

B.E./B.TECH. Degree Examination, December 2020

Fifth Semester

MR16505-MARINE ELECTRONICS

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. In weighted resistor DAC, how many resistor/s per bit is/are required?
 - a. One
 - b. Two
 - c. Three
 - d. Four
2. Three bits full adder contains _____
 - a. 3 combinational inputs
 - b. 4 combinational inputs
 - c. 6 combinational inputs
 - d. 8 combinational inputs
3. Which among the following is not the type of digital voltmeters?
 - a. Ramp type
 - b. Integrating type
 - c. Potentiometric type
 - d. None of these
4. Electro-optical effect is produced in _____
 - a. LED
 - b. LCD
 - c. OFC
 - d. OLED
5. Why integrators are preferred over differentiators in analog computers?
6. Implement the given function using NAND gates only. $F(X, Y, Z) = \sum m(0,6)$.
7. Calculate the value of the LSB, MSB and full-scale output for an 8 Bit DAC for the 0 to 12V range.
8. Draw the two-transistor equivalent circuit of SCR.

PART B - (4 X16 = 64 marks)

09. (a) Evaluate Inverting adder and Non-inverting adder with neat circuit diagram and derive its mathematical expressions. **(16)**

(OR)

- (b) Analyze and explain the operation of 555 timer as Monostable Multivibrator. Derive an expression for the frequency of oscillation with relevant waveforms. **(16)**

10. (a) (i) Label the Boolean function using K-map and draw the logic diagram **(10)**
 $F(w,x,y,z) = \sum m(0,1,2,4,5,6,8,9,12,13,14)$.

- (ii) Illustrate BCD to excess 3 code converter using minimum number of NAND gates. **(6)**

(OR)

- (b) (i) Analyze a 4-bit down counter using logic gates. **(8)**

- (ii) Interpret design of a 3-bit synchronous counter using JK flip-flop. **(8)**

11. (a) (i) Illustrate the working of successive approximation type analog to digital converter with a neat diagram. **(8)**

- (ii) With neat circuit diagram, explain the operation of R-2R digital to analog converter. **(8)**

(OR)

- (b) (i) Derive an expression for deflection D in CRO, which is the deflection of the electron beam. **(12)**

- (ii) Illustrate why is a triggering circuit provided in a CRO? **(4)**

12. (a) Derive the expressions for the rectification efficiency of (i) half wave rectifier (ii) full wave rectifier. **(16)**

(OR)

- (b) (i) Explain in detail about International Maritime Satellite. (INMARSAT). **(10)**

- (ii) Distinguish between Photo conductive and Photo voltaic modes of operation of Photodiodes. **(6)**