* A C - 1 4 2 8 *

AC-1428

M. Sc. (Electronics) (Sem. II) Examination

April / May - 2015

EL - 422 : Op. Amp & Integrated Circuit Designing

Time : 3 Hours] [Total Marks : 70

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ M. SC. (ELECTRONICS) (SEM. II)

Name of the Subject :

☛ EL - 422 : OP. AMP & INTEGRATED CIRCUIT DESIGNING

☛ Subject Code No. : 1 4 2 8 ☛ Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) This question paper includes **Five** main questions with three sub-question (a), (b) and (c) in each.

(3) Answer any **two** sub-questions form **each** main question.

(4) Assume data if require.

(5) Symbols used have their usual meaning.

1(a) With circuit diagram and mathematical formulas, describe operation of an Averaging Amplifier in inverting configuration. [7]

(b) Using floating load type Voltage – to – Current converter, design 0V – to – 10V Volt-Meter (Assume that the meter movement requires 2 mA Current for its full scale deflection) and explain its working. [7]

(c) What is the key difference between an instrumentation amplifier and an ordinary operational amplifier? Design an instrumentation amplifier with three Operational Amplifiers and explain its working. [7]

2(a) What is the difference between active and passive filters? Sketch the circuit diagram of a first order High-Pass filter and derive formula for its gain in terms of input frequency f, higher cut-off frequency f_H, and amplifier gain A_F. [7]

(b) Using an Operational Amplifier, design first order Band – Pass active filter with frequency band of 20 Hz to 20 kHz and pass band gain of 4. [7]

(c) With circuit diagram explain any one application of an active narrow band-pass filter. [7]

3(b)	Sketch circuit diagram of an Operational Amplifier based Phase shift oscillator and with necessary formula explain its working.	[7]
(b)	What is window detector? Design a window detector that gives positive output voltage only when its input is between 2 Volt and 5 Volts.	[7]
(c)	With circuit diagram and formula, explain any one application of a Zero-Crossing detector.	[7]
4(a)	With necessary circuit diagram and mathematical formula, explain any one application of PLL.	[7]
(b)	Sketch block diagram of Timer IC 555 and explain its application as an astable-multivibrator.	[7]
(c)	What is a "Three pin" voltage regulator? Design a DC to DC converter that converts −9.0 Volts to -6.0 Volts three pin regulator and explain its working.	[7]
5(a)	Why Power Amplifiers are required? Draw the circuit diagram of LM 380 based power amplifier and explain its working.	[7]
(b)	Using IC LM 317, design an adjustable positive voltage regulator to satisfy following specifications, Output Voltage = 3 to 9 Volt and Output current = 1 Amp. Also calculate the minimum input voltage required.	[7]
(c)	Sketch an internal functional block diagram and with formula and external circuit components, explain working of an IC 8038 function generator.	[7]