[60-A]

SARDAR PATEL UNIVERSITY

M.Sc. (Electronics and Communication) (Sem – I) Examination
Day & Date : Monday, 3/12/2012
Time : 10:30 am to 1:30 pm
Paper : Analog Interface Electronics
Subject : PS01CELC02

Note :

(a) *Figure to the right indicates full marks.*

(b) *All questions are compulsory.*

Total Marks : 70

Q-1   Choose the correct answers   (08)

1   Current flow in a semiconductor depends on the phenomenon of_____
   a) Drift   b) Diffusion   c) Recombination   d) All of above

2   Which of the following are the effects increasing reverse bias voltage across a *PN* junction
   a) increase in carrier generation current.
   b) increase in carrier recombination in the depletion region.
   c) decrease in junction capacitance of the diode.
   d) All of above

3   The main advantage of a JFET over a BJT is due to its_____
   a) low i/p impedance   b) high i/p impedance   c) large bandwidth   d) low power gain

4   When both inputs are zero, the output voltage is called_____
   a) input offset voltage   b) output offset voltage   c) zero offset voltage   d) input bias current

5   One of the application of the current mirror is_____
   a) output current   b) current feedback   c) obtaining very high   d) temperature
       limiting   current gain   stabilized biasing

6   Virtual ground in an OP-AMP is due to_____
   a) high gain   b) high i/p impedance   c) Both (a) & (b)   d) None of above

7   In the feedback capacitor in an inverting mode of OP-AMP is replaced by a resistor, the circuit will work as
   a) Integrator   b) Differentiator   c) Inverting summer   d) Schmitt trigger

8   Mark the correct statement/statements
   a) the temperature coefficient of an intrinsic semiconductor is negative
   b) for N-type semiconductor doping material is pentavalent
   c) an N-type semiconductor as a whole electrically neutral
   d) when an extrinsic semiconductor is doped with P-type impurity, each impurity atom will acquire
       negative charge

Q-2   Attempt Any Seven out of the followings   (14)

1,   Discuss the energy band diagram of Insulator, Conductor and Semiconductor.

2.   Define : Zener effect

3.   Show that Inverting amplifier is 180^0 out of phase with respect to input voltage.

4.   Calculate the forbidden gap (E_g) for Silicon at absolute temperature 55^0 and 65^0.

5.   Why current mirror circuit is required?

6.   Point out all the benefits of active filter over passive filter.

7. Explain the zero crossing detector with circuit diagram.
8. Differentiate between diffusion current & drift current.
9. Why do we use window comparator?

Q-3 (a) Using the necessary concepts, derive the equation for hall coefficient obtained from Hall (06) effect.
(b) With appropriate circuit diagrams, explain the enhancement mode & depletion enhancement (06) mode MOSFET.

OR

(b) Note down the difference between Schmitt trigger and Square wave generator. Explain (06) Schmitt trigger in detail.

Q-4 (a) Explain the AC analysis of the Differential amplifier. (06)
(b) Explain the First order Low pass filter with necessary circuit diagram. (06)

OR

(b) With appropriate circuit diagrams, explain the enhancement mode & depletion enhancement (06) mode MOSFET.

Q-5 (a) Note down the AC & DC parameter of OP-AMP, explain it. (06)
(b) Compare and contrast between Intrinsic & Extrinsic Semiconductor? Explain the p-type (06) semiconductor which behaves as a acceptor ion with crystal structure.

OR

(b) Draw the circuit diagram of Instrumentation amplifier and describe its working in detail. (06)

Q-6 (a) Explain the Second order High pass filter with necessary circuit diagram. (06)
(b) Draw the circuit diagram of integrator. Describe the process of integration carried out in (06) circuit.

OR

(b) Write a note on following : (06)
    a. Varactor diode
    b. Zener diode

---- Best of luck ----