2016

M.Sc.

4th Semester Examination

ELECTRONICS

PAPER—ELC-405

(PRACTICAL)

Full Marks : 50

Time : 3 hours

The figures in the right-hand margin indicate full marks.

(Advanced Electronics Lab)

Answer any *one* question selecting it by a lucky draw.

1. Design a first order low pass active filter with cut off frequency 2 KHz in PSPICE. Stimulate the circuit and plot the gain *Vs.* frequency curve. Also verify the cut off frequency of the plot with its given value.

2. Design an inverting amplifier circuit using OP–AMP taking input resistor R_1 = 1KΩ, feedback resistor R_2 = 6·8 KΩ and load resistor R_3 = 10 KΩ. Apply sine wave as an input signal with suitable amplitude and frequency of your choice. Simulate the circuit using PSPICE and plot the input voltage V_{in} *vs.* time (t) and output voltage V_0 *vs.* time (t) in same graph. Also verify the gain of the amplifier with given value.

(Turn Over)

3. Design an astable multivibrator arcuit with frequency 1KHz and duty cycle 66·67% using IC 555. Simulate the circuit using PSPICE and plot the out put voltage *vs.* time curve. Also verify the output frequency and duty cycle of the plot with their given values.

4. Design an non-inverting amplifier circuit using OP–AMP taking input resistor R_1 = 1 KΩ, feedback resistor R_2 = 10 KΩ and load resistor R_3 = 10 KΩ. Apply sine wave as an input signal with suitable amplitude and frequency of your choice. Simulate the circuit using PSPICE and plot the input voltage (V_{in}) *vs.* time (t) and output voltage (V_0) *vs.* time (t) in same graph. Also verify the gain of the amplifier with given value.

5. Design a second order active low pass Butterworth filter with cut-off frequency 5 KHz. Simulate the circuit using PSPICE and plot the gain *vs.* frequency curve. Also verify the cut-off frequency with the given value.

6. Design a first order high pass active filter with cut-off frequency 1 KHz in PSPICE. Simulate the circuit and plot the gain *vs.* frequency curve. Also verify the cut-off frequency from the plot with its given value.

7. Design a astable multivibrator circuit with frequency 3 KHz and duty cycle 75% using IC – 555. Simulate the circuit using PSPICE and plot the output voltage *vs.* time

curve. Also verify the output frequency and duty cycle of the plot with their given values.

8. Design a second order active high pass Buttrworth filter with cut off frequency 2KHz. Sinulate the circuit using PSPICE and plot the gain Vs. frequency curve. Also verify the cut-off frequency with the given value.

9. Design a differentiator circuit using OP-AMP taking input resistor R_1 = 1 KΩ , input capacitor C_1 = 0·4 μF, feedback resistor R_2 = 8·2 KΩ. and load resistor R_3 = 10 KΩ. Simulate the circuit using PSPICE and plot the transitent response of the output voltage for a suitable input voltage.

10. Design an integrator circuit using OP-AMP taking input resistor R_1 = 1 KΩ feedback resistor R_2 = 8.2 KΩ, feedback capacitor C_2 = 0·1 μF and load resistor R_3 = 10 KΩ. Simulate the circuit using PSPICE and plot the transient response of the output voltage for a suitable input voltage.

11. Design a 3-bit synchronous MOD-5 counter using J-K flip-flop. Verify *vs* count seauence by LED display.

12. Design AND, OR and NOT gates using MOSFETs. Also verify their truth tables.

***Marks Distribution* (for PSPICE)**

For Question Nos. 1 to 10 :

		Marks
Theory	:	07
Circuit Design	:	10
Simulation	:	10
Verification & Accuracy	:	05
Discussion	:	03
Viva-Voce	:	10
Laboratory Note Book	:	05
Total	**:**	**50 Marks**

Marks distribution (for digital)

For Question Nos. 11 & 12 :

		Marks
Theory	:	05
Circuit Design	:	15
Implementation	:	07
Experimental Result	:	05
Discussion	:	03
Viva-Voce	:	10
Laboratory Note Book	:	05
Total	**:**	**50 Marks**