PG/IS/ELC-106/12(Pr.)

M.Sc. 1st Semester Examination, 2012

ELECTRONICS

(*Electronic Circuit Lab*)

(Practical)

PAPER—ELC-106

Full Marks : 50

Time : 3 hours

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

The figures in the right-hand margin indicate marks

1. Design a regulated power supply using 78xx group of IC regulator and study its performance.

Output Voltage = ··· V,
Output Current = ··· mA.

(*a*) Working formula. 4

(*b*) Drawing of circuit diagram with labelling. 3

(*c*) Circuit implementation on bread board. 3

(*d*) Recording of data for getting the characteristics of load and line regulations. 5 + 5

(*e*) Drawing of graphs. 4 + 4

(*f*) Calculation of percentage regulation and stability factor. 2 + 2

(*g*) Discussion of the results obtained. 3

2. Design a regulated power supply of variable output using LM 317

Output Voltage = 5V to 7·5 V
Output Current = 100 mA.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Circuit implementation on bread board. 3
(*d*) Recording of data for load and line regulations. 5 + 5
(*e*) Drawing of graphs. 4 + 4
(*f*) Calculation of percentage regulation and stability factor. 2 + 2
(*g*) Discuss of the results obtained. 3

3. Design a regulated power supply using a power transistor as a pass element and an OPAMP as comparator.

Output Voltage = ··· V, Output Current = ··· mA.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations and components to be used. 4
(*d*) Circuit implementation on bread board. 4
(*e*) Recording of data for load and line regulation characteristics. 4 + 4
(*f*) Drawing of graphs. 3 + 3
(*g*) Calculation of percentage regulation and stability factor. 2 + 2
(*h*) Discussion of the results obtained. 2

4. Design a regulated power supply using a power transistor as a pass element and another transistor as a comparator.

Output Voltage = ··· V, Output Current = ··· mA.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations and components to be used. 3
(*d*) Circuit implementation on bread board. 3
(*e*) Recording of data for load and line regulation characteristics. 4 + 4
(*f*) Drawing of graphs. 4 + 4
(*g*) Calculation of percentage regulation and stability factor. 2 + 2
(*h*) Discussion of the results obtained. 2

5. Study the performance of a logarithmic amplifier using OPAMP.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Implementation of the circuit on bread board. 3
(*d*) Recording of data by varying the input voltage at small steps. 10
(*e*) Drawing of graphs. 4 + 4
(*f*) Discuss the nature of graphs obtained and also the results. 3
(*g*) Comment on possible application of the circuit using the results obtained. 4

6. Study the performance of an antilogarithmic amplifier using OPAMP.

(*a*) Working formula. 4
(*b*) Drawing of circuit diagram with labelling. 3
(*c*) Circuit implementation on bread board. 3
(*d*) Recording of data by varying the input voltage at small steps. 10
(*e*) Drawing the graphs. 4 + 4
(*f*) Discussion about the nature of curves and the results obtained. 3
(*g*) Comment on possible application of the circuit. 4

7. Design an active low pass Butterworth filter with a roll off rate 20 dB/decade having cut off frequency 2 kHz and pass-band gain of 2. Study its performance.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations and components to be used. 4
(*d*) Implementation of the circuit on bread board. 3
(*e*) Recording of data for frequency response characteristics. 8
(*f*) Drawing of graphs. 4
(*g*) Finding and comparison of cut off frequency and Roll off rate with the supplied values. $(2+1\frac{1}{2})+(2+1\frac{1}{2})$
(*h*) Discussion of the results obtained. 2

8. Design an active high pass Butterworth filter at a cut off frequency of 3 kHz and pass band gain of 2 using only one R-C section and study its performance.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations and components to be used. 4
(*d*) Implementation of the circuit. 3
(*e*) Recording of data for frequency response characteristics. 8
(*f*) Drawing of graph. 4
(*g*) Finding and comparison of the cut-off frequency and Roll off rate with the given values. $(2+1\frac{1}{2})+(2+1\frac{1}{2})$
(*h*) Discussion of the results obtained. 2

9. Design a second order active low pass Butterworth filter and study its performance.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations for cut off frequency = ··· kHz. 5
(*d*) Implementation of the circuit on bread board. 3
(*e*) Recording of data for frequency response characterisics. 8
(*f*) Drawing of graph. 4
(*g*) Finding and comparison of the Cut off frequency and Roll off rate with the known values. $(2 + 1) + (2 + 1)$
(*h*) Discussion of the results obtained. 2

10. Design a second order active high pass Butterworth filter and study its performance.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations for cut off frequency = ··· kHz. 5
(*d*) Implementation of the circuit on bread board. 3
(*e*) Recording of data for frequency response characteristics. 8
(*f*) Drawing of graph. 4
(*g*) Finding and comparison of the Cut off frequency and the Roll off rate with the known values. (2 + 1) + (2 + 1)
(*h*) Discussion of the results obtained. 2

11. Design a R-C coupled amplifier using transistors and study its performance.

(*a*) Working formula. 4
(*b*) Circuit diagram with labelling. 3
(*c*) Design considerations for gain = ··· 5
(*d*) Implementation of the circuit on bread board. 3
(*e*) Recording of data for frequency response characteristics. 10
(*f*) Drawing of graph. 4
(*g*) Calculation of band width. 3
(*h*) Discussion of the results obtained. 3

Distribution of Marks

Laboratory Note Book	: 5
Viva Voce	: 10
Experiment	: 35
	50