Motilal Nehru National Institute of Technology Allahabad
Department of Electronics & Communication Engineering
End-Semester (odd) Examination (November-2016)
Programme: B. Tech (CSE & IT), III-Semester
Subject: Analog and Digital Electronics (EC-1303)

Time: 3:00 Hours | Maximum Marks: 60

NOTE: Attempt all the questions and assume the necessary data if required.

Q1 Draw and explain an integrator and differentiator circuit using operational amplifier. (4)

Q2 For a given function F(a, b, c, d) = Σm(0, 2, 3, 5, 7, 8, 10, 11, 12, 13, 14, 15) find the followings: (6)

(a) Minimized expression

(b) Implement the minimized function using two input NAND gates

Q3 For the circuit shown in Figure 1, determine (6)

(a) d. c. output voltage

(b) rectification efficiency

(c) peak inverse voltage

(d) output frequency

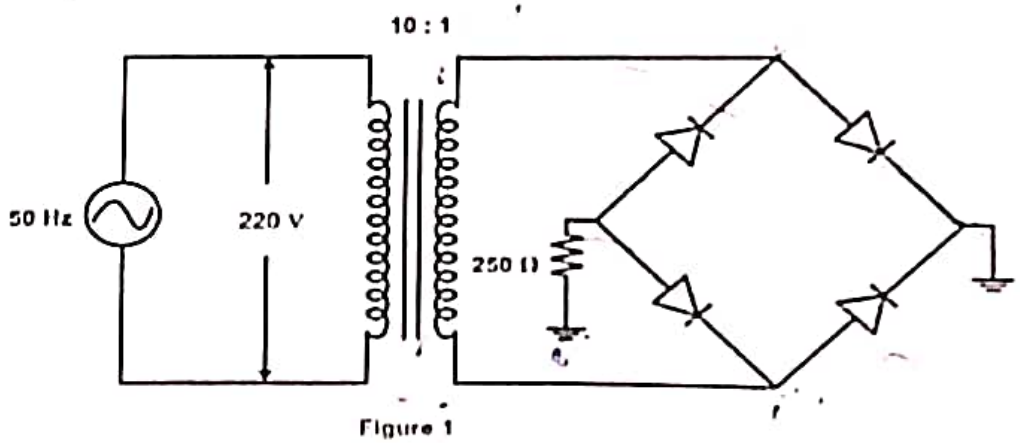


Figure 1

Q4 (a) Design 32X1 MUX using 2X1 MUX (8)

(b) Design a 3-input combinational circuit whose output is equal to 1 if the input variables have more 1's than 0's. The output is '0' otherwise.

Q5 (a) Implement 5-to-32 decoder using 2-to-4 and 3-to-8 decoders. (8)

(b) What is race around condition? And explain the operation of Master-Slave flip-flop.

(P.T.O)

Q6 With the help of neat diagram explain the operation, drain and transfer characteristics of n-channel JFET. (8)

Q7 Convert the following numbers from the given bases to the bases indicated: (8)

(a) Decimal 225.225 to binary, octal and hexadecimal.

(b) Binary 11010111.110 to decimal, octal and hexadecimal.

(c) Octal 623.77 to decimal, octal and binary.

(d) Hexadecimal 2AC5.D to decimal, octal and binary.

Q8 Answer the following questions: (12)

(a) State the definition of threshold voltage of a MOSFET.

(b) Define Ripple Factor and Peak Inverse Voltage.

(c) Define Reverse saturation current of a diode.

(d) State the mass–action law

(e) What is the relationship between $\alpha$, $\beta$ and $\gamma$.

(f) Difference between latch and flip–flop.

(g) Minimize the Boolean expression A'B(D' + C'D ) + B(A + A'CD)

(h) Show the variation of conductivity and resistivity with respect to temperature of an intrinsic semiconductor.

***END***