Total Pages—25

PG/IS/ELC-106/13(Pr.)

M.Sc. 1st Semester Examination, 2013

ELECTRONICS

(*Electronics 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 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 breadboard. 3

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

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

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

   (*g*) Discuss the results obtained. 3

2. Design regulated power supply using power transistor as pass element and an OP-AMP as comparator.

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

(*a*) Working formula. 4

(*b*) Circuit diagram and labelling. 3

(*c*) Design considerations and components to be used. 4

(*d*) Circuit implementation on breadboard. 4

(*e*) Recording of data for load and line regulations. 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

3. Study the performance of a logarithmic amplifier using OP-AMP.

(*a*) Working formula. 4

(*b*) Circuit diagram with labelling. 3

(*c*) Design considerations and components to be used. 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 the graphic obtained and also the results. 3

(*g*) Comment on possible application of the circuit using the results obtained. 4

4. 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 breadboard. 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 supplied value. $\left(2+1\frac{1}{2}\right)\left(2+1\frac{1}{2}\right)$

(*h*) Discussion of the results obtained. 2

5. Design an active high-pass Butterworth filter with 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. $\left(2+1\frac{1}{2}\right)+\left(2+1\frac{1}{2}\right)$

(*h*) Discussion of the results obtained. 2

6. Design of 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 bandwidth. 3

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

7. 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 consideration for cut off frequency = ··· kHz and gain = 2. 5

(*d*) Implementation of the circuit on breadboard. 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*) Discussions 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. $\left(2+1\frac{1}{2}\right)+\left(2+1\frac{1}{2}\right)$

(*h*) Discussion of the results obtained. 2

9. Study the performance of an antilogarithmic amplifier using OP-AMP.

(*a*) Working principle. 4

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

(*c*) Circuit implementation on breadboard. 3

(*d*) Recording of data by varying the input voltage at small steps. 10

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

(*f*) Discussions about the nature of the curves and the results obtained. 3

(*g*) Comment on possible application of the circuit. 4