

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



IV SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKE-UP EXAMINATIONS, JUNE 2016

SUBJECT: ANALOG SYSTEM DESIGN [ELE 2204]

REVISED CREDIT SYSTEM

07 JULY 2016

MAX. MARKS: 50

Time: 3 Hours

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitable assumed.

1A.	In the circuit shown Fig. Q1A, a step signal is applied as an input. Evaluate the output voltage $V_o(t)$ by the end of 5 seconds. Derive the expression for $V_o(t)$. Assume R = 1M Ω , C = 1 μ F.	04
1B.	In the circuit shown in Fig. Q1B, determine the expression for output voltage Vo.	<i>03</i>
1C.	With a neat circuit diagram, derive the expression for gain and phase of an Op-amp based phase lag circuit.	03
2A.	Find Io and Vo in the circuit shown in Fig. Q2A.	<i>03</i>
2B.	Using the pole-zero concept, design a 4 th order Butterworth high pass filter with a cut-off frequency of 1kHz. Assume capacitor of 0.1μ F if required. Determine the overall gain of filter.	05
2C.	With a neat circuit diagram and waveform, discuss a half wave precision rectifier.	<i>02</i>
3A.	Design an Op-amp based circuit which converts an input triangular wave having frequency range 400 Hz to 4kHz into a square wave. Assume capacitor of 0.1μ F if required.	03
3B.	Design a 555 timer based circuit which produces the waveform as shown in Fig. Q3B. Assume capacitor of $0.1\mu F$ if required.	05
3C.	With a neat circuit diagram, discuss an Op-amp based peak detector.	<i>02</i>
4A.	Design a 555 timer based circuit which produces mono pulses with an adjustable time period of 0.2 ms to 1.3 ms. Assume a capacitance of 0.1 μ F if required.	03
4B.	With a neat circuit diagram, discuss the Op-amp based voltage controlled oscillator.	<i>03</i>
4C.	Design an Op-amp based circuit which produces the transfer characteristics as shown in Fig. Q4C. Assume feedback resistance of 10 k Ω . Draw the output voltage waveform w.r.t. time if an input of 8 sin ω t is applied.	04
5A.	Derive the expression for the input and output resistance of a trans-conductance amplifier with feedback	04
5B.	Draw the equivalent open loop small signal for amplifier circuits shown in Fig. 5B (i) and (ii). Also mention type of sampling, mixing and basic amplifier circuit.	06





Vout

2

3

4

5

0









10

11

8

fig Q3B

Fig. 5B (i)

Fig. 5B (ii)

Electrical & Electronics Engineering

ms

12