PG/IS/ETC-106/10(Pr.)

M.Sc 1st Semester Examination, 2010

ELECTRONICS

(Electronic Circuit Laboratory)

PAPER—ELC-106

(Practical)

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 of variable output using LM 317.

(*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 regulation characteristics (one set each). 5 + 5

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

(*f*) Calculation of percentage regulation and stability factor for I_L = ····· mA and V_{il} = ····· V respectively. 2 + 2

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

2. Design a regulated power supply using 78 XX group (regulator) and study its performance.

(*a*) Working formula. 4

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

(*c*) Implementation of the circuit on a bread board. 3

(*d*) Recording of data for load and line regulation characteristics (one set each). 5 + 5

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

(*f*) Calculation of percentage regulation and stability factor for $I_L = \cdots\cdots$ mA and $V_{i1} = \cdots\cdots$ V respectively. 2 + 2

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

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

Output current = ... mA, output voltage = ...V.

(*a*) Working formula. 4

(*b*) Circuit diagram with labelling. 3

(*c*) Design considerations. 4

(*d*) Circuit implementation on a bread board. 4

(*e*) Recording of data for load and line regulation characteristics.(one set each) 4 + 4

(*f*) Drawing of graphs. 3 + 3

(*g*) Calculation of percentage regulation and stability factor at I_L = ...mA, and V_{il} = ...V respectively. 2 + 2

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

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

(*a*) Working formula. 4

(*b*) Circuit diagram with labelling. 3

(*c*) Design considerations. 4

(*d*) Circuit implementation on a bread board. 4

(*e*) Recording of data for load and line regulation characteristics. (one set each). 4 + 4

(*f*) Drawing of graphs. 3 + 3

(*g*) Calculation of percentage regulation and stability factor at I_L = ·····mA and V_{il} = ·····V respectively. 2 + 2

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

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

(*a*) Working formula. 4

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

(*c*) Implementation of the circuit on a bread board. 3

(*d*) Recording of data by varying the input voltage from 0 to 3 V at steps of 0·1 V. 10

(*e*) Drawing of characteristic curves . 4 + 4

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

(*g*) Writing of possible applications 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*) Implementation of the circuit on a bread board. 3

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

(*e*) Drawing of characteristic curves. 4 + 4

(*f*) Discussion about the curves and the results obtained. 3

(*g*) Discussion of possible applications of the circuit using the results obtained. 4

7. Design a first order low-pass active Butterworth filter and study its performance.

(*a*) Working formula. 4

(*b*) Circuit diagram with labelling. 3

(*c*) Design considerations for cut-off frequency = ·····Hz and gain = ····· . 5

(*d*) Implementation of the circuit on a bread board. 3

(*e*) Recording of data for frequency response characteristics. 8

(*f*) Drawing of graph. 4

(*g*) Finding the cut-off-frequency and comparison of it with the supplied value. 2 + 2

(*h*) Finding the Roll-off-rate for the filter. 2

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

8. Design a first 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 = ·····Hz and gain = ····· . 5

(*d*) Implementation of the circuit on a bread board. 3

(*e*) Recording of data for frequency response characteristics. 8

(*f*) Drawing of graph. 4

(*g*) Finding the cut-off-frequency and comparison of it with the supplied value. 2 + 2

(*h*) Finding the Roll-off-rate for the filter. 2

(*i*) 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 = ·····Hz and gain = ····· . 5

(*d*) Implementation of the circuit on a bread board. 3

(*e*) Recording of data for frequency response characteristics and drawing graph. 8 + 4

(*f*) Finding the cut-off-frequency and comparison of it with the supplied value. 2 + 2

(*g*) Finding the Roll-off-rate for the filter. 2

(*h*) Discussion of the result 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 = ·····Hz and gain = ····· . 5

(*d*) Implementation of the circuit on a bread board. 3

(*e*) Recording of data for frequency response characteristics and drawing graph. 8 + 4

(*f*) Finding the cut-off-frequency and comparison of it with the supplied value. 2 + 2

(*g*) Finding the Roll-off-rate for the filter. 2

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

Distribution of Marks

Experiment	– 35
Viva voce	– 10
L.N.B	– 05
Total	– 50