PG/IS/ELC-104/12

M.Sc. 1st Semester Examination, 2012

ELECTRONICS

(*Analog Electronics*)

(Theory)

PAPER – ELC- 104

Full Marks : 50

Time : 2 hours

Answer **Q.No.1** and any **three** from the rest

The figures in the right hand margin indicate marks

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

Illustrate the answers wherever necessary

1. Answer the following : 2 × 5

(*a*) With the help of frequency response curve of a first order low pass filter explain its 'roll off rate'.

(*b*) "A class-C amplifier could be used as a power amplifier"– Justify the statement.

(*c*) What do you mean by linear interlaced scanning related to Television ?

(*d*) What are voltage and current regulators ?

(*e*) Using log and antilog amplifiers how analog division could be obtained ?

2. (*a*) Deduce expression for output voltage of a differential amplifier using three OP AMPs.

(*b*) Draw a suitable circuit diagram and discuss how a second order differential equation could be solved with its help. Indicate the outputs at every stage.

(*c*) Draw and label the circuit diagram of an instrumentation amplifier. Explain its operation and advantages. 3 + 3 + 4

3. (*a*) Draw the circuit diagram of an active low pass second order Butter worth filter and explain its operation. Derive the expression of the transfer function.

(*b*) Design an active first order high pass Butter worth filter at cut off frequency 3 kHz and pass band gain 2. (2 + 2 + 3) + 3

4. (*a*) Give the circuit diagram and describe the operation of a triangular wave generator. Derive the expression for frequency of output signal.

   (*b*) Describe, with schematic diagram, the operation of a vidicon TV camera. Explain its advantage over the Image Orthicon type Camera.

   5 +(3 + 2)

5. (*a*) What do you mean by frequency shift Keying ?

   (*b*) Discuss how a PLL circuit can be used as a frequency multiplier.

   (*c*) Indicate how phase detection could be achieved in PLL using XOR phase detector.

   (*d*) Write down the fundamental differences among class A, class B and class C amplifiers.

   1 + 4 + 3 + 2

6. (*a*) What are the advantages of SMPS over an ordinary power supply ?

   (*b*) Describe how you can generate a variable power supply using ICLM-317. Explain the operation of the circuit used.

(*c*) Explain with suitable circuit diagram, the principle of operation of a 566VCO. 3 + 3 + 4

[*Internal Assessment* – 10 Marks]