[A-79]

SARDAR PATEL UNIVERSITY

T.Y.B.Sc. (Electronics & Communication) (Sem. - VI) Examination
Day & Date: Friday, 01/04/2016
Time: 02:30 p.m. To 05:30 p.m.
Subject Code: US06CELC03
Subject: Operational Amplifier & its Applications

Instructions:

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

(b) *All questions are compulsory.*   **Total Marks: 70**

Q-1   **Choose the correct answer.**   **(10)**

1. The average of the two input bias current is called as _____.
   - (a) I/P offset current
   - (b) I/P offset voltage
   - (c) I/P bias current
   - (d) O/P offset current

2. Slew rate is defined as_____.
   - (a) $\frac{dv}{dt}|max$
   - (b) $\frac{dv}{dt}|min$
   - (c) $\frac{di}{dt}|min$
   - (d) $\frac{di}{dt}|max$

3. _____ amplifier is a circuit whose output is amplified version of difference between two input voltages.
   - (a) Difference
   - (b) Inverting
   - (c) Non-inverting
   - (d) Summing

4. The voltage gain (AV_0) for first order Butterworth low pass filter is_____.
   - (a) 1.56
   - (b) 0.707
   - (c) 0.56
   - (d) 0.30

5. Among these which is the slowest type of the ADC?
   - (a) Dual Slope type
   - (b) Counter type
   - (c) Flash type
   - (d) Tracking type

6. _____ is a device that converts change in physical quantity in to corresponding electrical quantity.
   - (a) Transducer
   - (b) Capacitor
   - (c) Resistor
   - (d) All of these

7. In Inverting amplifier the input is given to inverting terminal so that the output is _____ with respect to input.
   - (a) 90^0 out of phase
   - (b) 180^0 out of phase
   - (c) 270^0 out of phase
   - (d) same

8. The first order low pass filter circuit uses a RC network for filtering is used _____ Configuration.
   - (a) Inverting
   - (b) Non Inverting
   - (c) Both (a) & (b)
   - (d) None of above

9. The most popular D/A Converter_____.
   - (a) Successive approximation
   - (b) Weighted resistor
   - (c) Switched capacitor
   - (d) R – 2R ladder

10. The Least expensive A/D Converter is_____.
    - (a) Flash type
    - (b) Counter type
    - (c) Dual Slope type
    - (d) Tracking type

Q-2   **Answer the following questions. (Any Ten)** (20)

1. Define the following terms :
   (i) Slew rate   (ii) Power supply rejection ratio
2. Draw the pin out diagram of IC741.
3. Calculate the value of resistor for first order Low Pass Filter having cut off frequency
   1.5 KHz and C = 0.1μF.
4. Define the following terms :
   (i) Thermal drift   (ii) Output voltage swing
5. What do you meant by Virtual ground in Op – Amp?
6. What is the function of ADC & DAC?
7. Is the output of DAC are true analogy? Give reason.
8. Define: Accuracy.
9. Draw the models of non linear devices.
10. Define Notch filter.
11. Write down the expression for Antilog amplifier.
12. What are the advantages of Active filter over Passive Filter?

Q-3   **(a)**   List out the requirement for designing Instrumentation amplifier. Discuss the Instrumentation   (10)
          amplifier and also derive the expression for overall gain in I.A.

                                              OR

Q-3   **(a)**   What do you mean by AC & DC parameters? Explain any one in detail.   (05)

          (b)   Explain Inverting Amplifier in detail.   (05)

Q-4   **(a)**   Draw the circuit diagram of integrator. Describe the process of integration carried out in circuit   (10)
          with appropriate waveforms.

                                              OR

Q-4   **(a)**   With necessary diagram and equation Antilog Amplifier in detail.   (05)

          (b)   Explain Non-linear Op-Amp in detail.   (05)

Q-5   **(a)**   What is Filter? Differentiate between Active and Passive filters. Draw the ideal filter   (10)
          characteristics of all filters.

                                              OR

Q-5   **(a)**   Designs the Second order High Pass Filter also derive the expression for cut off frequency.   (10)

Q-6   **(a)**   Explain R – 2R Ladder type D/A Converter and also calculate the output voltage for input 0100   (05)
          & 0001.
          (b)   Discuss resistor weighted type D/A converter.   (05)

                                              OR

Q-6   **(a)**   With necessary circuit diagram explain Tracking type ADC.   (05)

          (b)   Discuss Successive Approximation A/D Converter in detail.   (05)

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