M.Sc 1st Semester Examination, 2009

ELECTRONICS

(*Analog Electronics*)

PAPER—EL-1104

Full Marks : 50

Time : 2 hours

Answer **Q. No. 1** and any **three** questions
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 *all* questions :   2 × 5

   (*a*) Explain how a R-S flip-flop can be used as a
   phase comparator.

    (b) How a black and white TV receiver can reproduce a monochrome telecast on its screen ?

    (c) Explain the function of a Bridge amplifier as a transducer.

    (d) What is the slew rate of an OP-AMP ? Write down its ideal value.

    (e) Draw the circuit diagram of an Instrumentation amplifier.

2.   (a) Draw the block diagram of a phase locked loop and explain its principle of operation.

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

    (c) What is state variable filter ? $4 + 4 + 2$

3.   (a) How is synchronization between scanning at the TV transmitter and receiver is obtained ?

                (*Continued*)

(b) Define the terms frame and field.

(c) Draw the schematic diagrams of a colour camera and a shadow-mask colour tube and explain their operation. $3 + 2 + 5$

4. (a) Discuss with suitable diagram how a differential equation can be solved using OP-AMP circuits.

   (b) Explain the operation of a square wave-generator using proper circuit diagram and derive the expression of its output frequency. $5 + 5$

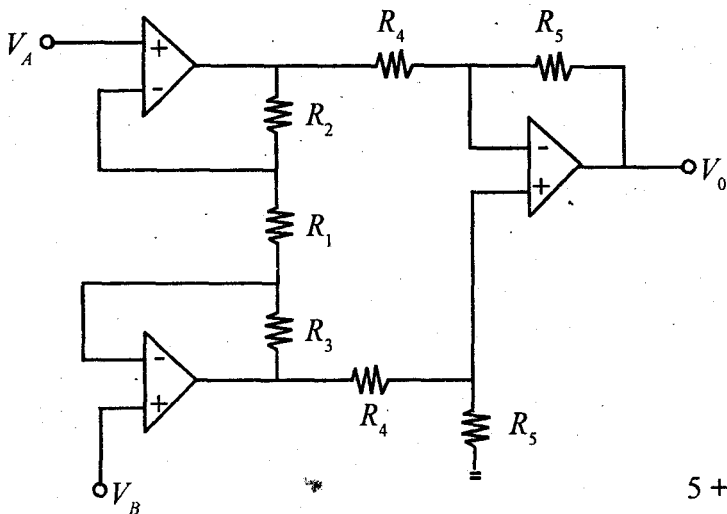5. (a) Write down the differences between series and shunt regulation of voltage.

   (b) Draw the circuit diagram of a voltage regulator using OP-AMP as a comparator and explain its operation. Derive also its output voltage.

   (c) What do you mean by monolithic voltage regulators? $2 + (4 + 2) + 2$

6. (a) Draw the circuit diagram of a triangular wave generator and explain its operation.

(b) For the circuit of the following show that

$$V_0 = (V_B - V_A) \left(1 + 2 \cdot \frac{R_2}{R_1}\right)$$

5 + 5

[*Internal Assessment* : 10 Marks]