2014

M.Sc.

1st Semester Examination

ELECTRONICS

PAPER—ELC-106

(PRACTICAL)

Full Marks : 50

Time : 3 Hours

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

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

(*Electronic Circuit Lab*)

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

1. Design a regulated power supply using a 78XX series of IC regulator and study its performance :

    Output Voltage :   V

    Output Current :   .... mA

    (a) Working formula   4

    (b) Draw of circuit diagram with labelling   3

    (c) Circuit implementation on broadboard   3

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

(Turn Over)

(e) Drawing of graphs   4+4

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

(g) Discuss the results obtained   3

2. Design a small stage active low pass Butter-worth filter and study its performance :

      Cut of Frequency : .... kHz
      Gain   :

(a) Working formula   4

(b) Circuit diagram with labelling   3

(c) Design consideration for cut-off frequency
     = ... kHz

(d) Implementation of the circuit on the bread board 3

(e) Recording of data for frequency response characteristics   8

(f) Drawing of graph   5

(g) Finding and compression of the cut-off frequency and roll-off rate with the known value   3+2+3+2

(h) Discussion of the result obtained   2

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

      Output Voltage : .... 6V to 10V
      Output Current : .... 250 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

(f) Drawing of graphs   4+4

(g) Calculation of percentage of regulation and stability factor   2+2

(h) Discussuion of the results obtained   3

4. Study the performance of an antilogarithmic amplifier using OPAMP :

(a) Working Principle   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 of graphs   4+4

(f) Discussuion of the results obtained   3

(g) Comment on possible application on the circuit 4

5. Design of R–C coupled amplifier using transistors and study its performance :

(a) Working formula   4

(b) Circuit diagram with labelling   3

(c) Design consideration for gain ...   5

(d) Recording of data for frequency response characteristics   10

(e) Drawing of graphs   4

(f) Calculation of bandwidth   3

(g) Implementation of the circuit of bread board   3

(h) Discussion of the results obtained   3

6. Design a 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 with labelling   3

(c) Design considerations   4

(d) Circuit implementation on bread board   4

(e) Recording of data for load and line regulations   4+4

(f) Drawing of graphs   3+3

(g) Calculation of percentage of regulation and stability factor   2+2

(h) Discussions of the results obtained   2

7. Design a second order active high pass Butter-worth 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 = ...   5

(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 compression of the cut-off frequency and roll-off rate with known values   (2+1)+(2+1)

(h) Discussions of the results obtained   2

8. Design an active high pass Butter-worth filter with cut-off frequency = ... kHz and pass band gain = ... using one R–C section and study its performance :

(a) Working formula 4

(b) Circuit diagram with labelling 3

(c) Design consideration 4

(d) Implementation of the circuit 3

(e) Recording of data for frequency response characteristics 8

(f) Drawing of graphs 4

(g) Finding and compression of the cut-off frequency and roll-off rate with known values $(2+1\frac{1}{2})+(2+1\frac{1}{2})$

(h) Discussions of the results obtained 2

9. 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 10

(e) Drawing of graphs 4+4

(f) Discuss the nature of the graph obtained and also the results 3

(h) Comment on possible application of the circuit using the results obtained 4

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

(a) Working formula   4

(b) Circuit diagram with labelling   3

(c) Design considerations   2

(d) Implementation of the circuit on bread board   3

(e) Recording of data for frequency response
    characteristics   8

(f) Drawing of graphs   3

(g) Finding and compression of cut-off frequency and
    roll-off rate with supplied value $(2+1\frac{1}{2})+(2+1\frac{1}{2})$

(h) Discussion of the results obtained   2

Distribution of Marks

Experiment	:	35 Marks
Viva-Voce	:	10 Marks
Laboratory Note Book	:	05 Marks
Total	:	50 Marks