier along with circuit diagram, and derive the expression for voltage gain. (10)

III. (a) What is race around condition? How it is avoided? Explain the working of JK Flipflop along with its truth table. (10)

(b) Using Boolean algebra reduce the expression $f = A[B + C'(AB + AC')']$. (5)

(c) Draw the circuit diagram of any one type of ADC and explain its working and applications. (5)

OR

IV. (a) Design a MOD 10 Asynchronous counter using T flipflop along with its truth table. (10)

(b) Reduce following Boolean function using K MAP (5)

F(A, B, C, D) = Σm (0, 1, 3, 4, 5, 6, 7, 13, 15)

(c) What are weighted and nonweighted BCD codes? Compare the features of Gray code and Excess three (XS-3) code with any 2 respective code patterns of decimals. (5)

V. (a) Describe the working of TTL NAND gate along with circuit diagram. (10)

(b) Describe the working of CMOS NOR gate along with circuit diagram. (10)

OR

VI. (a) The gate current in a thyristorised half wave rectifier is adjusted to 1.25 mA and the forward breakdown voltage of SCR corresponding to this gate current is 110 V. The applied voltage is a sinusoidalvoltage of 220 V peak, the load resistance is 150 Ω and the holding current is zero. Determine (i) firing angle (ii) conduction angle (iii) average output voltage (iv) average current (v) power output. (10)

(b) Explain the working of single-phase full wave thyristor rectifier circuit with R load. Draw its circuit diagram, waveforms of output voltage, current and mark firing angle and conduction angle (10)

(P.T.O.)

VII. (a) Draw the block diagram of FM super heterodyne receiver and explain its working principle. (10)

(b) What is Modulation Index? With the help of Amplitude modulated waveform, explain and derive the expression for modulation index of an AM wave. (10)

OR

VIII. (a) With the help of waveforms explain the three analog pulse modulation techniques briefly and give its comparison and applications. (10)

(b) Explain the functional block diagram of Satellite communication and mention the application of Satellite communication to GMDSS. (10)

IX. (a) Draw architecture of 8085 microprocessor and explain the significance of each block. (10)

(b) Write an 8085-microprocessorassembly language program (along with algorithm and necessary comments) for BINARY DIVISION. The divisor is stored in memory location 4201H, dividend is stored in 4202H. The reminder and quotient should be stored in 4203H and 4204H respectively. (10)

OR

X. (a) Draw the pin diagram of 8085 microprocessor. Discuss the pin details and features of 8085 microprocessor. (10)

(b) Write an 8085-microprocessor assembly language program (along with algorithm and necessary comments) for finding out smallest among 10 numbers stored in memory location starting from 4200 H. (10)

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