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Total Number of Pages: 02

**B.Tech**  
**PEEI5302**

**6<sup>th</sup> Semester Regular / Back Examination 2016-17**

**ANALOG SIGNAL PROCESSING**

**BRANCH(S): AEIE, EIE, IEE**

**Time: 3 Hours**

**Max Marks: 70**

**Q.CODE: Z676**

**Answer Question No.1 which is compulsory and any five from the rest.  
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)**
- a) What is the need of frequency compensation in Op-amp?
  - b) Mention the advantages of active filter over passive filter.
  - c) An Op-amp has a slew rate of  $25\text{V}/\mu\text{sec}$ . How long will it take for the output to change from 0 V to 15V?
  - d) What is a precision diode?
  - e) What are the limitations of an ideal differentiator?
  - f) Draw an Op-amp circuit whose output will be  $V_1 - V_2 + V_3 - V_4$ .
  - g) Define PSRR w.r.t. Op-amp.
  - h) If the differential amplifier has an input  $v_1 = 1050 \mu\text{V}$  and  $V_2 = 950 \mu\text{V}$  with CMRR as 60dB. What is the error in the differential output?
  - i) Define Lock range and Capture range in PLL.
  - j) Draw the circuit of a unity follower using Op-amp? What is its importance in electronic circuits?
- Q2 a) Explain with block diagram and response curve how a band reject filter can be obtained using low pass, high pass filter and a summing circuit. (5)**
- b) Draw an inverting integrator using switched capacitor and Derive the expression for its time constant. (5)**
- Q3 a) The input current to a current to voltage converter using Op-amp varies from  $600\mu\text{A}$  to 1 mA. If the feedback resistor  $R_f = 10 \text{K}\Omega$ , determine the variation of output voltage. (5)**
- b) What are the different sources of noise in Op-amp? How they can be minimized? (5)**
- Q4 a) Explain with block diagram representation for multiplication of two analog signals  $V_x$  and  $V_y$  using logarithmic summing technique. (5)**
- b) What are switched capacitor filters? Explain with diagram. What are its advantages and disadvantages? (5)**

- Q5** a) Draw a precision half wave rectifier circuit using Op-amp and explain its operation. (5)
- b) The noise present at the input of a two port receiver stage is  $1\mu\text{W}$ . The noise figure (F) is 0.5dB. The receiver gain is  $10^{10}$ . Calculate the noise power contributed by the two port and the output available noise power. (5)
- Q6** a) Draw and explain the working of Isolation amplifier. Mention its applications. (5)
- b) Explain with its circuit diagram, how Op-amp can be used as a basic anti-logarithmic amplifier. (5)
- Q7** Discuss the characteristics of Instrumentation amplifier. Draw an Instrumentation amplifier system using a transducer bridge. Explain how this can be used as a Temperature Indicator. (10)
- Q8** Write short answer on any TWO: (5 x 2)
- a) Sample and Hold circuit
- b) Switched capacitor Filter
- c) Zero crossing detector
- d) Peak detector using Op-amp