B.Tech Sem – IV (2007 Course) (Electrical Engg.) : WINTER - 2018

SUBJECT: LINEAR AND DIGITAL INTEGRATED CIRCUITS

Day: Tuesday
Date: 13/11/2018

W-2018-2753

Time: 02.30 PM TO 05.30 PM
Max. Marks: 80

N.B.:

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY**. Out of remaining attempt **ANY TWO** questions from Section – I and Section – II.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should between in **SEPARATE** answer books.
4) Draw neat and labeled diagrams **WHEREVER** necessary.
5) Assume suitable data, if necessary.

SECTION - I

Q.1 **a)** Define slew rate. What is the typical value of slew rate of IC741? What is its effect on output? **(04)**

b) Draw circuit diagram of op-amp as peak detector and describe its operation. **(04)**

c) Describe operation of op-amp as square wave generator with neat circuit diagram and waveforms. **(05)**

Q.2 **a)** Draw diagram of Widlar current source and describe its operation. **(06)**

b) Define: **(07)**

i) Input bias current
ii) Input offset current
iii) Input offset voltage
iv) Thermal drift

And state how it can be minimized.

Q.3 **a)** Draw circuit diagram of instrumentation amplifier and describe its operation. **(06)**

b) Draw diagram of non inverting comparator and describe its operation with input and output waveforms. **(07)**

Q.4 **a)** Describe operation of op amp as sine wave generator with neat diagram. **(07)**

b) Draw pin diagram of IC 555 and state its applications. **(06)**

SECTION - II

Q.5 **a)** Convert the following: **(05)**

i) $(1E.53)_{16} = (\ )_8$

ii) $(170)_{10} = (\ )_{16}$

iii) $(01011.1011)_2 = (\ )_{10}$

b) What is tri state logic? Explain one application of such logic circuit. **(05)**

c) Explain the functional truth table of 8:3 Encoder. **(04)**

Q.6 **a)** With proper truth table explain the difference between BCD, 8421, Gray code. **(07)**

b) Using 2's complement method solve the following **(06)**

i) 5 + (-3) ii) 7-12

Q.7 **a)** Draw the voltage levels of input & output for typical TTL logic. **(07)**

b) Compare the TTL, CMOS & ECL logic families with respect to speed of operation, Noise margin and Figure of merit. **(06)**

Q.8 **a)** Implement the following function using 8:1 multiplexer. **(07)**

$F(a,b,c,d) = \sum m(3,7,8,9,11,15)$.

b) With neat block diagram explain 4 bit binary parallel adder. **(06)**

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