**Registration No :** | | | | | | | | | | |

**Total Number of Pages : 02** **M.Sc.**
**16MPYC205**

**2nd Semester Back Examination 2017-18**
**ELECTRONICS**
**BRANCH : M.Sc.(AP)**
**Time : 3 Hours**
**Max Marks : 70**
**Q.CODE : C1044**

**Answer Question No.1 which is compulsory and any five from the rest.**
**The figures in the right hand margin indicate marks.**
**Answer all parts of a question at a place.**

**Q1.** **Answer the following questions:** **(2 x 10)**

**a)** Convert $200_{10}$ to binary system.

**b)** Find the frequency of oscillations of a Wien's bridge oscillator with R=20KΩ and C=100pF.

**c)** Draw the block diagram of a typical operational amplifier.

**d)** Which gates are called universal building blocks.

**e)** Draw the logic gate diagram for the following equation
$\overline{(A+B)(A+C)(B+\bar{C})} = (\overline{A+B}) + (\overline{A+C}) + (\overline{B+C})$.

**f)** Draw the ideal voltage transfer curve for ideal differential amplifier.

**g)** What is Barkhausen criterion for oscillation.

**h)** Give an example of a truth table using AND gate and OR gate.

**i)** Define multiplexer.

**j)** A signal of r.m.s amplitude of 10volt is applied to the input terminals of a half-wave dipole. Calculate the radiated power if the input impedance of the dipole is $Z_{in} = 73 + j42$ .

**Q2.** **a)** With a suitable circuit diagram explain the operation of a RC phase shift oscillator. Find the expression for the frequency and condition of oscillation. **(7)**

**b)** In a crystal oscillator, the electrical equivalent of a crystal is given by L=0.5H, C=0.05 pF, R=2 kΩ and C'=10 pF. Find the series and parallel frequencies of the crystal. **(3)**

**Q3.** **a)** Give the truth table of a JK flip-flop. What are D flip-flop and T flip-flop? How can these flip-flops be constructed using JK flip-flop? **(7)**

**b)** What is a half-adder? Give its truth table using circuit diagram. **(3)**

**Q4.** **a)** Prove the following Boolean expressions. **(5)**

$$(A+C)(\bar{A}+B) = AB + \bar{A}C$$
$$(A+B)(A+C) = A + BC$$

**b)** Simplify the following four variable Boolean function given in sum of product rotation. **(5)**
$f(A,B,C,D) = \sum(1,2,3,6,8,9,13,14)$.

**Q5.** **a)** What is a multivibrator? With the help of a labeled circuit diagram describe the operation of an astable multivibrator. **(7)**

**b)** What is CMRR? **(3)**

**Q6.** **a)** Describe the function of an operational amplifier as (i) inverter, (ii) adder and (iii) integrator. **(6)**

**b)** Derive the expression for voltage gain of differential amplifier by taking a.c analysis. **(4)**

**Q7.** Give a brief idea about different types of antenna. **(10)**

**Q8.** **Write short answer on any TWO :** **(5 x 2)**

**a)** RS flip-flop

**b)** De Morgan's theorems

**c)** Wien's bridge oscillator

**d)** Optical fiber