2 0 1 7

ELECTRONICS

(General)

(Linear Active Circuits and Digital Systems)

Full Marks : 40

Time : 2 hours

*The figures in the margin indicate full marks
for the questions*

1. Fill in the blanks :   1×4=4

   (a) The amplifier which operates with least
        distortion is _____ (class A/class B).

   (b) The junction field-effect transistor
        (JFET) can operate in _____ (depletion/
        enhancement) mode only.

   (c) The output impedance of an ideal
        OPAMP is _____ (infinite/zero).

   (d) The ASCII code is basically a _____ (5/7)
        -bit code.

2. Answer the following questions :   2×3=6

   (a) Define the terms—*(i)* CMRR (common-
        mode rejection ratio) and *(ii)* slew rate of
        an OPAMP.   1+1=2

(Turn Over)

(b) What do you mean by an active filter? Mention its different types. 1+1=2

(c) Convert the following : 1+1=2

(i) $(25)_{10}$ to binary

(ii) $(1111101)_2$ to decimal

3. Answer the following questions : 5×2=10

(a) Give the general theory of feedback. What do you mean by positive and negative feedbacks? Mention some advantages of negative feedback. 2+1+2=5

Or

What is an oscillator? What are its different types? Describe briefly the working principle of any one of the oscillator types. 1+1+3=5

(b) Minimize the Boolean function

$$f(A, B, C, D) = AB\overline{C}\overline{D} + AB\overline{C}D + ABCD + ABC\overline{D}$$

5

Or

Why is NAND gate called a universal gate? Realize the logic functions NOT, OR and AND using only NAND gates. 1+4=5

4. Answer the following questions : 5×2=10

(a) Explain briefly the working principle of UJT (unijunction transistor). 5

Or

Mention some characteristics of an ideal OPAMP. Derive the expression for voltage gain of an OPAMP in its inverting mode of operation. 2+3=5

(b) Design clocked R-S flip-flop and explain briefly its operation. 5

Or

Explain briefly different types of semiconductor memory. 5

5. Write short notes on (any *two*) : 5×2=10

(a) Power amplifier

(b) Schmitt trigger

(c) Half-adder and full-adder

(d) Multiplexer

★ ★ ★